

**STUDIES ON THE EFFECT OF ORGANIC AND INORGANIC  
FERTILIZER ON THE GROWTH OF AFRICAN EGGPLANT - *Solanum  
macrocarpon* LINN.**

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## CERTIFICATION

We certify that this research work was carried out by Anointed Iguehide **EKHATOR** (Miss) of the Department of Plant Biology and Biotechnology, Faculty of Life Sciences, University of Benin, Benin City, Edo State, Nigeria.

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**(Head of Department)**

## **DEDICATION**

I dedicate this project to God Almighty, my creator, my ever-present father and source of my strength. I also dedicate this project to my parents (Mr. and Mrs. Ekhaton). I sincerely appreciate them for their encouragement and support throughout the course of this project.

## **ACKNOWLEDGEMENT**

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## ABSTRACT

The effects of organic and inorganic fertilizers on the growth and yield of *Solanum macrocarpon* (African eggplant) was investigated. Declining soil fertility remains a major challenge to agricultural productivity, necessitating the exploration of effective fertilization strategies. This research aimed to evaluate and compare the growth performance of *Solanum macrocarpon* under different fertilizer treatments, including poultry dung (organic manure), NPK (inorganic fertilizer), and a combination of both. A randomized complete block design (RCBD) was employed, with plants subjected to varying concentrations of the fertilizers. Growth parameters such as seed germination, chlorophyll content index, leaf number, leaf area and stem girth were monitored over the study period. Data were analyzed using IBM SPSS 20. Duncan Multiple Range (DMR) was used for Analyses of variance (ANOVA) to separate the means and report statistical significance among treatments. The findings revealed that plants treated with inorganic fertilizer (NPK) exhibited the highest initial growth rate and yield, attributed to the rapid availability of essential nutrients. However, poultry dung-treated plants demonstrated sustained growth over time due to improved soil structure and microbial activity. The combination of poultry dung and NPK resulted in optimal growth performance, indicating a complementary effect of organic and inorganic fertilizers. The Control group, with no fertilizer application, showed the least growth and productivity. The study concluded that while inorganic fertilizers offer immediate growth enhancement, organic fertilizers contribute to long-term soil fertility and sustainable agriculture. The integrated application of both fertilizers is recommended to maximize crop productivity while maintaining soil health. These findings provide valuable insights for farmers and policy makers on efficient fertilizer management strategies for *Solanum macrocarpon* cultivation

# CHAPTER ONE

## 1.0

## INTRODUCTION

Agriculture plays a pivotal role in ensuring global food security, providing livelihoods, and supporting economic growth, particularly in developing nations. According to the Food and Agriculture Organization (FAO), the agricultural sector is essential for poverty reduction, economic development, and environmental sustainability. Among the many crops cultivated globally, *Solanum macrocarpon* (commonly known as African eggplant) is a vegetable of significant nutritional, economic, and cultural importance. It is an indigenous crop widely grown in Africa and Asia, valued not only for its edible fruits but also for its tender, nutritious leaves. The fruits, often consumed in stews or as side dishes, are rich in vitamins A, C, calcium, and potassium, making them an essential part of local diets, particularly in regions facing micronutrient deficiencies (Akanbi *et al.*, 2007).

Despite its importance, *Solanum macrocarpon* faces numerous production challenges, especially in the context of soil fertility decline. Soil degradation, caused by factors such as erosion, nutrient depletion, and poor land management practices, directly impacts crop productivity. *S. macrocarpon*, like other vegetables, is highly sensitive to soil nutrient status, and its productivity is often limited by insufficient soil fertility. Fertilizers, both organic and inorganic, are frequently used as a means to address soil nutrient deficiencies and boost crop growth and yield. However, the decision between using organic and inorganic fertilizers remains a subject of debate among farmers and agricultural experts. Organic fertilizers, derived from natural sources such as manure, compost, and green manures, contribute to soil health by improving its structure, enhancing microbial activity, and increasing its organic matter content (Agegnehu *et al.*, 2016).

In contrast, inorganic fertilizers, which are synthetically manufactured, supply nutrients in a highly soluble and readily available form, offering immediate benefits to crops but often with long term environmental consequences (Ju *et al.*, 2009).

Fertilizer application is crucial to restoring soil fertility and enhancing agricultural productivity, but its impact depends on various factors, including the type of fertilizer used, soil conditions, and crop characteristics. Organic fertilizers tend to improve long term soil fertility and structure, while inorganic fertilizers are often more effective in providing immediate nutrient availability, particularly for crops that have high nutrient demands (Roy *et al.*, 2006). However, the sustainability of using inorganic fertilizers has raised concerns due to issues such as nutrient runoff, groundwater contamination, and soil acidification (Ju *et al.*, 2009). Consequently, there is growing interest in understanding how different types of fertilizers influence the growth, yield, and environmental sustainability of crops like *S. macrocarpon*.

The use of fertilizers in agriculture, while crucial for boosting crop yields, can also have significant environmental and economic impacts. The overuse of chemical fertilizers, for example, can lead to soil acidification, nutrient imbalances, and contamination of water bodies through leaching or runoff. This has prompted many researchers and practitioners to explore sustainable alternatives and practices, such as integrated nutrient management (INM), which combines the use of organic and inorganic fertilizers to balance nutrient supply and improve soil health over the long term (Giller *et al.*, 2009). This approach seeks to optimize fertilizer use, minimizing negative environmental impacts while maximizing crop productivity.

The use of organic fertilizers has been shown to improve soil structure by increasing organic matter, which, in turn, enhances water retention, aeration, and microbial activity (Agegnehu *et*

*al.*, 2016). Organic fertilizers also tend to release nutrients more slowly, providing a steady supply of nutrients for crops over time. Inorganic fertilizers, on the other hand, are designed to deliver specific nutrients in concentrated forms, which can quickly address nutrient deficiencies in the soil. While inorganic fertilizers offer immediate results, their long term application without proper management can lead to nutrient imbalances and soil degradation (Ju *et al.*, 2009).

Therefore, understanding the comparative effectiveness of organic and inorganic fertilizers in improving the productivity of crops like *Solanum macrocarpon* is crucial for developing sustainable farming practices. This study aims to examine the effects of these two types of fertilizers on the growth and yield of *S. macrocarpon*, providing insights into their relative benefits and potential environmental consequences.

*Solanum macrocarpon* thrives in tropical climates but requires nutrient rich soils to perform well. In many regions where this crop is grown, soils are naturally low in essential nutrients such as nitrogen, phosphorus, and potassium. These nutrients are vital for plant growth and reproduction, and deficiencies can lead to stunted growth, poor fruiting, and reduced yield. In addition to nutrient deficiencies, many soils in sub-Saharan Africa and South Asia suffer from low organic matter content, poor water retention, and reduced microbial activity, all of which exacerbate the effects of nutrient depletion (Schippers, 2000).

Given these challenges, fertilizer application has become a key strategy for improving *S. macrocarpon* yield. Organic fertilizers, which are widely available and cost-effective in many rural farming systems, can improve the soil's organic content, enhancing its physical and chemical properties. In contrast, inorganic fertilizers, particularly those containing high levels of nitrogen and phosphorus, can stimulate rapid plant growth and significantly increase yields, although they must be used judiciously to avoid environmental degradation (Roy *et al.*, 2006).

## 1.1 Background of the Study

*Solanum macrocarpon*, a member of the Solanaceae family, is a widely consumed vegetable across Africa and Asia. It is highly valued for its edible leaves and fruits, which are rich in essential nutrients such as vitamins A, C, and calcium, making it an important food source in many regions, particularly in areas facing nutritional deficiencies (Akanbi *et al.*, 2007). However, the productivity of *S. macrocarpon* is constrained by poor soil fertility, which significantly impacts its growth and yield. Soil degradation, characterized by nutrient depletion and low organic matter content, is a common problem in the regions where *S. macrocarpon* is grown. This poor soil condition directly affects the crop's ability to absorb sufficient nutrients, resulting in stunted growth, poor fruit production, and reduced overall yield.

Fertilizer application is a critical agronomic practice that helps replenish soil nutrients and improve plant vigor. By supplying essential macro and micronutrients, fertilizers enhance soil fertility and promote healthy crop growth. Organic fertilizers, such as compost and manure, play a vital role in enriching the soil by increasing its organic matter content. These organic inputs improve the soil's physical properties, such as water retention and aeration, and stimulate microbial activity, which in turn aids nutrient cycling and enhances soil health over time (Agegnehu *et al.*, 2016). On the other hand, inorganic fertilizers, which are synthetically produced, provide nutrients in a highly soluble form, offering immediate availability of key elements like nitrogen (N), phosphorus (P), and potassium (K). These nutrients are essential for promoting rapid plant growth and are particularly useful in addressing specific nutrient deficiencies quickly.

## 1.2 Statement of the Problem

The productivity of *Solanum macrocarpon* is frequently limited by declining soil fertility, particularly in areas where continuous cropping and poor nutrient management are common. Soil fertility depletion, caused by nutrient exhaustion, poor agricultural practices, and insufficient organic matter, is a critical issue for farmers in regions where *S. macrocarpon* is cultivated (Bationo *et al.*, 2012). The inability of the soil to maintain sufficient levels of nutrients, such as nitrogen (N), phosphorus (P), and potassium (K), leads to reduced crop growth, poor fruit production, and ultimately lower yields (Teixeira *et al.*, 2017). These nutrient deficiencies are particularly problematic for crops like *S. macrocarpon*, which require consistent and balanced nutrient availability to achieve optimal growth and fruiting. In regions where the soil quality has declined due to overexploitation and poor land management practices, the application of fertilizers becomes necessary to restore nutrient levels and enhance crop productivity (Adhikari *et al.*, 2020).

Farmers often face a dilemma in choosing between organic and inorganic fertilizers. Organic fertilizers, such as compost, manure, and cover crops, improve soil fertility by increasing organic matter content, enhancing soil structure, and boosting microbial activity, which all contribute to long term improvements in soil health (Lehmann and Joseph, 2015). Organic fertilizers also provide a slow, steady release of nutrients, which can enhance soil water retention and prevent erosion, ultimately leading to more sustainable farming practices (Lal, 2015). However, the main limitation of organic fertilizers is their slow nutrient release, which may not meet the immediate nutrient needs of fast growing crops like *S. macrocarpon* (Zhao *et al.*, 2021). While organic fertilizers contribute to long term soil health, they may not be

sufficient to supply the required levels of nutrients during peak growth stages, leading to suboptimal growth and yields.

On the other hand, inorganic fertilizers, such as urea, ammonium nitrate, and triple superphosphate, provide nutrients in a more soluble and readily available form, allowing for rapid uptake by crops. These fertilizers are typically used to address immediate nutrient deficiencies and can significantly enhance plant growth and fruit yield in the short term (Marschner, 2012). However, the misuse or overuse of inorganic fertilizers can lead to several environmental concerns. Excessive application of chemical fertilizers can cause nutrient leaching, groundwater contamination, and soil acidification, which may degrade soil quality over time and contribute to environmental pollution (Zhang *et al.*, 2020). Additionally, the reliance on inorganic fertilizers often leads to an imbalance in soil nutrient levels, further reducing long term soil fertility (Schoenau and Huang, 2018). Therefore, while inorganic fertilizers can rapidly boost crop productivity, their overuse can result in negative environmental and economic consequences.

Addressing the challenges associated with fertilizer use requires a comprehensive understanding of how organic and inorganic fertilizers affect the growth, yield, and sustainability of *S. macrocarpon* cultivation. Despite the distinct advantages and disadvantages of both fertilizer types, a more nuanced approach may be required to balance short term productivity with long term soil health. Integrated nutrient management (INM), which combines the use of both organic and inorganic fertilizers, may offer a more sustainable solution by optimizing nutrient supply while minimizing the adverse effects of chemical fertilizers (Giller *et al.*, 2017). This study aims to investigate the comparative effects of organic and inorganic fertilizers on the growth and yield of *S. macrocarpon*, providing evidence that can guide farmers in making informed decisions based on the specific needs of

their soils and crops. Furthermore, the research will offer insights into how to improve fertilizer use efficiency and promote more sustainable agricultural practices in the cultivation of *S. macrocarpon*.



**Plate 1.1** *Solanum macrocarpon* L. collected from Uselu market, Benin City.

### **1.3 Taxonomical Classification**

Kingdom: Plantae

Phylum: Tracheophyta

Class: Angiosperm

Order: Solanales

Family: Solanaceae

Genus: Solanum

Species: Solanum macrocarpon L.

### **1.4 Literature Review**

*Solanum macrocarpon* is a tropical vegetable valued for its adaptability, resilience, and nutritional content. It thrives in warm climates and diverse soil types. Its fruits and leaves are consumed fresh

or cooked, providing essential nutrients that combat malnutrition in vulnerable populations (Akanbi *et al.*, 2007).

African eggplant is an important indigenous african leafy vegetable. It is a tropical perennial crop that originated in West Africa. The crop is also cultivated in Central and East Africa, Caribbean, South America, and some parts of Southeast Asia. *Solanum macrocarpon* can grow to a height of 11.5 cm. It has an alternate leaf pattern with the blade width of 41.5 cm. The shapes of the leaves are oval and lobed with a wavy margin. The vegetable is raised from seeds, which are sown in a nursery with 20 cm space between the rows. The seedlings are

transplanted into the field when they are 46 weeks old at a spacing of 50 × 50 cm (Schippers, 2000).

The importance of *S. macrocarpon* as a vegetable is mainly derived from its high nutritive and food values of its leaves, which make it a popular soup condiment in West Africa. Fresh leaves and young stems of *S. macrocarpon* are widely consumed in West Africa and Central Africa (Schippers, 2000).

Leaves can be harvested for a number of seasons and sometimes for more than a year when not interrupted by a dry season. According to (Schippers, 2000), the leaves consist of 86 % water, 6 % carbohydrates, 4.6 % protein, 1.6 % fibers and 1 % fat. (Oboh *et al.*, 2005) reported that unprocessed leaves of *S. macrocarpon* had 4.3 % protein, 0.6 % fat, 1.4 % crude fiber, 1.3 % ash, 89.7 % moisture, 32.6mg·kg<sup>-1</sup>Ca and 8.2mg·kg<sup>-1</sup>Zn. Research revealed that the leaves of the vegetable contain 14.0 % glutamic acid, 13.3 % aspartic acid, 7.5 % leucine and 6.6 % arginine (Schippers, 2000). Medicinal properties of the vegetable are being exploited to cure many human and animal diseases in Africa and Asia. For example, in Sierra Leone, mature leaves of the vegetable are heated and chewed to ease throat pain. In Kenya, decoctions made from the roots are used to treat hookworms (Schippers, 2000). Furthermore, the root of *S. macrocarpon* is a part of the herbal mix for curing bronchitis, body aches and asthma, and for speeding up the process of healing wounds. During the screening of the leaf cuticular waxes from two cultivars of *S. macrocarpon*, an unusual profile with elevated sterols and low hydrocarbon contents was detected, suggesting that the plant is producing phytosterols (Haliński *et al.*, 2012).

Despite its nutritional and medicinal importance, production of the vegetable falls short of demand throughout the year (Adebooye and Opabode, 2004). This is attributed to slow growth and regeneration caused by limited axillary bud formation by the vegetable (Owojori,

2017). External application of plant growth regulators (PGRs), to augment internally secreted ones, is a viable method of increasing yield, regrowth and quality of *S. macrocarpon* (Opabode and Adebooye, 2005). Studies have established that cytokinin and gibberellins driven diversion of assimilates and mineral nutrients toward shoot meristems, rather than to roots, resulted in an increase in aerial biomass in a wide number of species (Di Benedetto, 2015). As a result, 6benzylaminopurine (BAP; a cytokinin) and GA3 (gibberellic acid) have been externally applied to promote the growth, development and quality of crop species, including vegetables. For example, exogenous benzyl amino purine supplied to pot grown rooted cuttings of *Epipremnum aureum* (an ornamental plant) resulted in the promotion of shoot development, leaf area growth and fresh and dry weights accumulation (Di Benedetto, 2013). A single foliar application of 50 ppm of GA3 increased plant height, number of leaves, number of fruits, fruit weight, ascorbic acid and total soluble solids of tomato (Kumar, 2014). Foliar application of GA3 substantially boosted stem elongation, number of leaves per plant, number of pods per plant, number of seeds per pod, seed weight and seed yield in okra (Ayyub, 2013).

#### **1.4.2 Importance of *Solanum macrocarpon* in Agriculture and Nutrition**

*Solanum macrocarpon*, commonly known as the African eggplant or garden egg, is of significant importance in both agricultural and nutritional contexts. It is a key vegetable in many parts of Africa and Asia, where it is cultivated primarily by smallholder farmers. These farmers rely on *S. macrocarpon* not only for their own consumption but also as a source of income through its sale at local markets (Saka *et al.*, 2018). This crop plays a crucial role in improving food security, particularly in resource limited regions, as it provides a nutritious and affordable food source to households, often during periods when other crops may not be

in season (Baiyeri and Mbah, 2006). The importance of *S. macrocarpon* extends beyond its immediate dietary benefits, making it an integral part of sustainable agricultural systems.

From an agricultural perspective, *S. macrocarpon* is an ideal crop for smallholder farmers due to its relatively short growth cycle, which allows for multiple harvests within a year. The crop typically matures in 3 to 4 months, making it a viable option for farmers who need quick returns on investment. This rapid growth cycle also helps farmers diversify their income streams, as *S. macrocarpon* can be grown alongside other staple crops, thus enhancing overall farm productivity and reducing the risks associated with monocropping (Olaniyi *et al.*, 2014). Additionally, the crop is relatively resilient to various environmental conditions, requiring less water compared to other vegetables, which is especially advantageous in regions facing water scarcity (Abdulai *et al.*, 2019). This characteristic of *S. macrocarpon* makes it an important crop for ensuring food security, particularly in arid and semiarid regions.

The nutritional value of *S. macrocarpon* further underpins its importance in agricultural systems. The fruit is a rich source of essential vitamins, particularly vitamins A and C, which are crucial for maintaining a healthy immune system and improving vision. Additionally, *S. macrocarpon* contains important minerals such as potassium, calcium, and magnesium, which contribute to bone health and muscle function (Akinmoladun *et al.*, 2017). The consumption of *S. macrocarpon* also provides significant dietary fiber, which promotes digestive health and helps in managing blood sugar levels, making it a beneficial food for people with diabetes (Agboola *et al.*, 2020). As such, the crop is often included in the diets of communities where malnutrition and micronutrient deficiencies are prevalent, helping to combat deficiencies in vitamins and minerals.

Beyond nutrition, *S. macrocarpon* plays a vital role in the local economy. The high market demand for this vegetable, particularly in urban areas, makes it a lucrative crop for farmers.

Its value in local markets is boosted by its versatility in various culinary traditions, making it an essential ingredient in many African and Asian dishes (Hassan *et al.*, 2014). As demand for the crop grows, smallholder farmers have the opportunity to expand their production and improve their livelihoods, contributing to the broader agricultural economy. This market-driven demand also facilitates the development of value-added products, such as dried *S. macrocarpon* or processed sauces, which can increase the shelf life of the crop and provide additional income avenues for farmers (Tefera *et al.*, 2018).

In addition to these benefits, *S. macrocarpon* has potential ecological advantages. Being part of the Solanaceae family, it can be used in crop rotation systems to help break pest and disease cycles, which is a critical practice in sustainable agriculture (Tadesse *et al.*, 2020). The crop's ability to thrive in diverse agroecological zones makes it a valuable component of integrated farming systems, which aim to optimize resource use, increase biodiversity, and reduce environmental impact. Furthermore, its adaptability to different soil types, including those with low fertility, highlights the crop's resilience and its ability to contribute to the restoration of degraded lands when properly managed.

Despite its many advantages, the cultivation of *S. macrocarpon* faces challenges, particularly in terms of soil fertility and pest management. To address these challenges, there is an increasing focus on sustainable agricultural practices, including the judicious use of fertilizers and integrated pest management (IPM) strategies. These approaches not only enhance the productivity of *S. macrocarpon* but also ensure its long-term viability in diverse agricultural systems (Fajemisin *et al.*, 2020). Through proper management, *S. macrocarpon* can continue to serve as an important crop for enhancing both food security and the livelihoods of smallholder farmers across many developing regions.

### 1.4.3 Fertilizers: An Overview

Fertilizers are crucial in modern agriculture as they provide essential nutrients required for optimal plant growth and productivity. These nutrients, such as nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulfur (S), and micronutrients like iron (Fe), zinc (Zn), and copper (Cu), are vital for various physiological functions in plants, including photosynthesis, protein synthesis, and root development (Soto *et al.*, 2021). Without adequate nutrient supply, plants experience stunted growth, poor yields, and increased susceptibility to diseases and pests. Fertilizer application compensates for nutrient deficiencies in the soil and significantly boosts crop production, particularly in nutrient-depleted soils. Fertilizers are broadly categorized into two main types: organic and inorganic, each playing a distinct role in improving soil fertility and enhancing plant growth.

Organic fertilizers, derived from natural materials such as plant residues, animal manure, compost, and cover crops, are highly valued for their ability to improve long-term soil health. They contribute organic matter, which enhances soil structure, water retention, and microbial activity, thereby improving soil fertility over time (Schipanski *et al.*, 2017). Organic fertilizers release nutrients slowly, which allows for a gradual and sustained supply of essential elements to plants. This slow-release characteristic makes them particularly beneficial for improving soil organic matter and fostering soil biodiversity, contributing to the long-term sustainability of agricultural systems (Gattinger *et al.*, 2012). Furthermore, the use of organic fertilizers can help reduce the environmental impacts of conventional agricultural practices by promoting nutrient cycling and reducing the need for synthetic chemicals (Vázquez *et al.*, 2020). However, one of the primary limitations of organic fertilizers is their slower nutrient release rate, which may not meet the immediate nutritional demands of rapidly growing crops like vegetables (Palma *et al.*, 2019).

In contrast, inorganic fertilizers, also known as synthetic or chemical fertilizers, provide readily available nutrients in a form that plants can quickly absorb. These fertilizers are manufactured using industrial processes, often from mineral sources, and are typically high in nitrogen, phosphorus, and potassium—the primary macronutrients required by most plants (Marschner, 2012). Inorganic fertilizers are highly effective in rapidly addressing nutrient deficiencies, resulting in immediate improvements in plant growth, productivity, and yield (Bello *et al.*, 2016). The quick nutrient release is particularly advantageous in crops that require a fast response to nutrient availability, such as cereals and vegetables (Zhang *et al.*, 2018). Additionally, inorganic fertilizers are often more concentrated, making them easier to transport, store, and apply. They can be precisely tailored to meet the specific nutrient needs of crops, leading to more efficient nutrient use and higher yields in many cases (Ju *et al.*, 2009).

Despite their advantages, inorganic fertilizers have some significant drawbacks, particularly when used improperly or excessively. Overapplication of chemical fertilizers can lead to soil acidification, nutrient imbalances, and environmental degradation, such as water pollution due to nutrient leaching and runoff (Badejo *et al.*, 2015). These environmental impacts are of particular concern in intensive farming systems, where high inputs of inorganic fertilizers are commonly used without adequate soil management practices. Furthermore, inorganic fertilizers do not improve soil organic matter or promote soil microbial health, which can lead to long-term soil degradation if used in isolation (Dinesh *et al.*, 2018). Inorganic fertilizers also rely heavily on finite natural resources, such as phosphate rock, and their production can contribute to greenhouse gas emissions, making them less sustainable in the long run (Garnett *et al.*, 2013).

To address the limitations of both fertilizer types, integrated nutrient management (INM) has emerged as a viable solution. INM combines the use of organic and inorganic fertilizers in a way that maximizes nutrient use efficiency, improves soil health, and minimizes environmental harm (Giller *et al.*, 2017). Although balancing the quick-release nutrients of inorganic fertilizers with the long-term soil health benefits of organic fertilizers, INM aims to optimize plant growth while maintaining sustainable soil fertility. This integrated approach can help farmers achieve higher yields, reduce the need for chemical inputs, and improve the resilience of agricultural systems to environmental stresses (Lal, 2015). Furthermore, recent studies have emphasized the importance of applying fertilizers in a site-specific manner, tailored to the specific nutrient requirements of different crops and soils, to avoid nutrient excess and minimize negative environmental impacts (Sharma *et al.*, 2020).

#### **1.3.4 Organic Fertilizers**

Organic fertilizers play a crucial role in sustainable agriculture by providing essential nutrients to plants while improving soil health and enhancing the overall environment. Unlike inorganic fertilizers, which are synthesized through industrial processes, organic fertilizers are derived from natural sources, including animal manure, plant residues, compost, and other organic matter (Boddey *et al.*, 2004). These fertilizers not only supply nutrients but also contribute to soil structure and fertility in the long term, promoting a more balanced and sustainable approach to farming.

One of the key advantages of organic fertilizers is their ability to improve soil structure. Organic matter, such as compost or decomposed plant material, enhances the physical properties of the soil, including its texture, water-holding capacity, and drainage. This leads to

better root penetration and increased availability of nutrients, which in turn improves plant growth (Smith *et al.*, 2016). Organic fertilizers also help to prevent soil erosion by increasing soil cohesion and reducing runoff, which is especially important in areas prone to water and wind erosion. Furthermore, they enhance the microbial activity in the soil, fostering a rich ecosystem of beneficial microorganisms, such as bacteria and fungi, which play a key role in nutrient cycling and the breakdown of organic matter (Gattinger *et al.*, 2012).

In addition to improving soil structure, organic fertilizers are known for their slow-release characteristics. Nutrients in organic fertilizers are typically bound in organic compounds that need to be broken down by soil microorganisms before they become available to plants (Bastida *et al.*, 2008). While this slow-release mechanism can be beneficial in preventing nutrient leaching and ensuring a sustained supply of nutrients, it can also pose a challenge for crops with rapid growth requirements, as the nutrient supply may not be sufficient to meet their immediate needs (Palma *et al.*, 2019). Nevertheless, this gradual nutrient release helps to maintain soil fertility over time and reduces the dependency on synthetic fertilizers, making organic fertilizers a more environmentally friendly option in the long term. Moreover, organic fertilizers have a relatively low environmental impact compared to their synthetic counterparts. They are generally less prone to causing soil acidification, nutrient imbalances, or water pollution, which can result from the excessive use of inorganic fertilizers (Garnett *et al.*, 2013). Organic fertilizers also contribute to carbon sequestration, as the decomposition of organic matter releases carbon into the soil, where it can be stored for extended periods, helping mitigate the effects of climate change (Lal, 2015). Additionally, organic fertilizers are renewable resources, and their production typically has a lower carbon footprint than the manufacturing of synthetic fertilizers, making them a more sustainable choice for modern agriculture. However, despite their many advantages, organic fertilizers have certain

limitations. Their nutrient content is often lower and less predictable than that of inorganic fertilizers, and their slow nutrient release means that farmers may need to apply larger quantities or more frequent applications to achieve the desired crop yields (Schipanski *et al.*, 2017). This can sometimes lead to higher labor and transportation costs, particularly for smallholder farmers. Furthermore, while organic fertilizers can improve soil fertility and structure over time, they are not always sufficient on their own for maximizing crop yields in intensive agricultural systems. As a result, many farmers use organic fertilizers in combination with inorganic fertilizers, which provides a more balanced and efficient approach to nutrient management (Bello *et al.*, 2016).

#### **1.4.5 Inorganic Fertilizers**

Inorganic fertilizers, also known as synthetic or chemical fertilizers, are artificially produced substances designed to provide specific nutrients to plants in precise proportions. These fertilizers are manufactured through industrial processes that convert raw materials, such as minerals, into nutrient-rich compounds. One of the most common types of inorganic fertilizers is the NPK fertilizer, which contains a combination of nitrogen (N), phosphorus (P), and potassium (K)—the primary macronutrients essential for plant growth and development. These nutrients are crucial for processes such as photosynthesis, root development, flower and fruit production, and overall plant vigor (Marschner, 2012).

Nitrogen is essential for promoting vegetative growth and chlorophyll production, while phosphorus plays a key role in energy transfer, root development, and flowering. Potassium, on the other hand, is critical for regulating water balance, enzyme activation, and overall

stress resistance in plants. NPK fertilizers are widely used in agriculture because they supply these vital nutrients in readily available forms, ensuring that plants can immediately access the nutrients they need to maximize growth and yield (Liu *et al.*, 2015). The ability of inorganic fertilizers to deliver quick, targeted nutrient application is especially beneficial in intensive farming systems where rapid growth and high yields are desired.

One of the major advantages of inorganic fertilizers is their immediate availability to plants. Since these fertilizers are highly soluble in water, the nutrients are quickly absorbed by plant roots, leading to rapid improvements in plant health and productivity. This quick nutrient release is particularly useful for crops with high nutrient demands or those grown in soils that are low in essential nutrients (Bello *et al.*, 2016). In addition, inorganic fertilizers are generally more concentrated than organic fertilizers, making them easier to apply, transport, and store, which further increases their utility in largescale farming operations (Ju *et al.*, 2009).

Despite their effectiveness, excessive or improper use of inorganic fertilizers can have detrimental effects on soil health and the environment. Overapplication of chemical fertilizers can lead to soil nutrient imbalances, where certain nutrients are available in excess, while others become deficient, disrupting plant growth (Badejo *et al.*, 2015). Furthermore, the high solubility of inorganic fertilizers means that they are prone to leaching into the soil and groundwater, leading to water pollution. This is particularly concerning in areas with high rainfall or poor drainage, where nutrients may wash away and contaminate nearby rivers and lakes, causing eutrophication and harming aquatic ecosystems (Garnett *et al.*, 2013).

Inorganic fertilizers can also contribute to soil acidification, especially when applied in large quantities over time. Nitrogen-based fertilizers, for example, release hydrogen ions ( $H^+$ ) as they break down, which can lower the pH of the soil and reduce its overall fertility (Zhang *et*

*al.*, 2018). This acidification can negatively affect the availability of certain nutrients, such as calcium, magnesium, and phosphorus, which become less soluble in acidic soils, further exacerbating nutrient deficiencies and harming plant growth. Additionally, prolonged use of inorganic fertilizers can degrade soil organic matter, which plays a vital role in maintaining soil structure, water retention, and microbial activity (Dinesh *et al.*, 2018).

Another concern is the environmental impact associated with the production of inorganic fertilizers. The manufacturing process requires significant energy inputs, and the extraction of raw materials, such as phosphate rock, is resource-intensive and can contribute to environmental degradation (Garnett *et al.*, 2013). Furthermore, the reliance on finite mineral resources for the production of synthetic fertilizers raises concerns about the long-term sustainability of these inputs, as supplies of key raw materials like phosphorus are dwindling globally (Cordell *et al.*, 2009).

To mitigate these negative impacts, integrated nutrient management (INM) strategies have been developed. INM involves combining the use of both organic and inorganic fertilizers to optimize nutrient availability, improve soil health, and reduce environmental harm. By using organic fertilizers to improve soil structure and microbial activity, and inorganic fertilizers to provide quick-release nutrients, farmers can achieve higher yields while minimizing the risks associated with excessive fertilizer use (Giller *et al.*, 2017). Additionally, the use of site-specific nutrient management practices, which tailor fertilizer application to the specific needs of crops and soil types, can further enhance nutrient efficiency and reduce the potential for negative environmental impacts (Sharma *et al.*, 2020).

### **1.3.6 Comparative Analysis of Organic and Inorganic Fertilizers**

Comparing organic and inorganic fertilizers reveals tradeoffs. While organic fertilizers build long-term soil fertility, inorganic fertilizers address immediate nutrient deficiencies. Studies suggest integrating both types for sustainable productivity (Agegnehu *et al.*, 2016).

### **1.4.7 Effects of Fertilizers on Plant Growth and Yield**

Fertilizers significantly influence plant growth parameters such as height, leaf number, and chlorophyll content. Yield parameters, including fruit size, weight, and number, are also positively affected when appropriate fertilizers are applied (Akanbi *et al.*, 2007).

### **1.4.8 Impact on Growth Parameters**

Organic fertilizers enhance root development and soil water retention, indirectly promoting plant height and biomass. Inorganic fertilizers, due to their fast action, directly increase leaf area and chlorophyll content (Roy *et al.*, 2006).

### **1.4.9 Environmental Implications**

Improper fertilizer application poses risks such as nutrient leaching, water contamination, and greenhouse gas emissions. Sustainable practices, such as balanced fertilizer use, are essential to mitigate these impacts (Ju *et al.*, 2009).

## **1.5 Objectives of the Study**

- i. To compare the growth performance of *S. macrocarpon* under organic and inorganic fertilizer treatments.
- ii. To assess the yield potential of *S. macrocarpon* in response to different fertilizer applications.

## **1.6 Research Questions**

- i. How do organic and inorganic fertilizers affect the growth of *S. macrocarpon*?

- ii. What is the impact of these fertilizers on the yield of *S. macrocarpon*?

### **1.7 Research Hypotheses**

- i. Organic fertilizers significantly enhance the growth of *S. macrocarpon*.
- ii. Inorganic fertilizers improve the yield of *S. macrocarpon* more effectively than organic fertilizers.
- iii. A combination of organic and inorganic fertilizers provides optimal results for both growth and yield.

### **1.8 Significance of the Study**

This study provides valuable insights into sustainable fertilizer practices for *S. macrocarpon* cultivation. It will equip farmers with evidence-based recommendations, promoting ecofriendly and economically viable agricultural practices.

## **CHAPTER TWO**

### **2.0 MATERIALS AND METHODS**

#### **2.1 Materials**

The materials used during this project consist of African eggplant seeds (*Solanum macrocarpon*), shovel, soil (loamy), planting bags, 4 in 1 soil tester (used to measure Temperature, pH, moisture content and light intensity), chlorophyll meter, vernier caliper, water jerrycan, digital weighing balance and ruler.

## **2.2 Seed Source**

The seeds were gotten from Ondo town. The seeds were taken to the Screen house of the Department of Plant Biology and Biotechnology in the University of Benin where the viability of the seeds were tested by floatation method before sowing.

## **2.3 Soil Collection**

The loamy soil used in this study was collected in July, 2024. The loamy soil was obtained from Capitol just after Danjuma girls hostel in the University of Benin, Ugbowo campus.

## **2.4 Site of Experiment**

This experiment was conducted at the screenhouse of the Department of Plant Biology and Biotechnology, Faculty of Life Sciences, University of Benin, Ugbowo Campus, Benin City, Edo State located at 6° 23' 53.010' N and 5 36' 53.838'' E

## **2.5 Methodology**

The soil collected from Capitol was used to fill planting bags. Planting bags with dimensions of 31 cm in diameter and 36.5 cm in length were used. A total of 42 planting bags were each filled with 5 kg of loamy soil weighed with electronic weighing balance.

Twelve bags were mixed with organic fertilizer (poultry dung) in different concentrations: 3 bags were mixed with 50 g of poultry dung each, another 3 bags with 100 g of poultry dung, another 3 bags with 150 g of poultry dung, and the last 3 bags with 200 g of poultry dung.

Another 12 bags were mixed with inorganic fertilizer (NPK) in different concentrations: 3 bags were mixed with 50 g of NPK, another 3 bags with 100 g of NPK, another 3 bags with 150 g of NPK, and the last 3 bags with 200 g of NPK.

Another 12 bags were mixed with a combination of poultry dung and NPK: 3 bags were mixed with 25 g of Poultry dung + 25 g NPK, another 3 bags with 50 g of Poultry dung + 50 g of NPK, another 3 bags with 75 g of Poultry dung + 75 g of NPK, and the last 3 bags with 100 g of Poultry dung + 100 g of NPK.

The remaining 6 bags were used as a Control group, with no fertilizer added.

The experiment bags were placed randomly on the floor at the experiment site, and the soil were watered. The next Day, seed viability was tested using the floating method, and seeds were planted at 2 cm sowing depth, with 4 seeds per bag, totaling 480 seeds for this study. The plants were watered periodically from sowing to emergence, with watering done every other Day after effective emergence, watering was done every three Days.

## **2.6 Data Collection**

The data collected were used to perform analysis of variance (ANOVA) using IBM SPSS 20 to assess the effects of organic and inorganic fertilizers on the growth of *Solanum macrocarpon*. Soil conditions, including temperature, pH, moisture content, and light intensity, were measured every three Days from Day 0 to Day 15 using a 4 in1 soil tester. Stem girth, recorded every three Days using a vernier caliper, served as one of the primary growth indicators. Additionally, the number of leaves was monitored at regular intervals, and

seed germination was tracked by counting the germination Day.

The chlorophyll content index (CCI) of the plant was measured using a chlorophyll content meter (CCM 200 plus, Apogee). Apogee is used to measure the photosynthetic activity and overall plant health.



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The mean germination value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 3 were  $1.33 \pm 0.33$ ,  $3.00 \pm 0.00$  and  $2.33 \pm 0.33$  respectively.

The mean germination value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 3 were  $2.33 \pm 0.33$ ,  $3.00 \pm 0.00$  and  $2.67 \pm 0.33$  respectively.

The mean germination value for 150 g poultry dung, NPK, and poultry dung + NPK enriched soil for Day 3 were  $2.67 \pm 0.33$ ,  $2.33 \pm 0.33$  and  $3.00 \pm 0.00$  respectively.

The mean germination value for 200 g for poultry dung, NPK, poultry dung +NPK enriched soil for Day 3 were  $2.67 \pm 0.33$ ,  $2.67 \pm 0.33$  and  $2.33 \pm 0.33$  respectively.

The germination value for Control (0 g) were  $1.33 \pm 0.33$ ,  $0.00 \pm 0.00$ ,  $0.00 \pm 0.00$  respectively.

There was no significant difference between Control and 50 g - 200 g of poultry dung treatments on Day 3 (Figure 3.1). Similarly, there was no significant difference between Control and 50 g - 200 g of NPK treatments (Figure 3.2). Furthermore, there was no significant difference between Control and 50 g -200 g of poultry dung + NPK treatments (Figure 3.3).

The mean germination value for Control for Day 4 (0 g) were  $3.00 \pm 0.00$ ,  $0.00 \pm 0.00$ ,  $0.00 \pm 0.00$  respectively, while the mean germination value for 50 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 4 were  $3.67 \pm 0.33$ ,  $3.33 \pm 0.33$  and  $3.67 \pm 0.33$  respectively.

The mean germination value for 100 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 4 were  $3.00 \pm 0.00$ ,  $3.33 \pm 0.33$  and  $3.67 \pm 0.33$  respectively and the germination value for 150 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 4 were  $3.00 \pm 3.00$ ,  $3.33 \pm 0.33$  and  $4.00 \pm 4.00$  respectively.

The germination value for 200 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 4 were  $3.33 \pm 0.33$ ,  $3.33 \pm 0.33$  and  $3.67 \pm 0.33$  respectively.

There was no significant difference between 50 g - 200 g of poultry dung and Control treatments on Day 4 (Figure 3.4). Similarly, there was no significant difference between Control and 50 g - 200 g of NPK treatment (Figure 3.5). Furthermore, there was no significant difference between Control and 50 g – 200 g of poultry dung and NPK treatments also, because they were all grown.

The mean germination value for Control on Day 5 (0 g) were  $3.00 \pm 0.00$ ,  $0.00 \pm 0.00$ ,  $0.00 \pm 0.00$  respectively and the mean germination value for 50 g Poultry dung, NPK, poultry dung + NPK enriched soil on Day 5 were  $3.67 \pm 0.33$ ,  $4.00 \pm 0.00$  and  $3.67 \pm 0.33$  respectively while the mean germination value for 100 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 5 were  $3.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $3.67 \pm 0.33$  respectively.

The mean germination value for 150 g poultry dung, NPK, poultry dung + NPK for Day 5 were

$3.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $3.67 \pm 0.33$  respectively, while the mean germination value for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 5 were  $3.33 \pm 0.33$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

There was no significant difference between 50 g - 200 g of poultry dung and Control treatments (Figure 3.6). Similarly, there was no significant difference between Control and 50 g – 200 g of NPK treatments (Figure 3.7). Furthermore, there was no significance difference between Control and other treatment of poultry dung and NPK (Figure 3.8)

The mean germination value for Day 6 for CONTROL (0 g) were  $4.00 \pm 0.00$ ,  $1.33 \pm 1.33$  and  $0.00 \pm 0.00$  respectively.

The mean germination value for Day 6 for poultry dung, NPK, poultry dung + NPK enriched soil for 50 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 6 for poultry dung, NPK, poultry dung + NPK enriched soil for 100 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 6 for poultry dung, NPK, poultry dung +NPK enriched soil for 200 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively

There was significance difference between Control and the treatment 50 g – 200 g of poultry dung (Figure 3.9)

There was no significance difference between the treatment 50 g - 200 g of NPK, because they were all grown (Figure 3.10)

There was no significance difference between 50 g – 200 g poultry dung treatments + NPK and Control, because they wre all grown (Figure 3.11)

The mean germination value for Day 7 CONTROL (0 g) were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 7 poultry dung, NPK, poultry dung + NPK enriched soil for 50 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 7 poultry dung, NPK, poultry dung + NPK enriched soil for 100 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 7 poultry dung, NPK, poultry dung + NPK for 150 g were

$4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 7 poultry dung, NPK, poultry dung + NPK enriched soil for 200 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively

There was significant difference between Control and the treatment 50 g -200 g of poultry dung (Figure 3.12)

There was no significant difference between the treatment 50 g -200 g of NPK and Control, because they were all grown (Figure 3.13)

There was no significant difference between 50 g – 200 g poultry dung treatments and Control, because they were all grown. (Figure 3.14)

The mean germination value for Day 8 for CONTROL (0 g) were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 8 for poultry dung, NPK, poultry dung + NPK for 50 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 8 for poultry dung, NPK, poultry dung + NPK enriched soil for 100 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 8 for poultry dung, NPK, poultry dung + NPK for 150 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 8 for poultry dung, NPK, poultry dung + NPK enriched soil for 200 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

There was significant difference between Control and the treatment 50 g – 200 g of poultry dung treatments (Figure 3.15).

There was no significant difference between the treatment 50 g – 200 g of NPK, because they were all grown (Figure 3.16).

There was no significant difference between the treatment 50 g – 200 g of poultry dung + NPK and Control, because they were all grown (Figure 3.17).

The mean germination value for Day 9 for CONTROL (0 g) were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 9 for poultry dung, NPK, poultry dung + NPK enriched soil 50 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 9 for poultry dung, NPK, poultry dung + NPK for 100 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 9 for poultry dung, NPK, poultry dung + NPK enriched soil for 150 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

The mean germination value for Day 9 for poultry dung, NPK, poultry dung + NPK enriched soil for 200 g were  $4.00 \pm 0.00$ ,  $4.00 \pm 0.00$  and  $4.00 \pm 0.00$  respectively.

There was no significant difference between 50 g – 200 g poultry dung treatments and Control, because they were all grown (Figure 3.18)

There was no significant difference between the treatment 50 g - 200 g of NPK and Control, because they were all grown(Figure 3.19)

There was no significant difference between 50 g – 200 g poultry dung treatments + NPK and Control, because they were all grown (Figure 3.20)

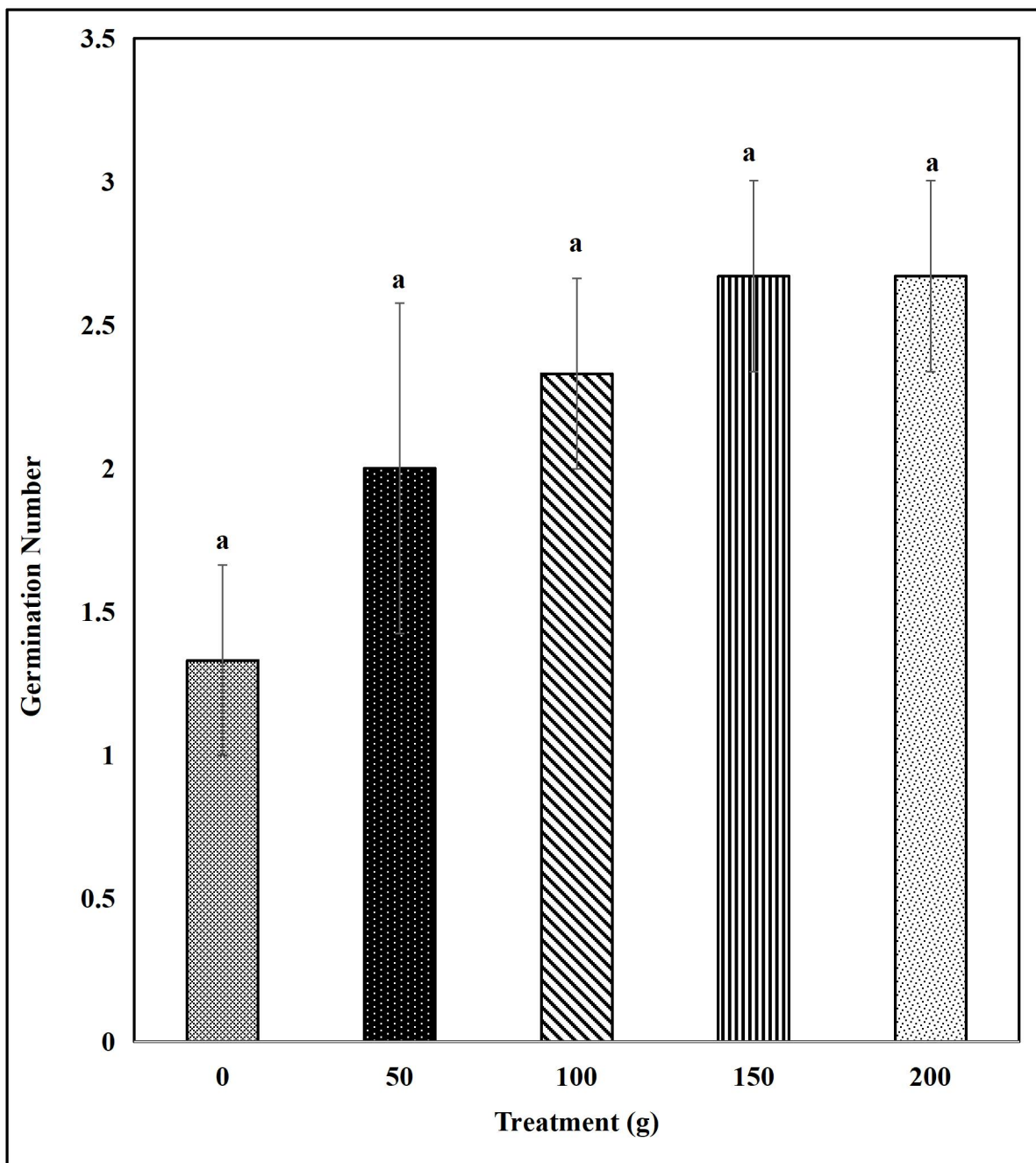


Figure 3.1: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 3

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

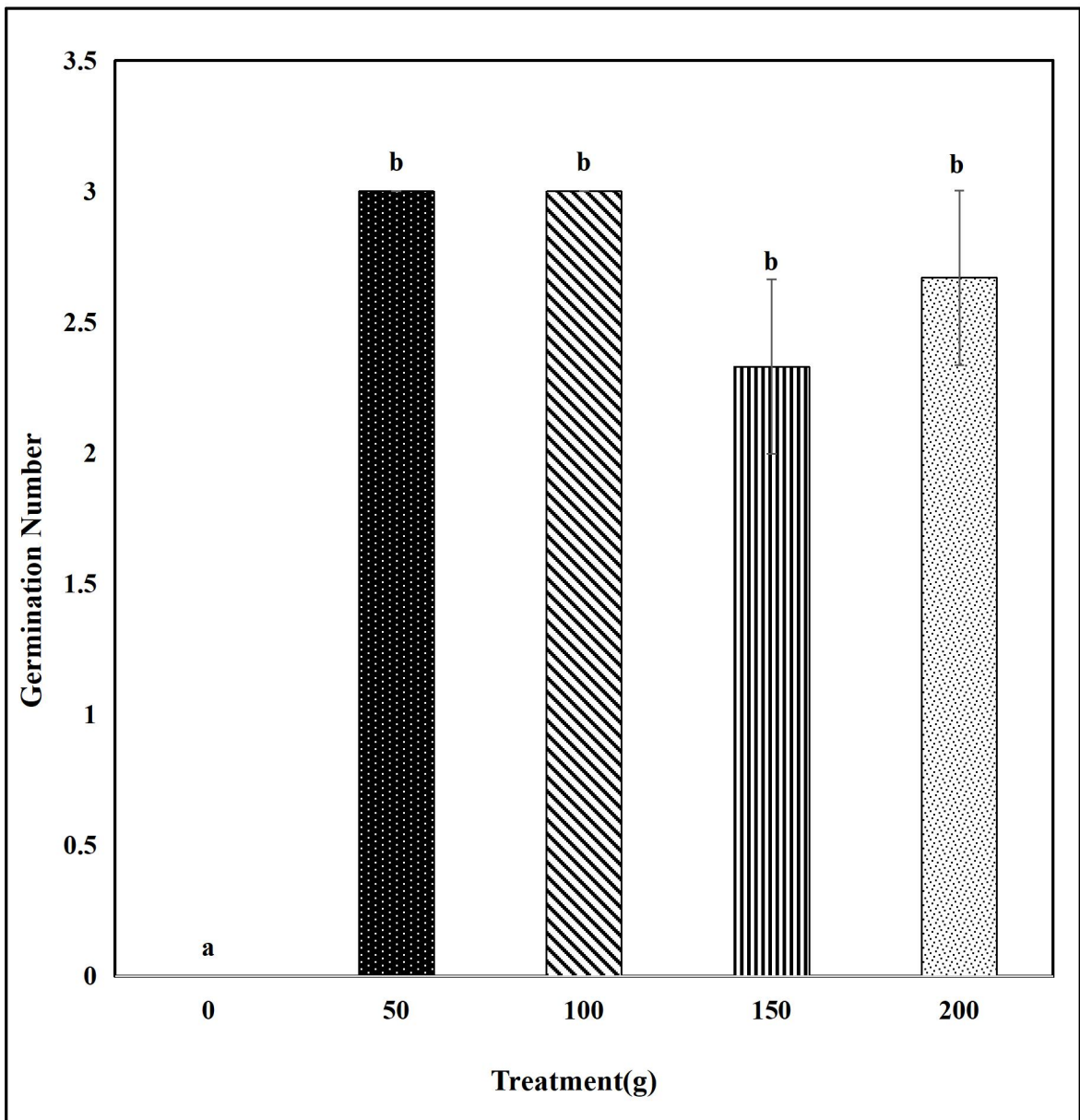


Figure 3.2: Germination Number of *Solanum macrocarpon* in NPK Enriched Soil on Day 3

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

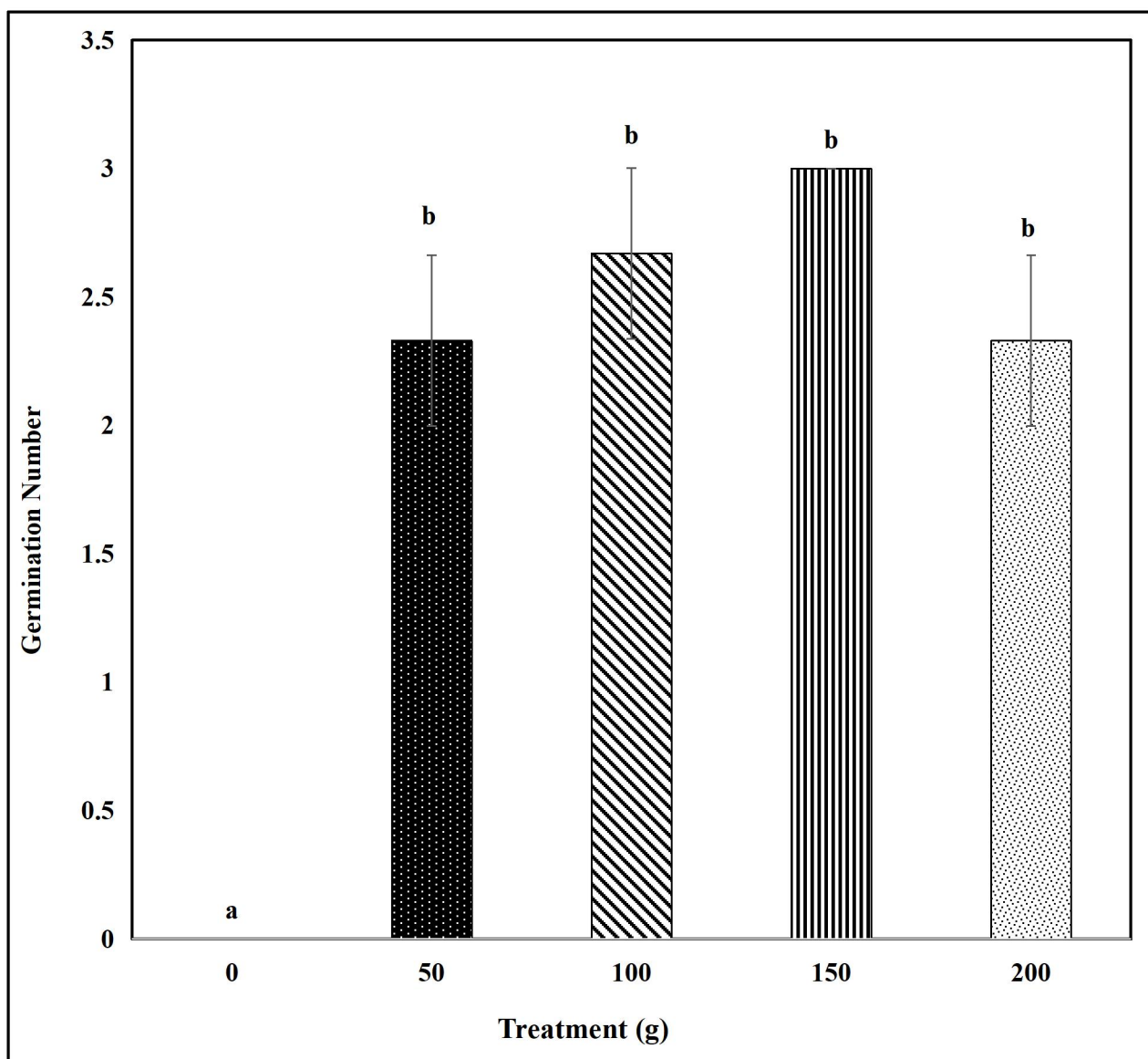


Figure 3.3: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 3

\*Bars showing Mean values  $\pm$  standard error of mean with different alphabets are significantly different from each other ( $P < 0.05$ )

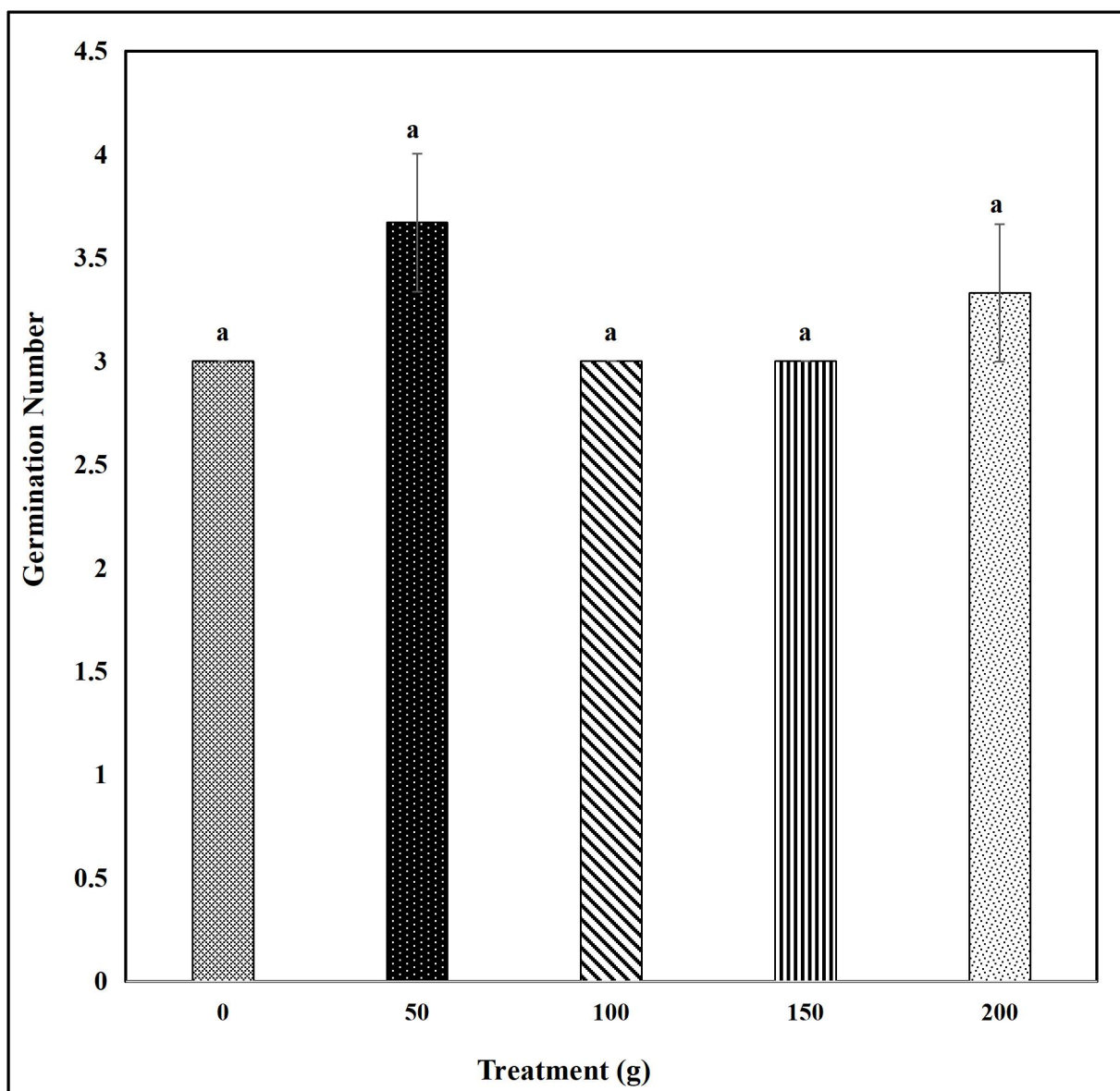


Figure 3.4: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 4

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

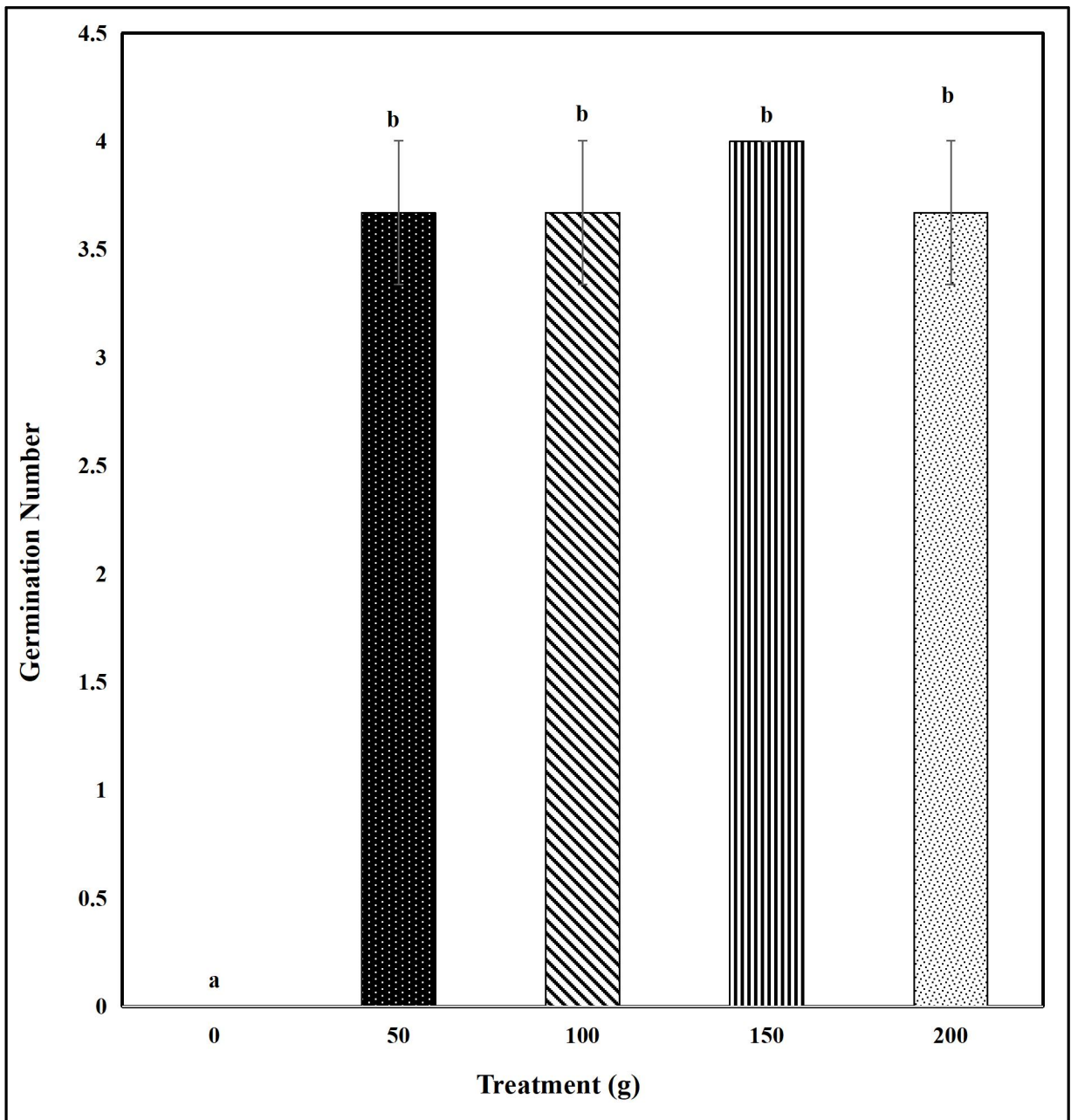


Figure 3.5: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 4

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

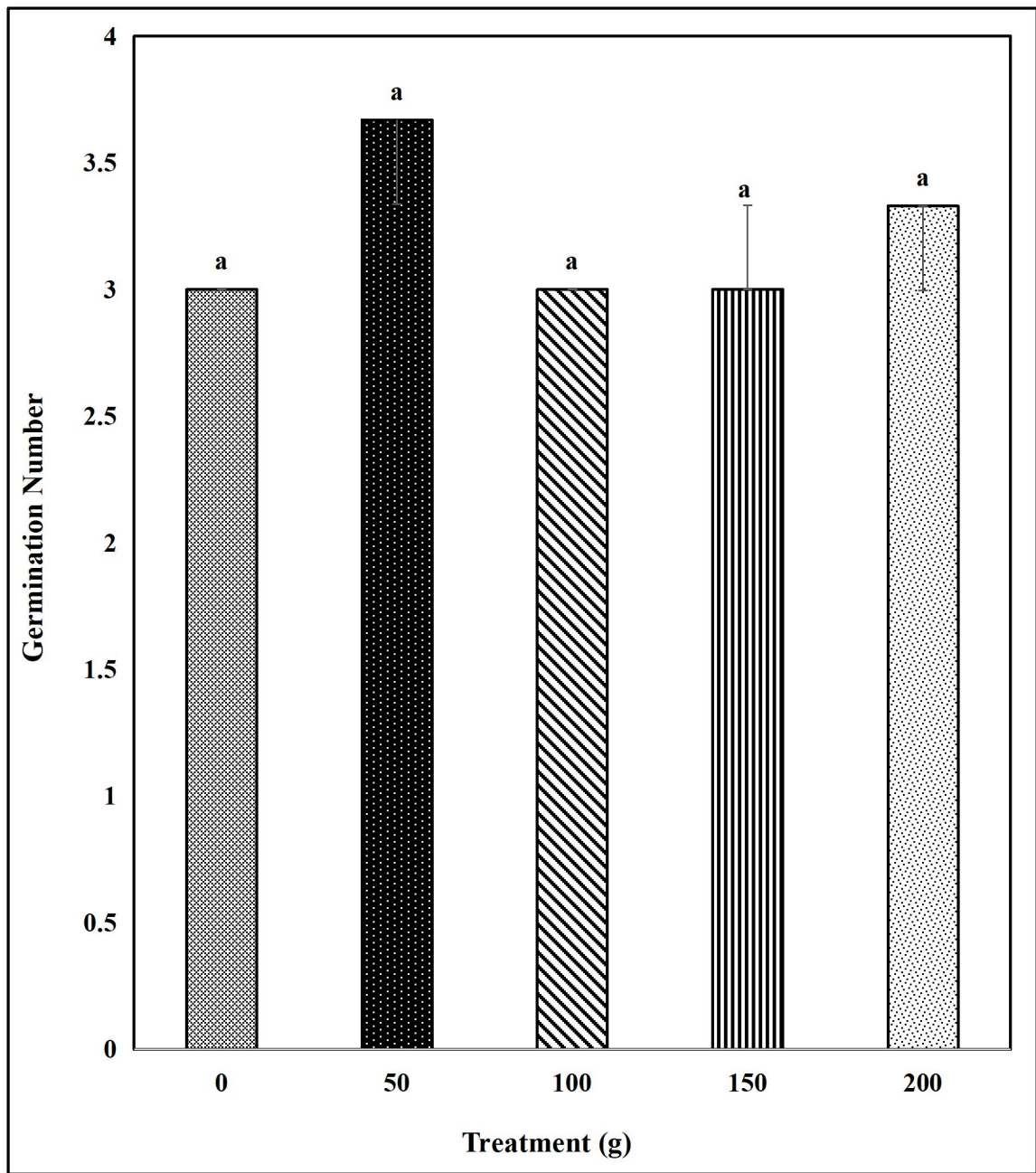


Figure 3.6: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 5

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

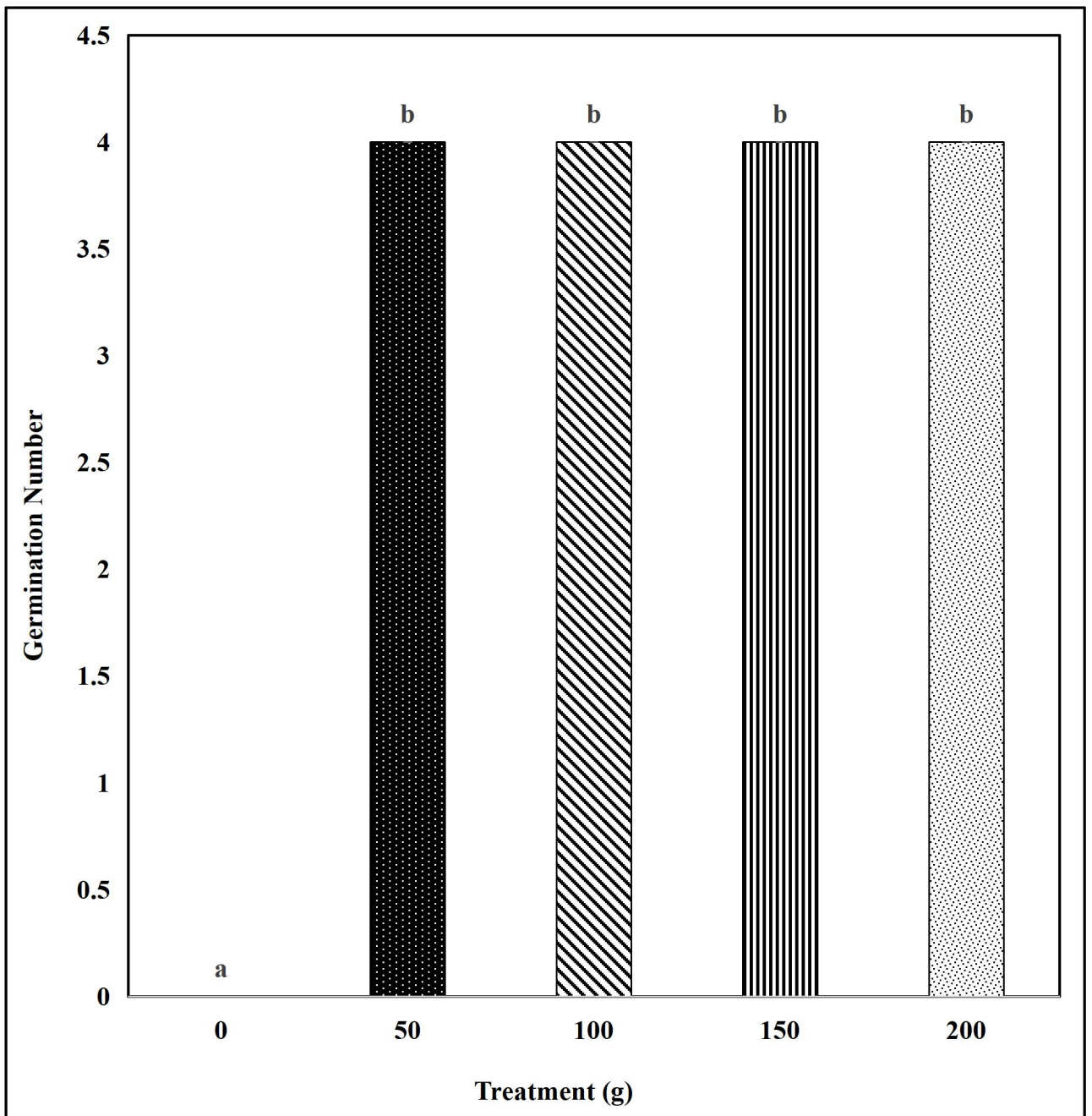


Figure 3.7: Germination Number of *Solanum macrocarpon* in NPK Enriched Soil on Day 5

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

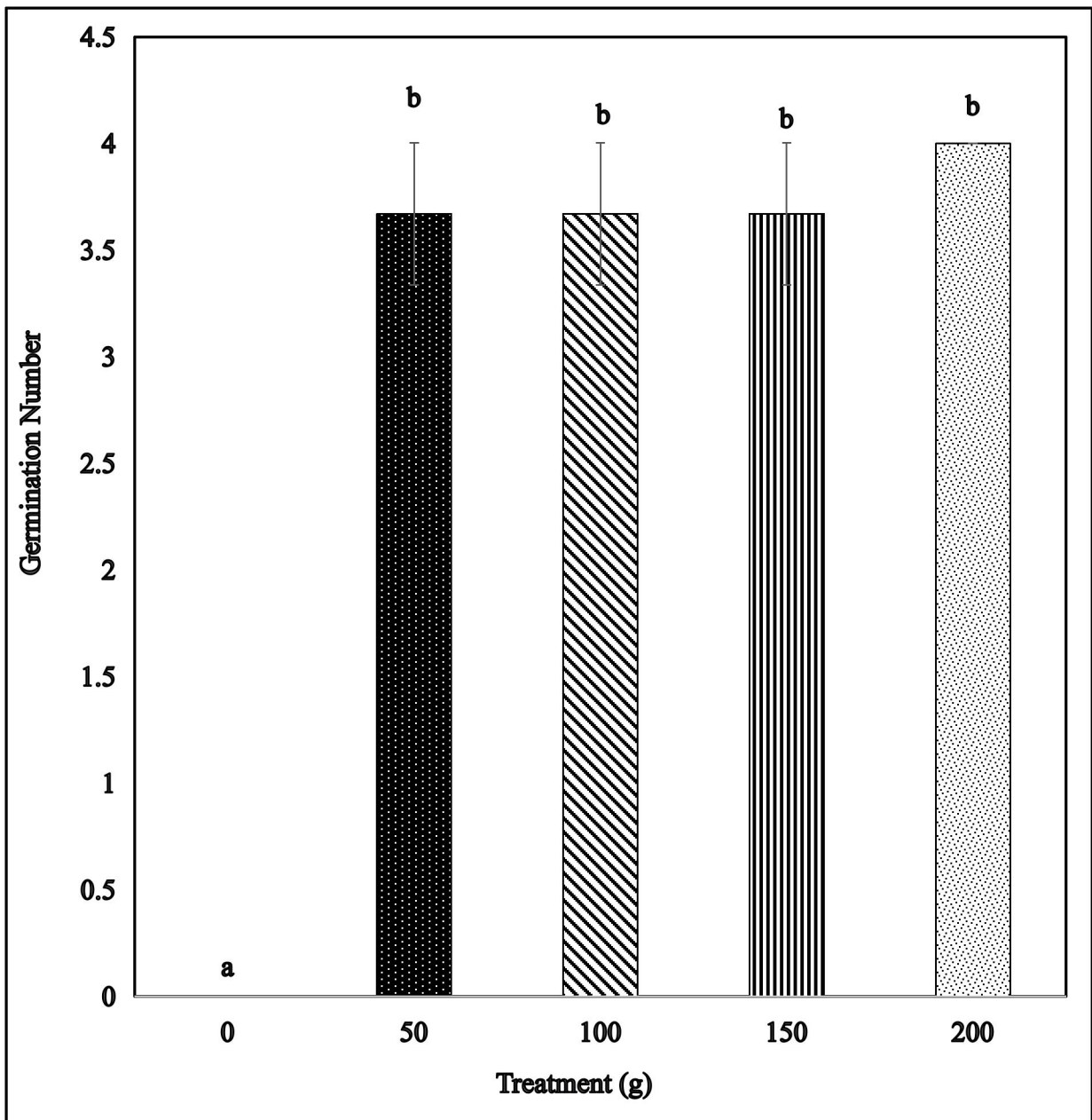


Figure 3.8: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 5

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

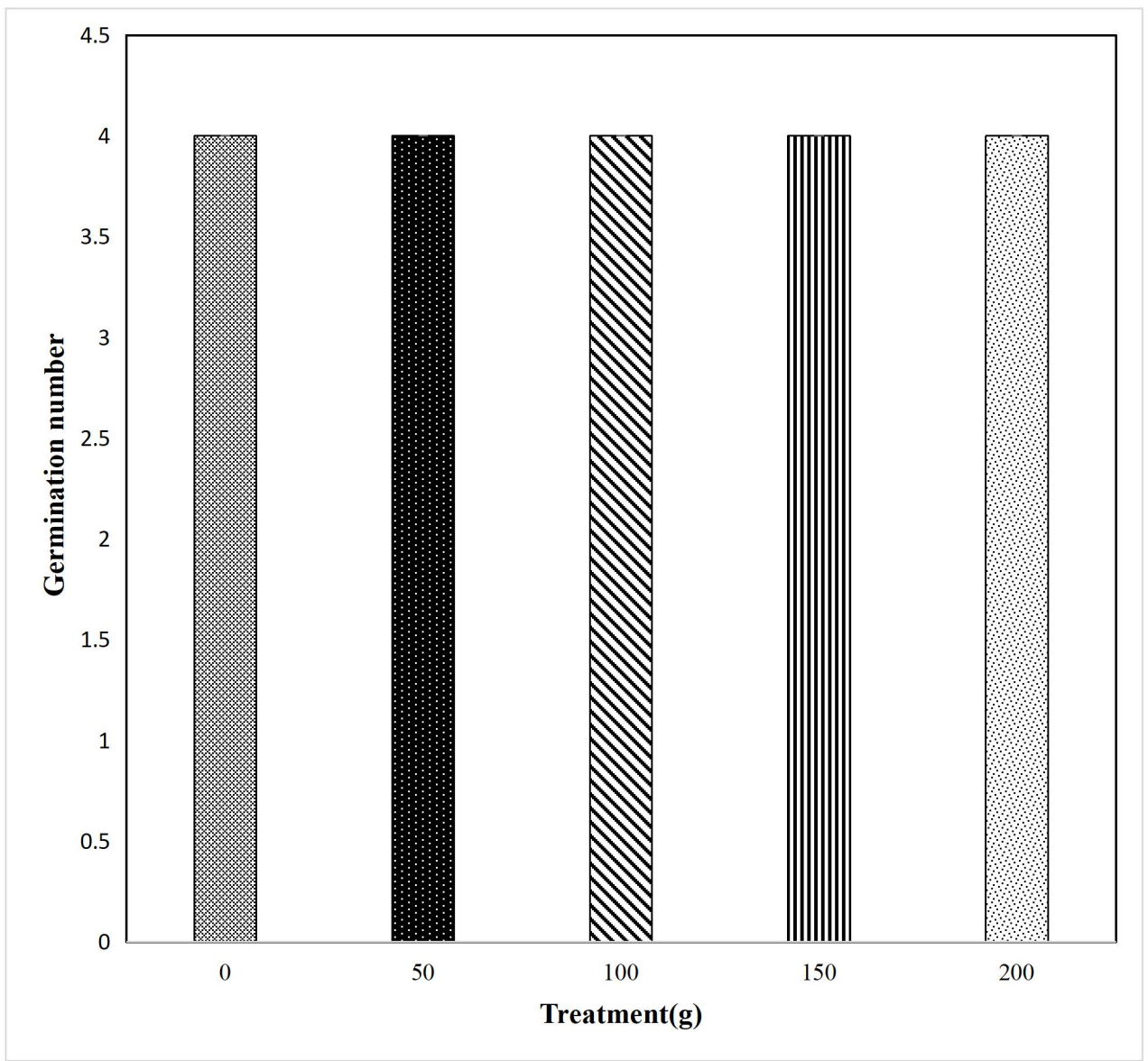


Figure 3.9: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 6

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

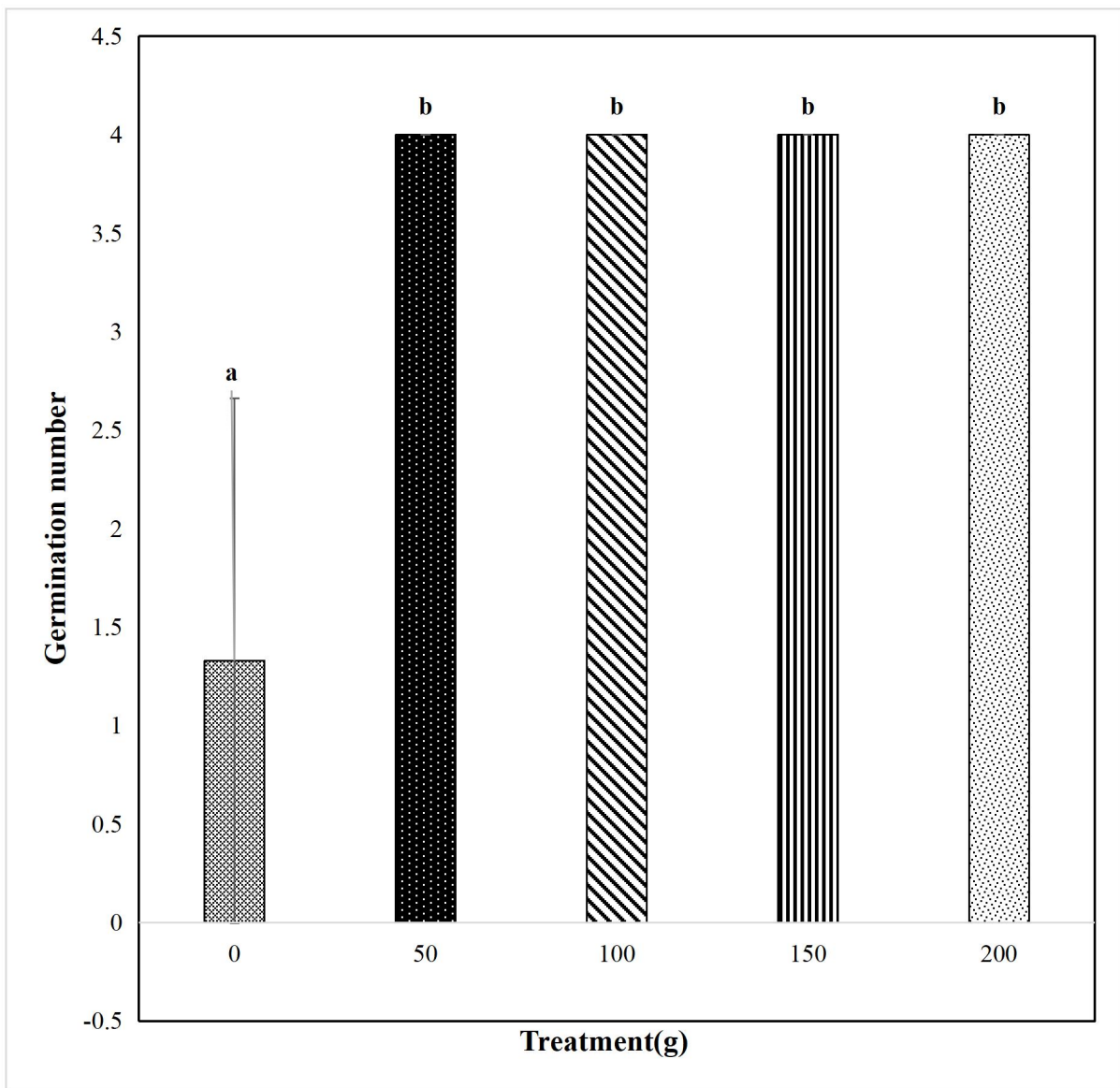


Figure 3.10: Germination Number of *Solanum macrocarpon* in NPK Enriched Soil on Day 6

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

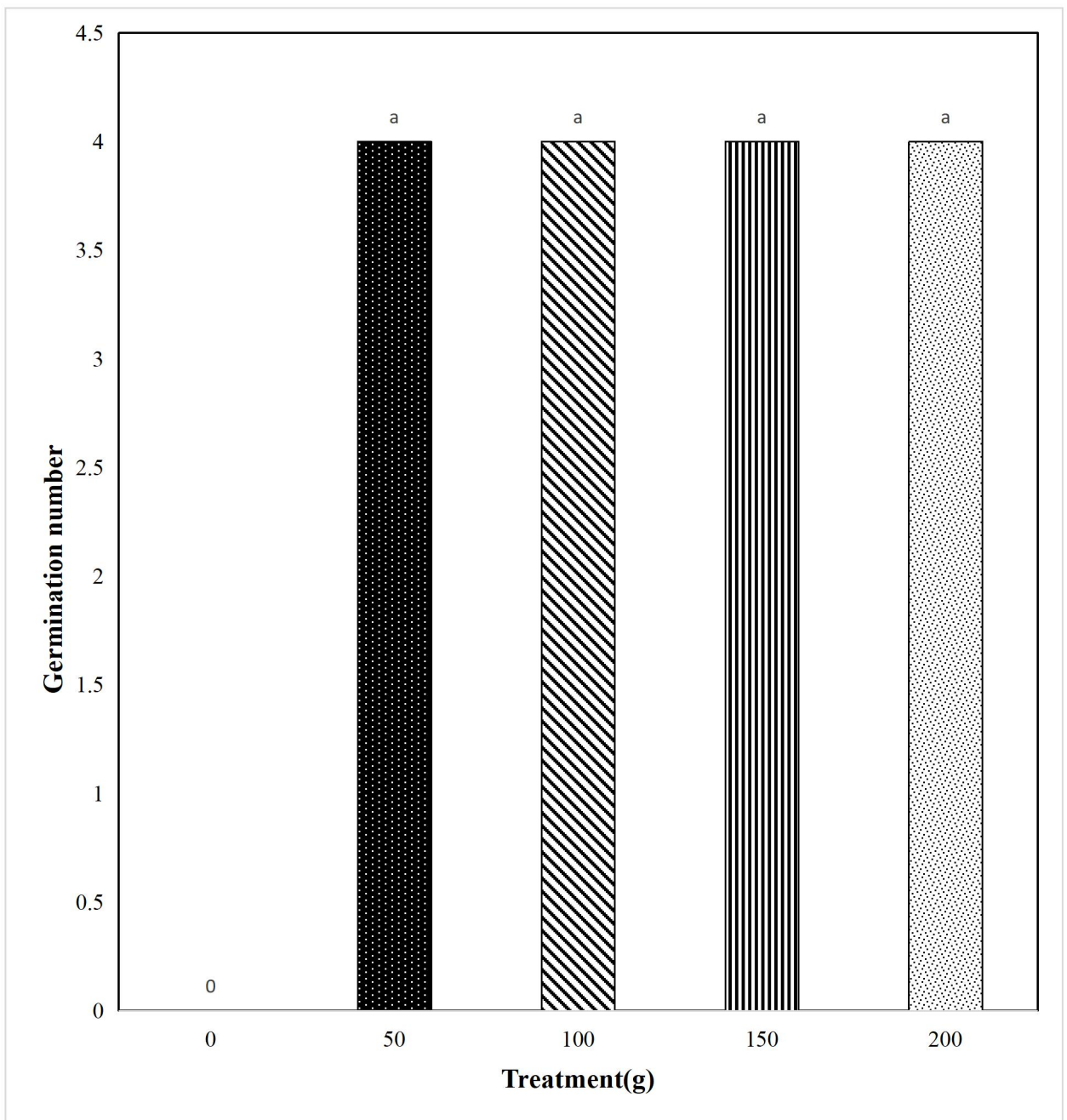


Figure 3.11: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 6

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

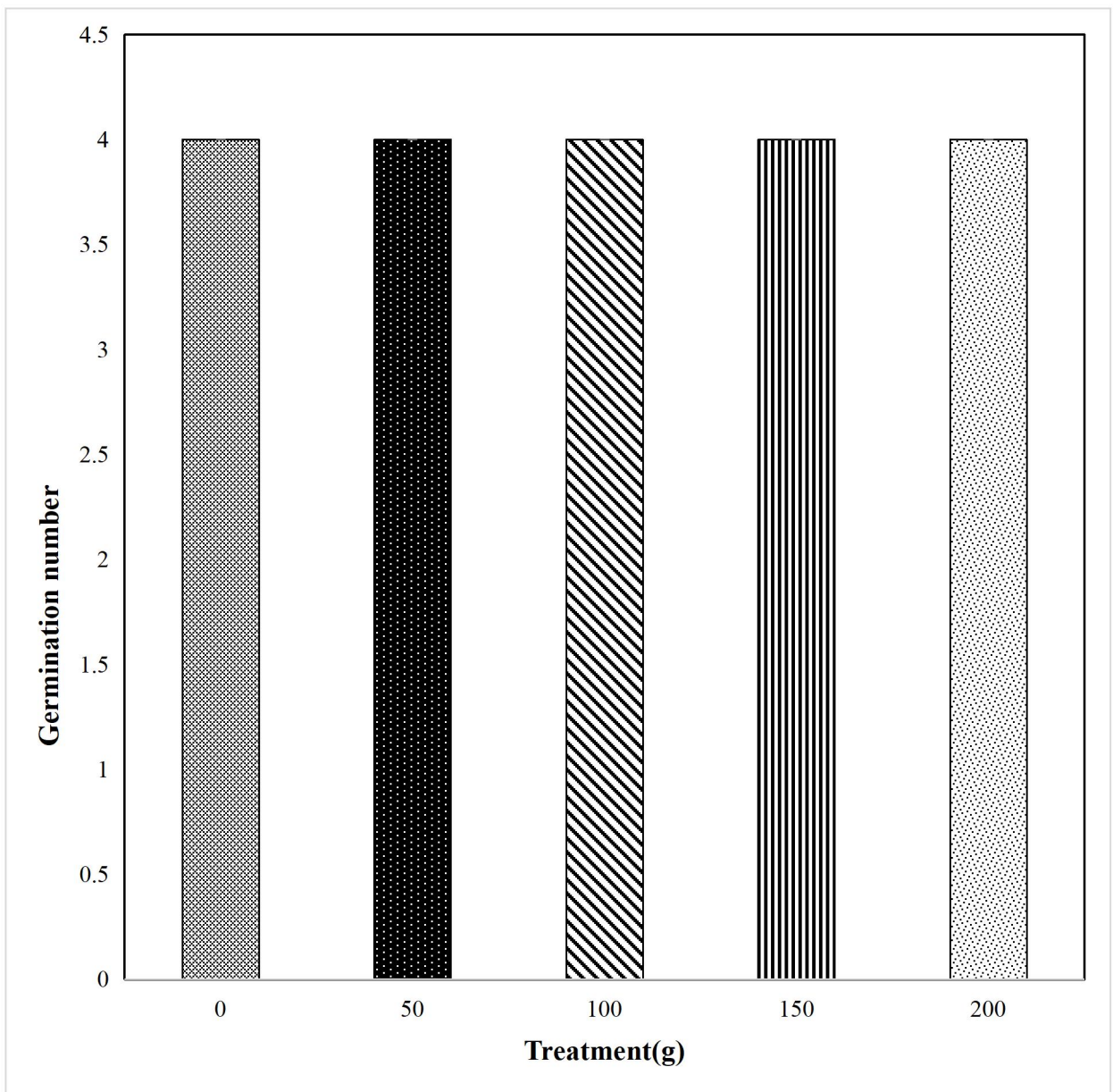


Figure 3.12: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 7

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

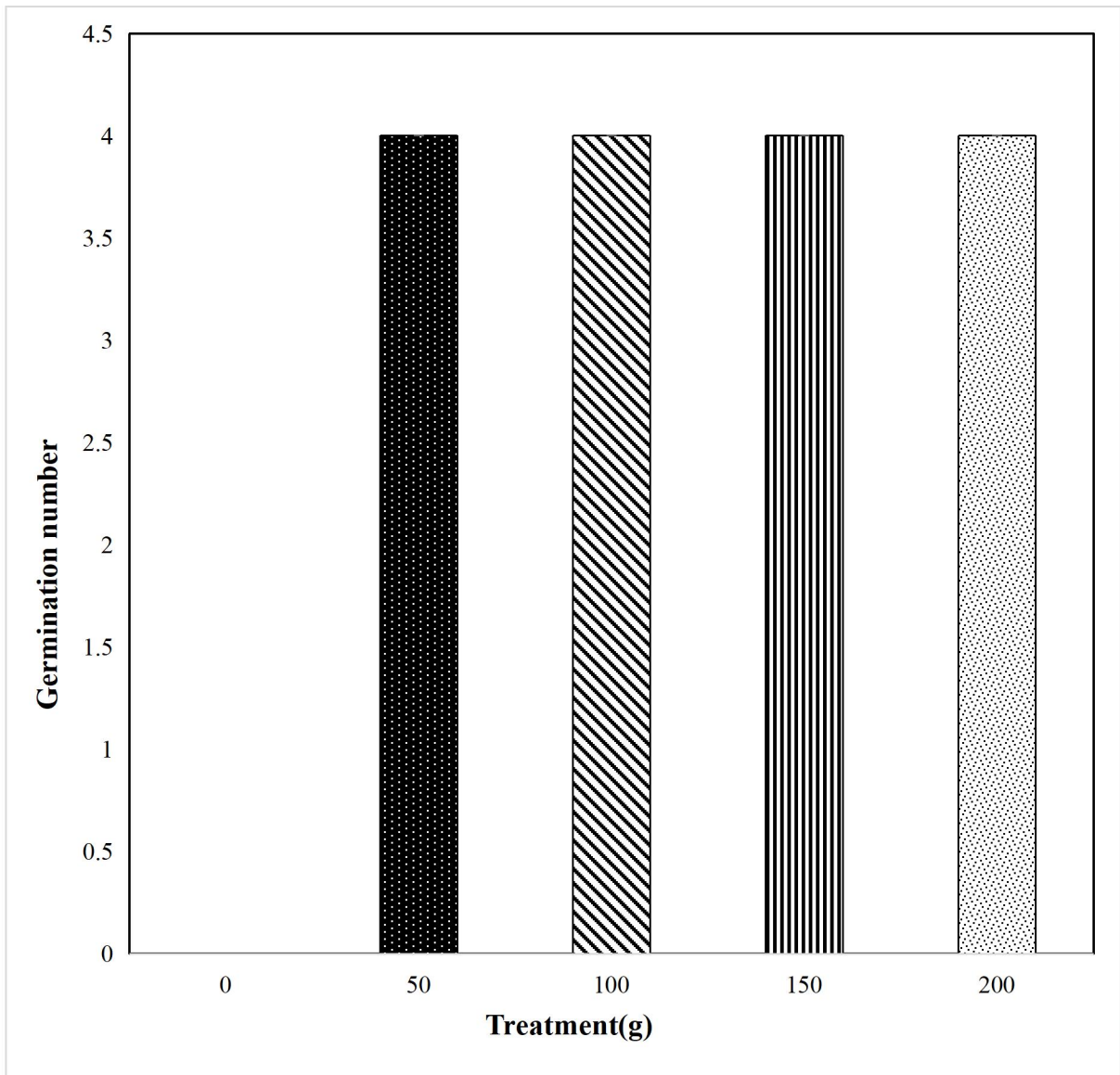


Figure 3.12: Germination Number of *Solanum macrocarpon* in NPK Enriched Soil on Day 7

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

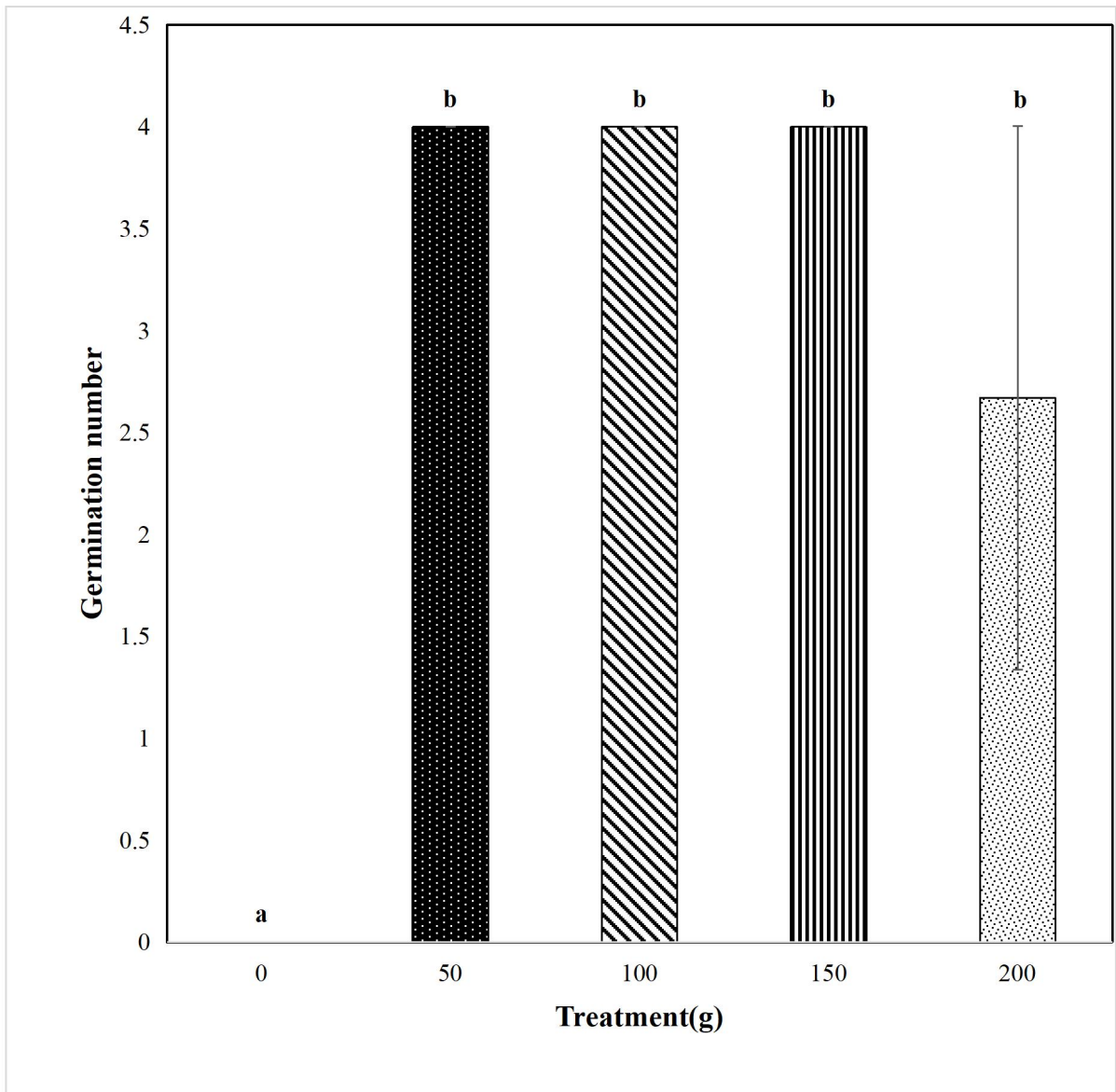


Figure 3.13: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 7

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

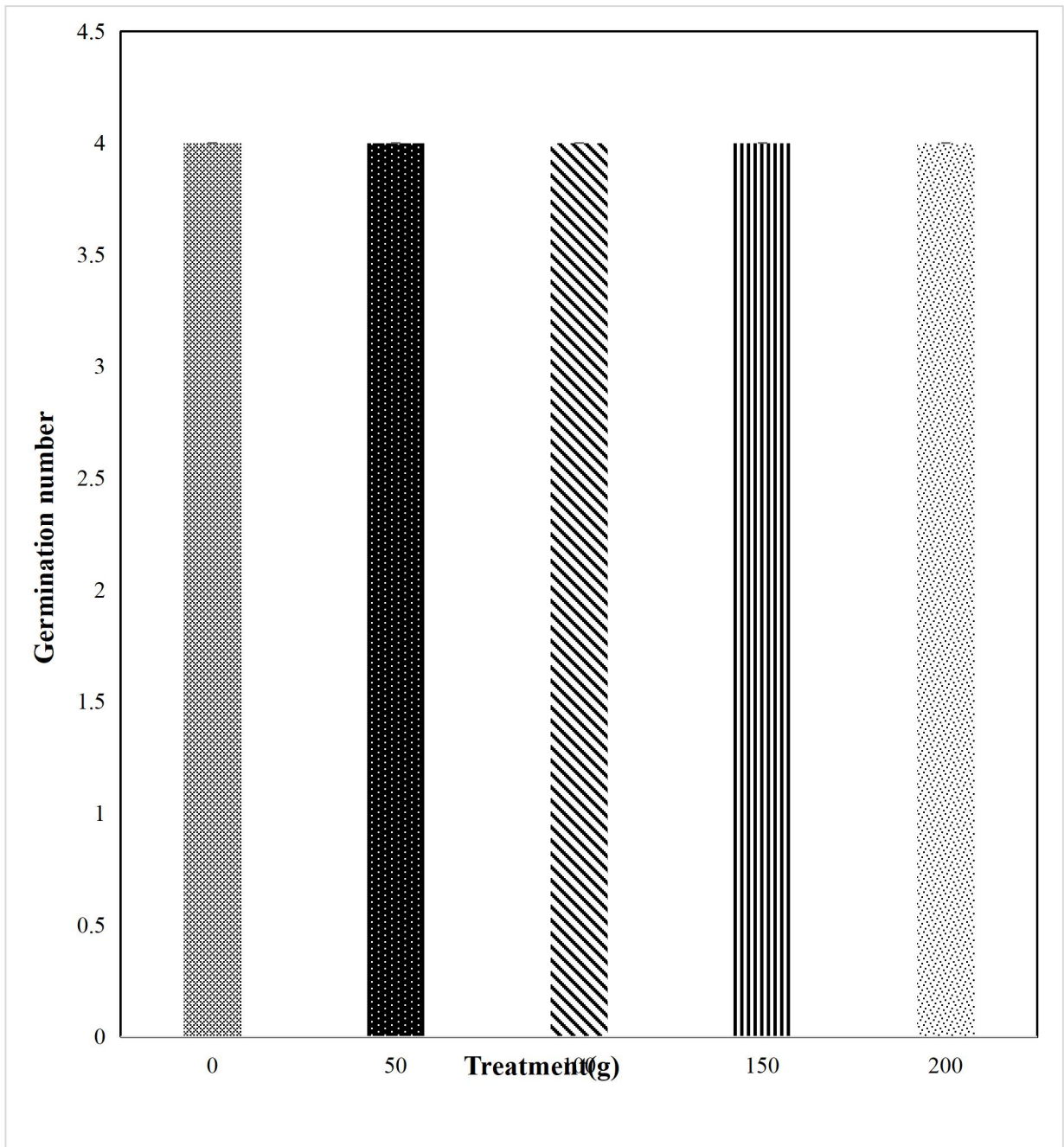


Figure 3.14: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 8

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

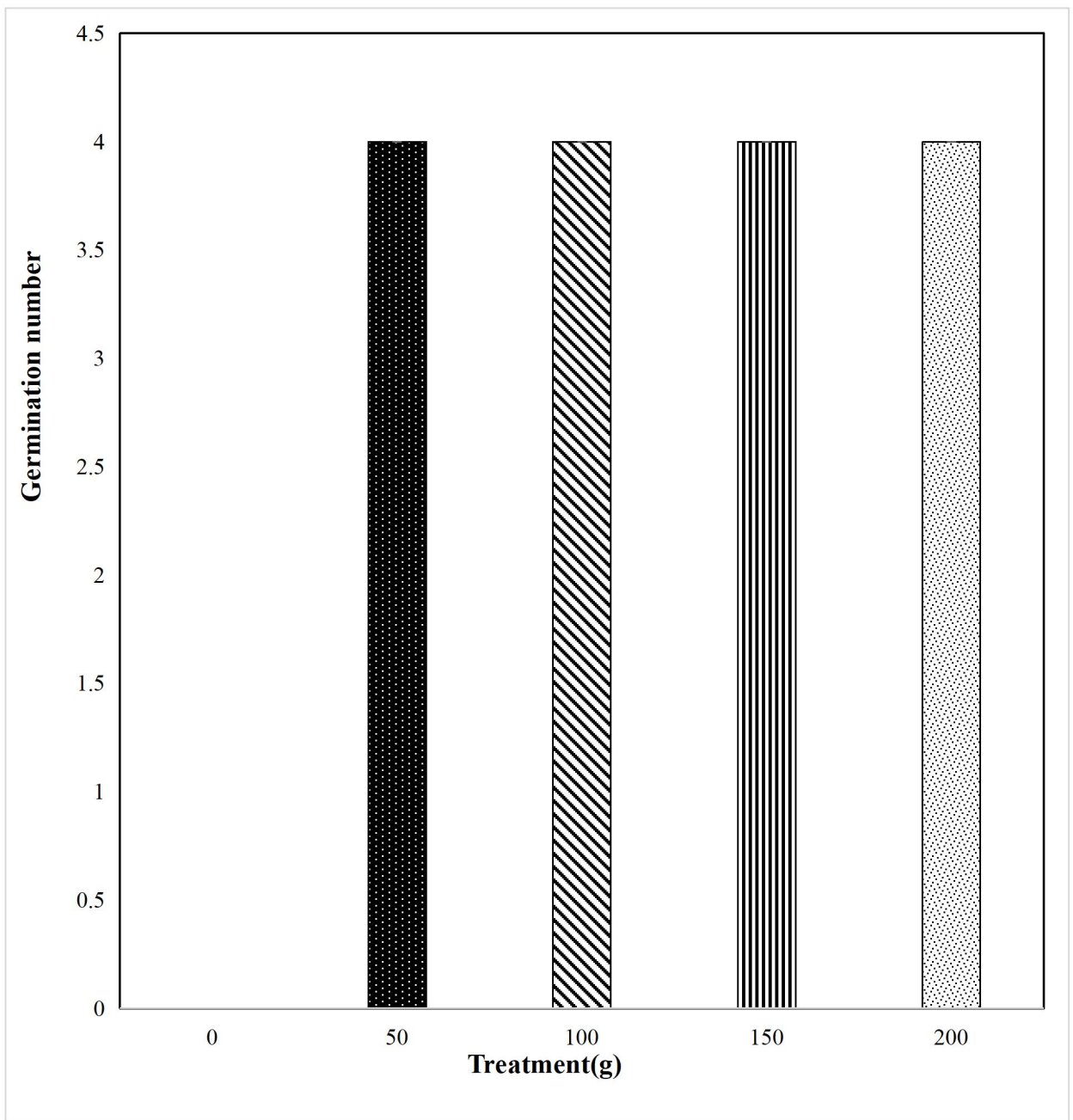


Figure 3.15: Germination Number of *Solanum macrocarpon* in NPK Enriched Soil on Day 8

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

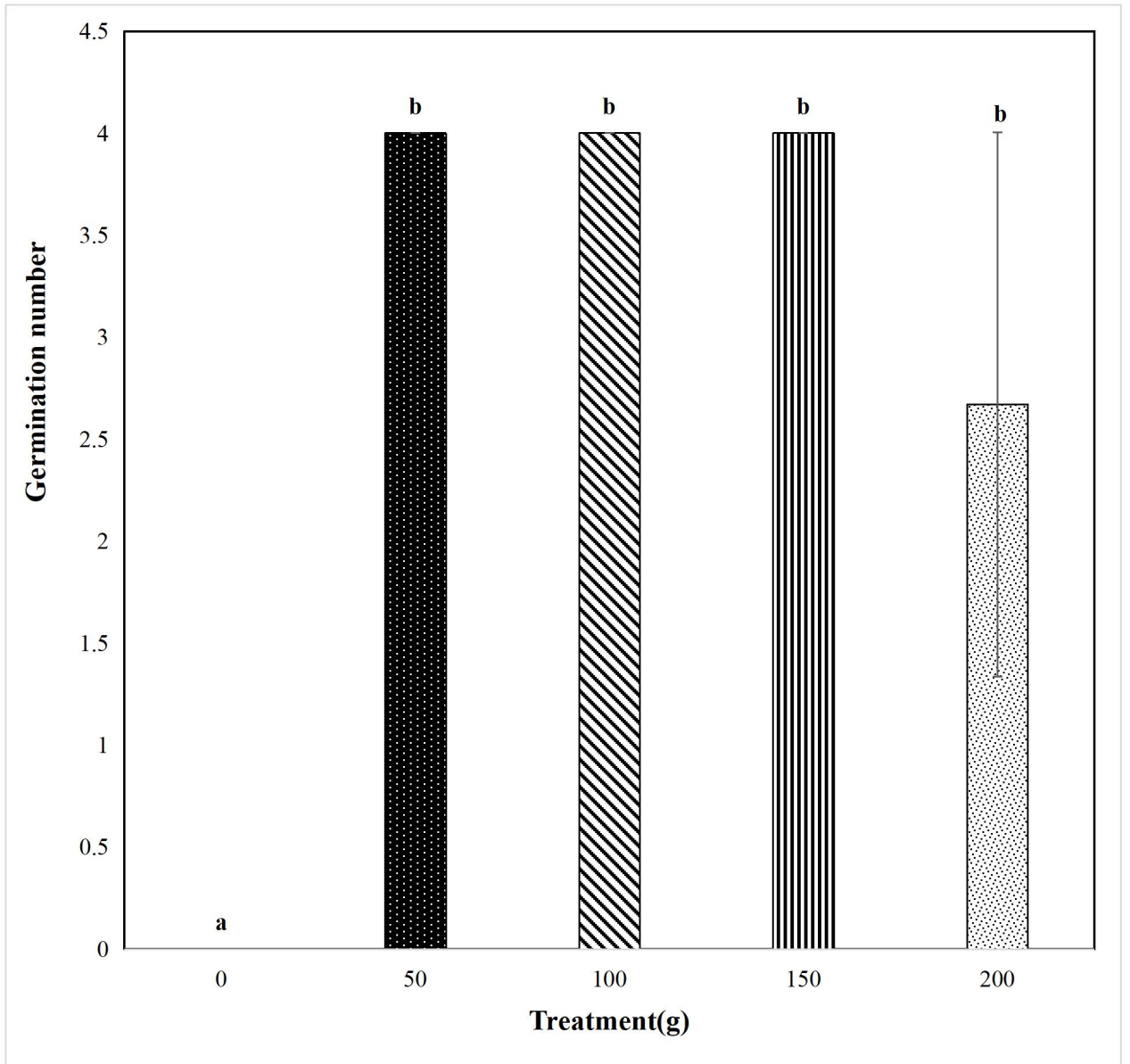


Figure 3.16: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 8\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

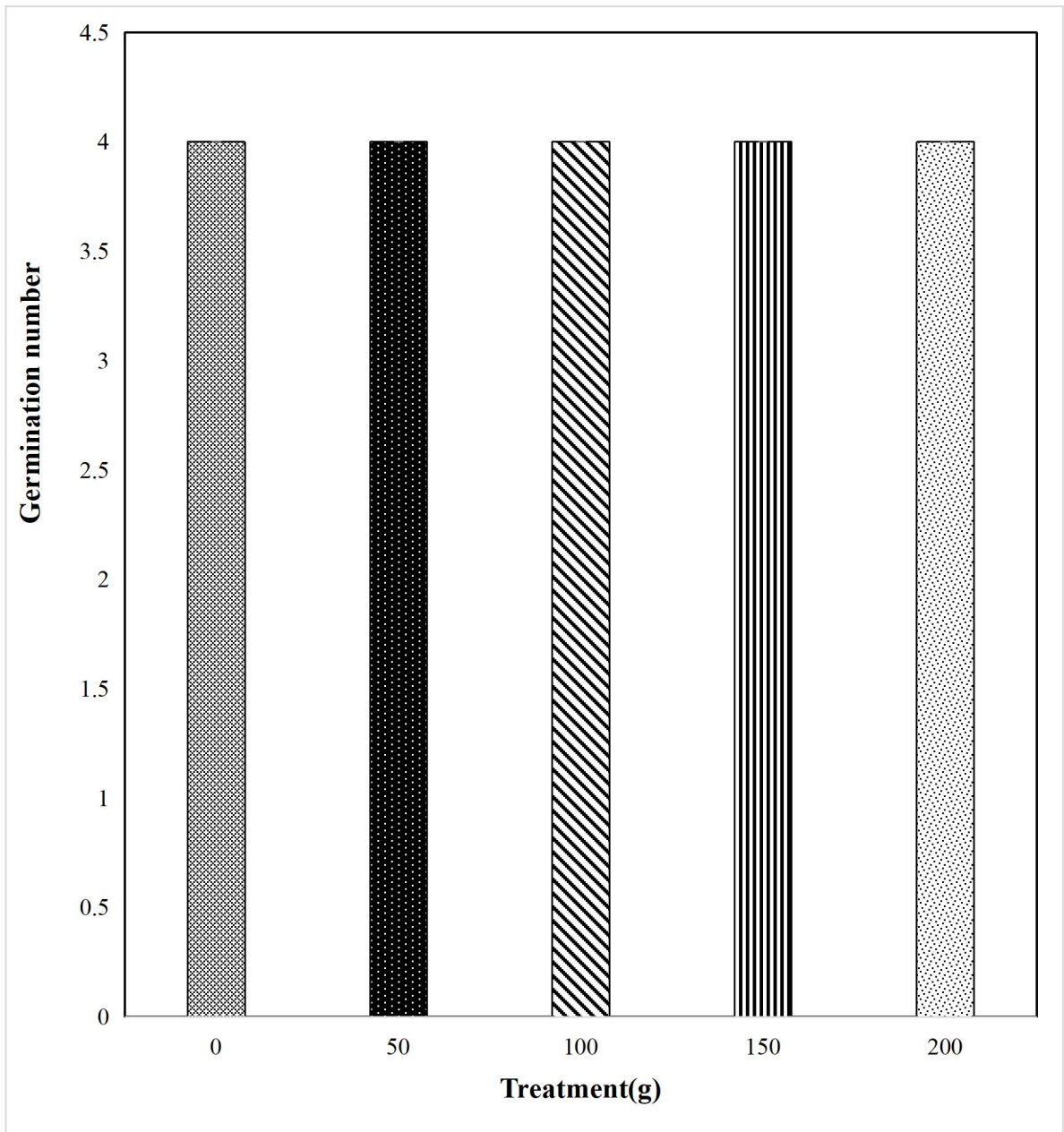


Figure 3.17: Germination Number of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 9\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

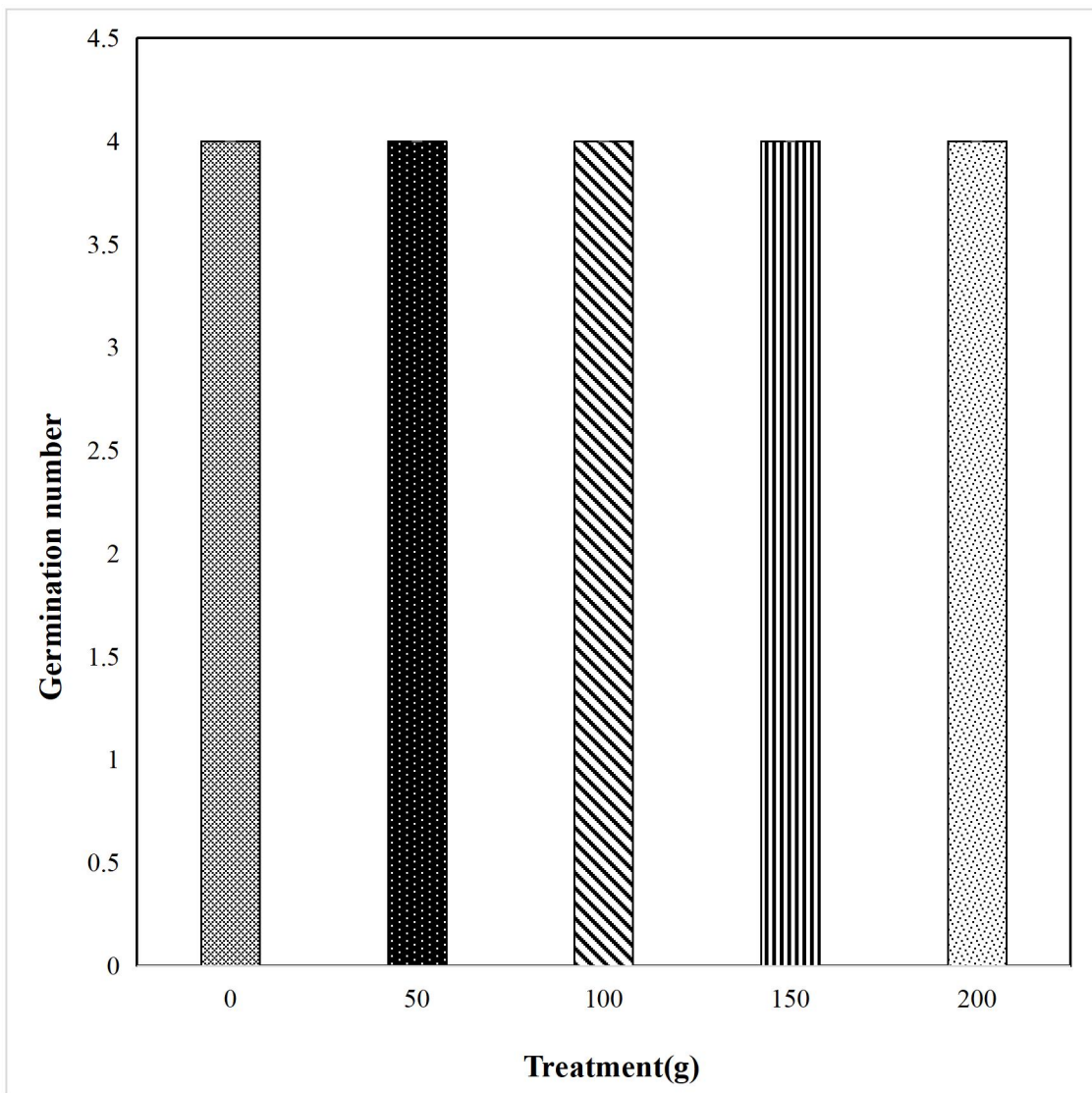


Figure 3.18: Germination Number of *Solanum macrocarpon* in NPK Enriched Soil on Day 9

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

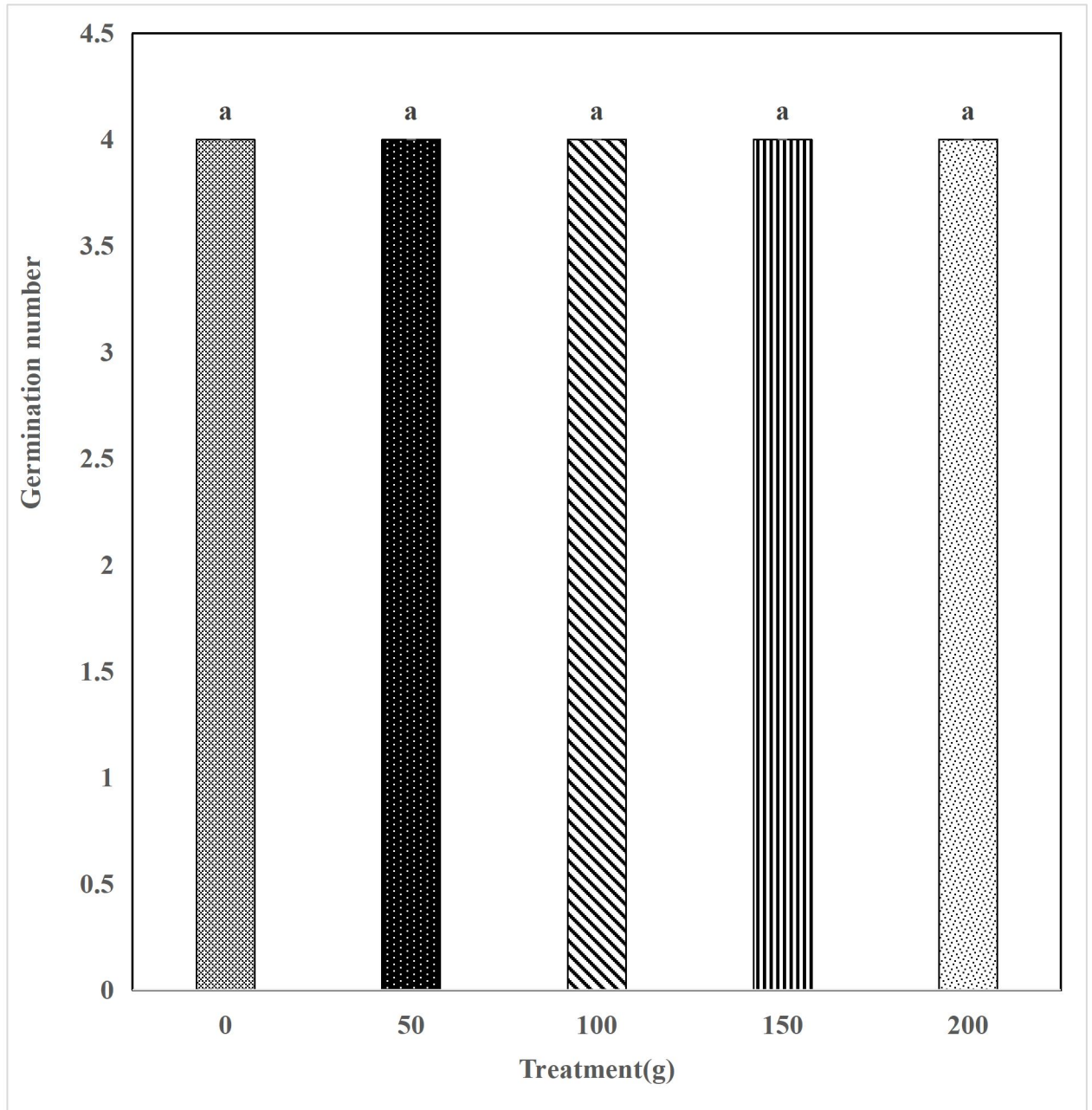


Figure 3.19: Germination Number of *Solanum macrocarpon* in Poultry Dung with NPK Enriched Soil on Day 9

\*Bars showing Mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

The mean chlorophyll content value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 9 were  $5.80 \pm 1.40$ ,  $4.90 \pm 1.73$  and  $2.33 \pm 0.12$  respectively.

The mean chlorophyll content value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 9 were  $1.63 \pm 0.28$ ,  $7.83 \pm 0.48$  and  $7.97 \pm 0.41$  respectively.

The mean chlorophyll content value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 9 were  $4.77 \pm 0.14$ ,  $6.93 \pm 0.23$  and  $6.73 \pm 0.12$  respectively.

The mean chlorophyll content value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 9 were  $3.70 \pm 1.72$ ,  $6.03 \pm 0.08$  and  $6.30 \pm 0.624$  respectively.

The mean chlorophyll content value for CONTROL (0 g) for Day 9 were  $2.77 \pm 0.36$ ,  $2.77 \pm 0.36$  and  $2.77 \pm 0.36$  respectively.

There was no significant difference between 50 g – 200 g poultry dung treatments and Control (Figure 3.21)

There was no significant difference between the treatment 50 g - 200 g of NPK and Control (Figure 3.22)

There was significant difference between Control and 50 g – 200 g poultry dung treatments + NPK, but there was no significant differences among the treatment 50 g - 200 g of NPK. (Figure 3.23)

The mean chlorophyll content value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 12 were  $4.97 \pm 0.32$ ,  $5.30 \pm 1.42$  and  $2.90 \pm 0.36$  respectively.

The mean chlorophyll content value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 12 were  $6.03 \pm 0.53$ ,  $7.90 \pm 0.45$  and  $8.00 \pm 0.45$  respectively.

The mean chlorophyll content value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 12 were  $5.80 \pm 0.23$ ,  $6.37 \pm 0.52$  and  $6.37 \pm 0.35$  respectively.

The mean chlorophyll content value for 200 g for 200 g poultry dung, NPK, poultry dung +NPK enrich soil on Day 12 were  $6.07 \pm 0.69$ ,  $6.03 \pm 0.08$  and  $7.37 \pm 0.75$  respectively.

The chlorophyll content value for CONTROL (0 g) were  $2.90 \pm 0.32$ ,  $2.90 \pm 0.32$  and  $2.90 \pm 0.32$  respectively.

There was no significant difference between the treatment 50g - 200g of NPK and Control (Figure 3.24)

Control is significantly different from all NPK treatment, similarly 50 g enriched soil is significantly different from 100 g enriched soil, but there is no significant difference between 150 g and 200 g NPK enriched soil (Figure 3.25)

Control and 50 g is significantly different from all of poultry dung + NPK treatment, similarly 150 g is significantly different from 200g

The mean chlorophyll content value for 50g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 15 were  $5.60 \pm 0.47$ ,  $5.27 \pm 1.37$ ,  $2.90 \pm 0.45$ .

The mean chlorophyll content value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 15 were  $6.67 \pm 0.90$ ,  $7.93 \pm 0.48$  and  $7.63 \pm 0.22$  respectively.

The mean chlorophyll content value for 150 g poultry dung NPK, and poultry dung + NPK enriched soil on Day 15 were  $6.13 \pm 0.55$ ,  $7.27 \pm 0.46$  and  $6.77 \pm 0.14$  respectively.

The mean chlorophyll content value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 15 were  $6.43 \pm 0.52$ ,  $6.37 \pm 0.42$  and  $6.37 \pm 0.84$  respectively.

The chlorophyll content value for CONTROL (0 g) for Day 15 were  $2.63 \pm 0.23$ ,  $2.63 \pm 0.23$  and  $2.63 \pm 0.23$  respectively.

There was significant difference between Control and the treatment 50 g – 200 g of poultry dung, but there was no significant differences among the treatment 50 g - 200 g of poultry dung treated soil (Figure 3.26)

Control was significantly different from all NPK treated with soil, similarly 50 g enriched soil is significantly different from 100 g enriched soil, but there is no significant difference between 150 g and 200 g NPK enriched soil (Figure 3.27)

There was significant difference between Control and the treatment 50 g -200 g of poultry dung, but there is no significant differences among the treatment 50 g -200 g of poultry dung treated soil (Figure 3.28)

The mean chlorophyll content value for 50g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 18 were  $4.90 \pm 0.30$ ,  $7.40 \pm 2.19$  and  $5.70 \pm 0.20$  respectively.

The mean chlorophyll content value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day were  $6.40 \pm 0.82$ ,  $7.53 \pm 1.08$  and  $9.10 \pm 0.55$  respectively.

The mean chlorophyll content value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 18 were  $6.53 \pm 0.59$ ,  $6.90 \pm 0.26$  and  $5.67 \pm 1.33$  respectively.

The mean chlorophyll content value for 200 g for 200 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 18 were  $6.33 \pm 0.46$ ,  $7.17 \pm 0.37$  and  $7.50 \pm 0.61$  respectively.

The mean chlorophyll content value for CONTROL (0 g) for Day 18 were  $5.97 \pm 0.95$ ,  $5.97 \pm 0.95$  and  $5.97 \pm 0.95$  respectively.

There was no significant difference between the treatment 50 g -200 g of poultry dung and Control (Figure 3.29)

There was no significant difference between the treatment 50 g - 200 g of NPK and Control (Figure 3.30)

There was no significant difference between Control and the treatment 50g - 200g of poultry dung + NPK, but there is no significant differences among the treatment 50 g-200 g of NPK. (Figure 3.31)

The mean chlorophyll content value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $4.93 \pm 0.20$ ,  $7.30 \pm 1.83$  and  $6.20 \pm 1.33$  respectively.

The mean chlorophyll content value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 21 were  $5.97 \pm 0.61$ ,  $6.20 \pm 0.46$  and  $12.3 \pm 1.77$  respectively.

The mean chlorophyll content value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 21 were  $7.13 \pm 0.92$ ,  $7.23 \pm 0.46$  and  $7.53 \pm 0.26$  respectively.

The mean chlorophyll content value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 21 were  $6.17 \pm 0.63$ ,  $9.23 \pm 1.11$  and  $8.00 \pm 0.70$  respectively.

The chlorophyll content value for CONTROL (0 g) on Day 21 were  $5.97 \pm 0.83$ ,  $5.97 \pm 0.83$  and  $5.97 \pm 0.83$  respectively.

There was no significant difference between the treatment 50 g – 200 g of poultry dung and Control (Figure 3.32)

There was no significant difference between the treatment 50 g – 200 g of NPK and Control (Figure 3.33)

There is significant difference between Control and the treatment 50 g – 200 g of poultry dung + NPK, but there was no significant differences among the treatment 50 g-200 g Of poultry dung + NPK (Figure 3.34)

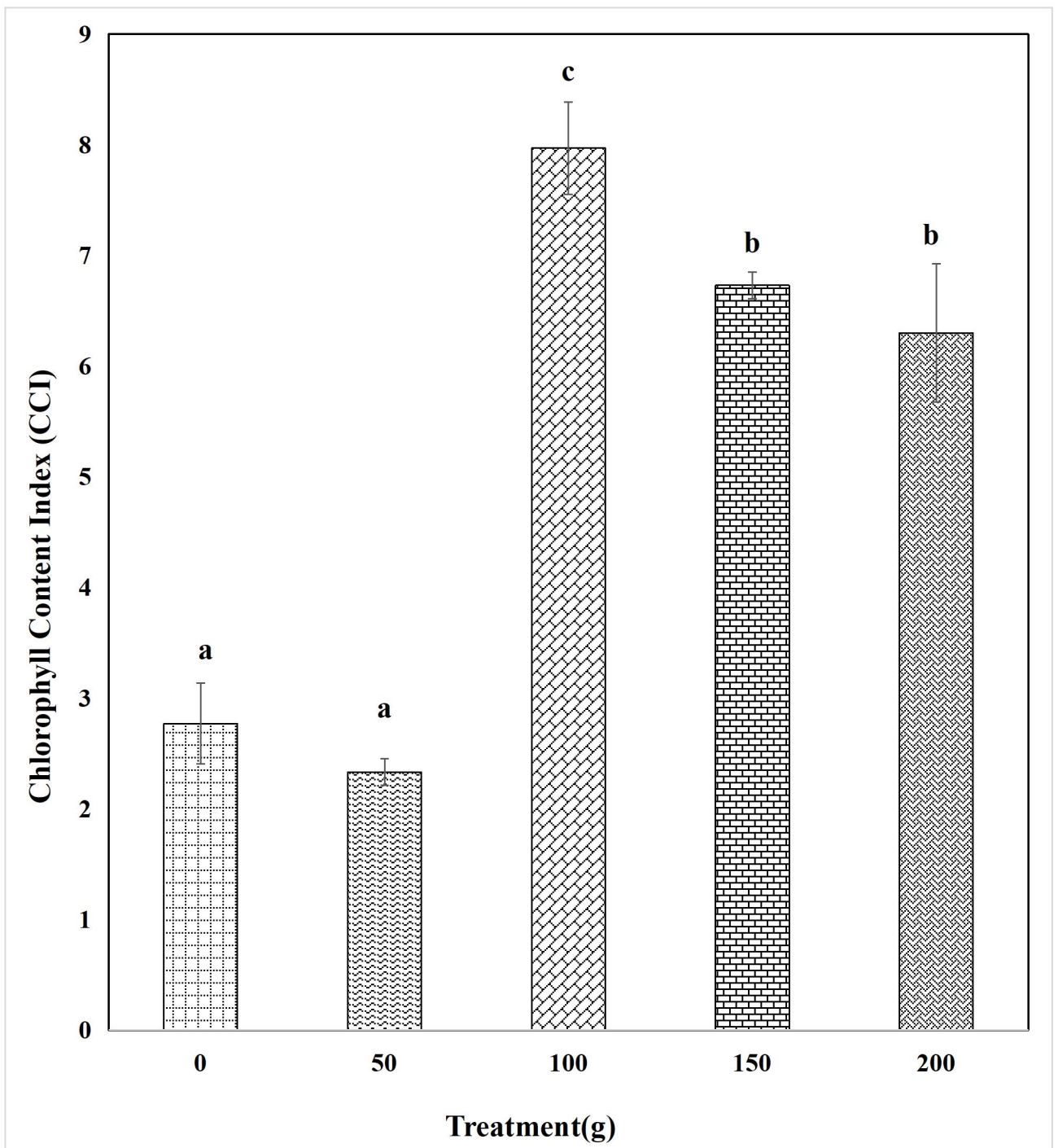


Figure 3.20: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 9

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

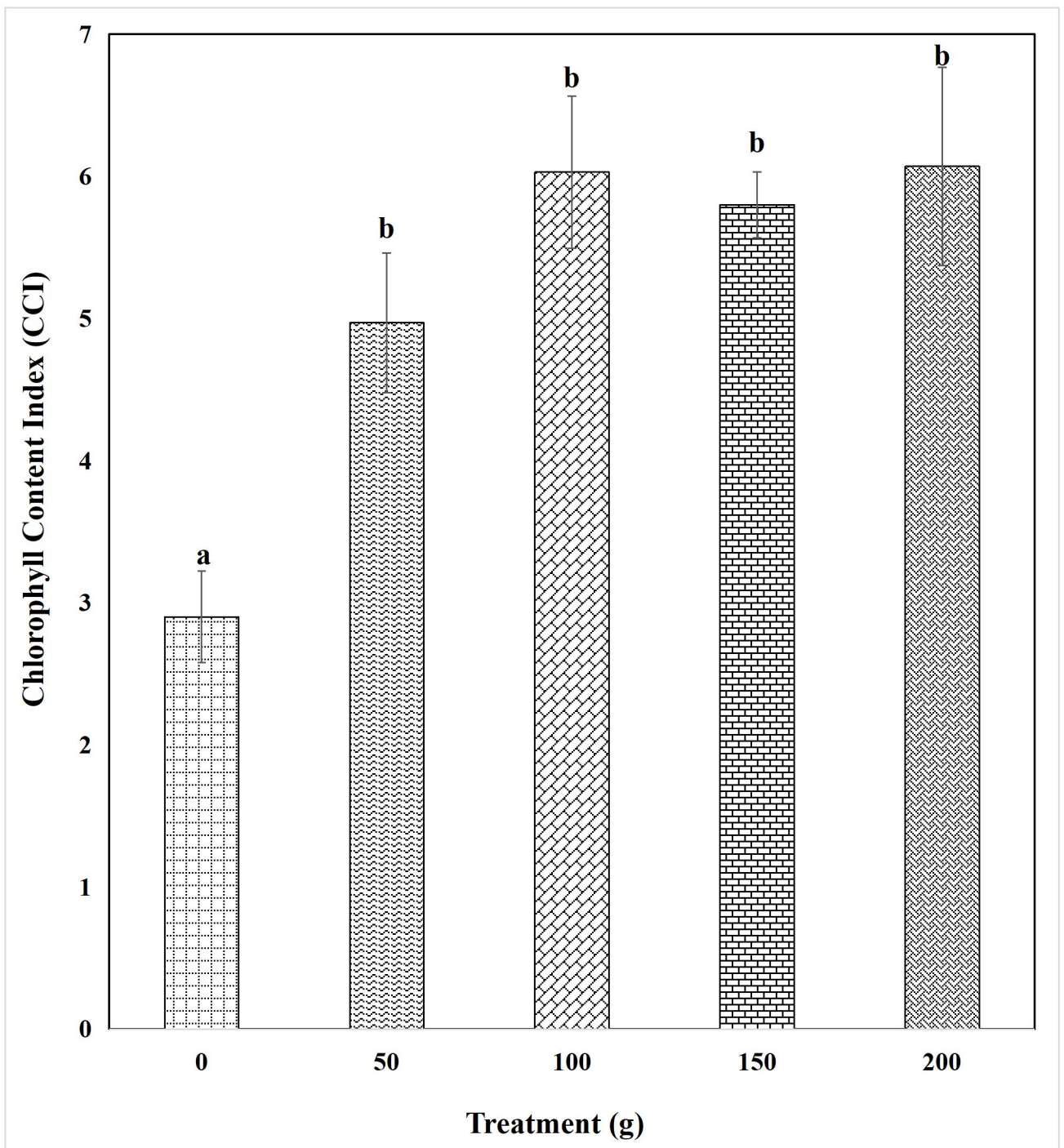


Figure 3.21: Chlorophyll Content Index of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 9

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

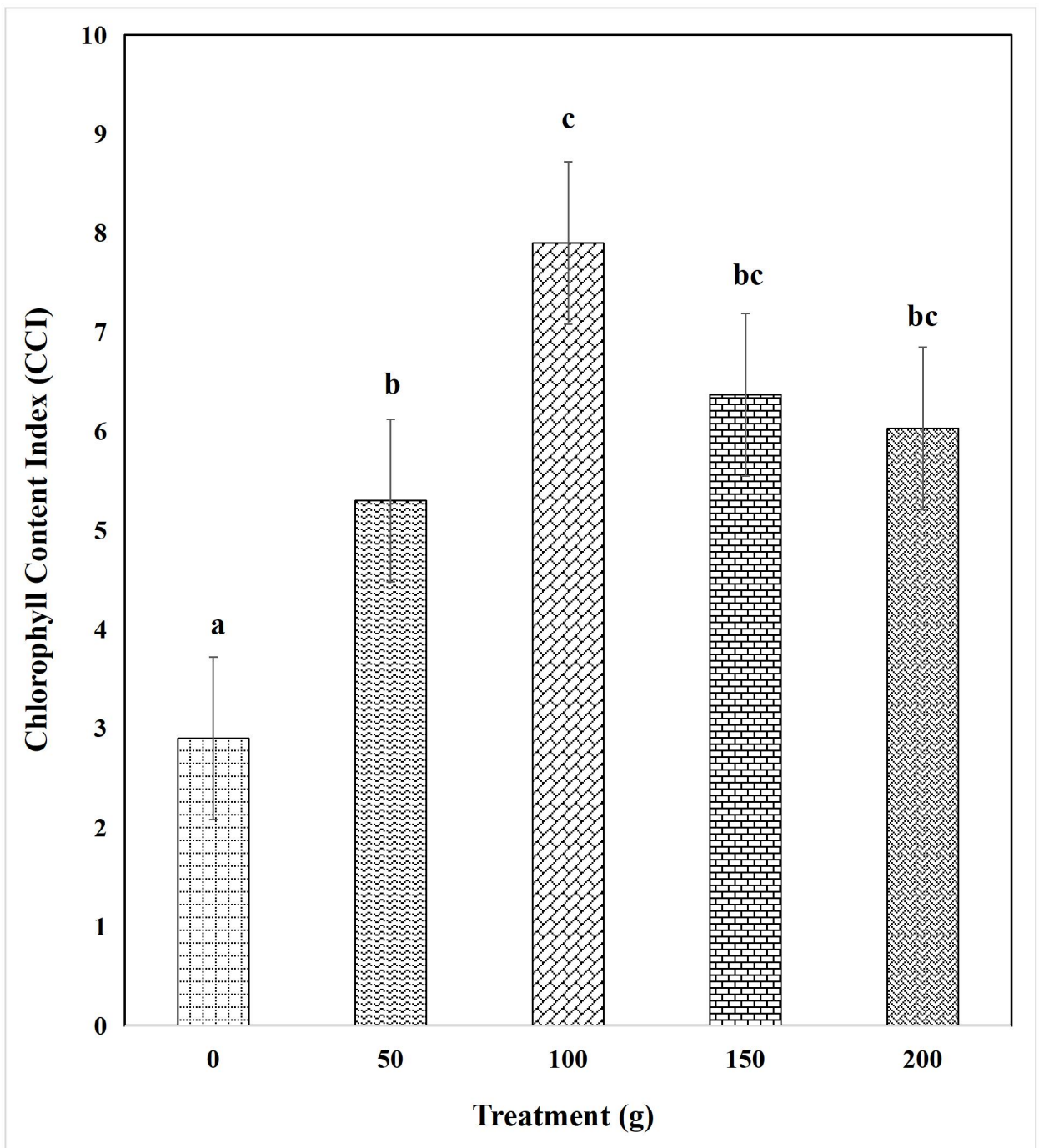


Figure 3.22: Chlorophyll Content Index of *Solanum macrocarpon* in NPK Enriched Soil on Day 9

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

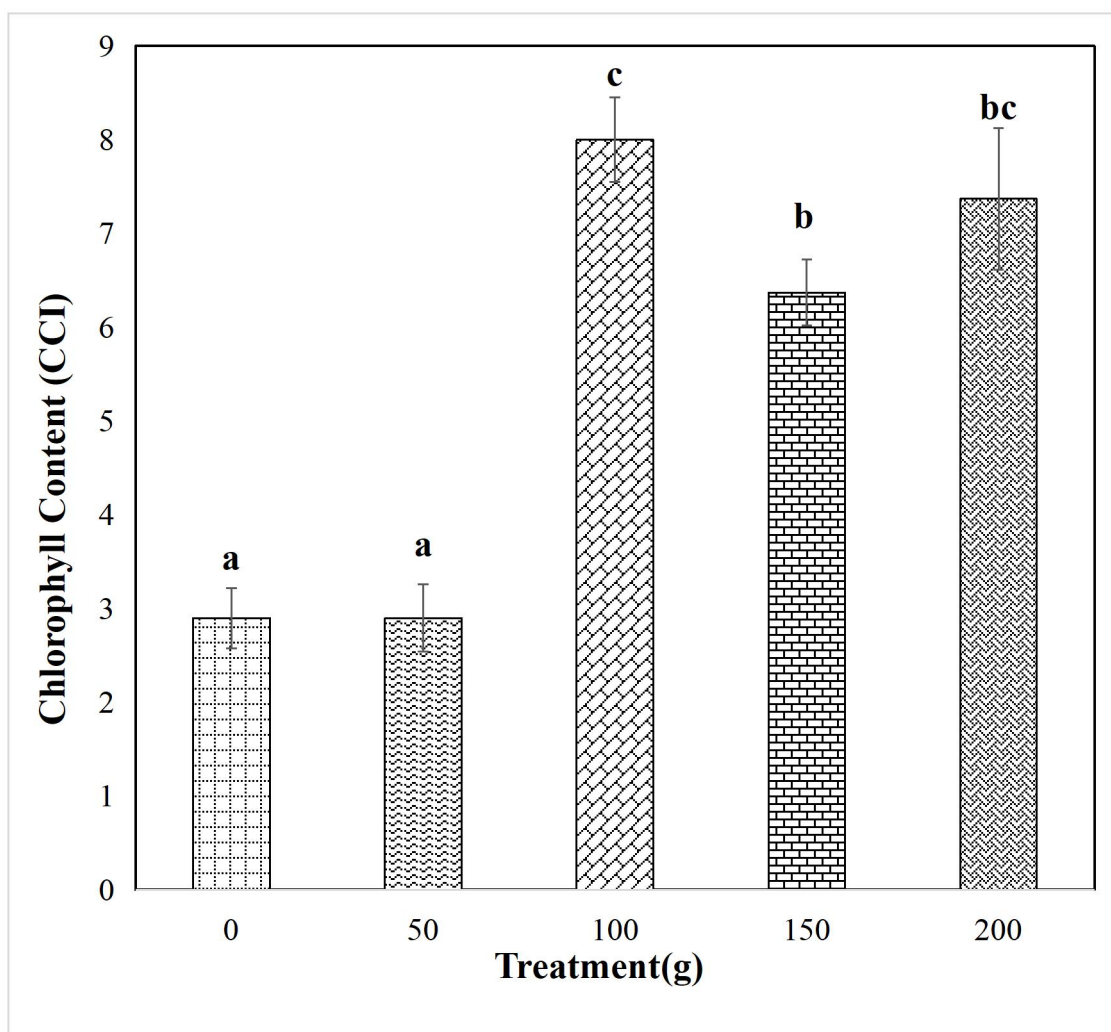


Figure 3.23: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 12

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

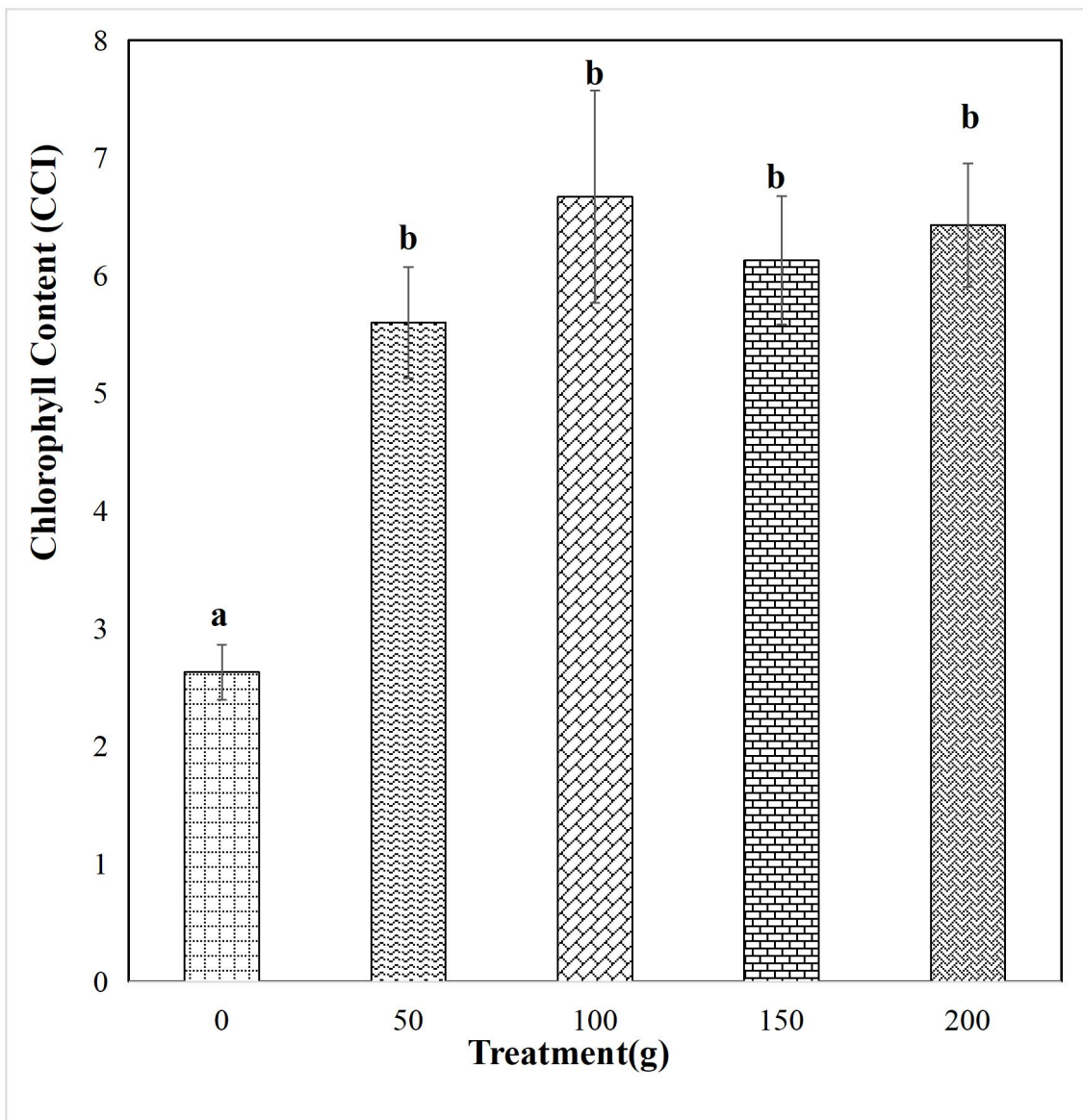


Figure 3.24: Chlorophyll Content Index of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 12

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

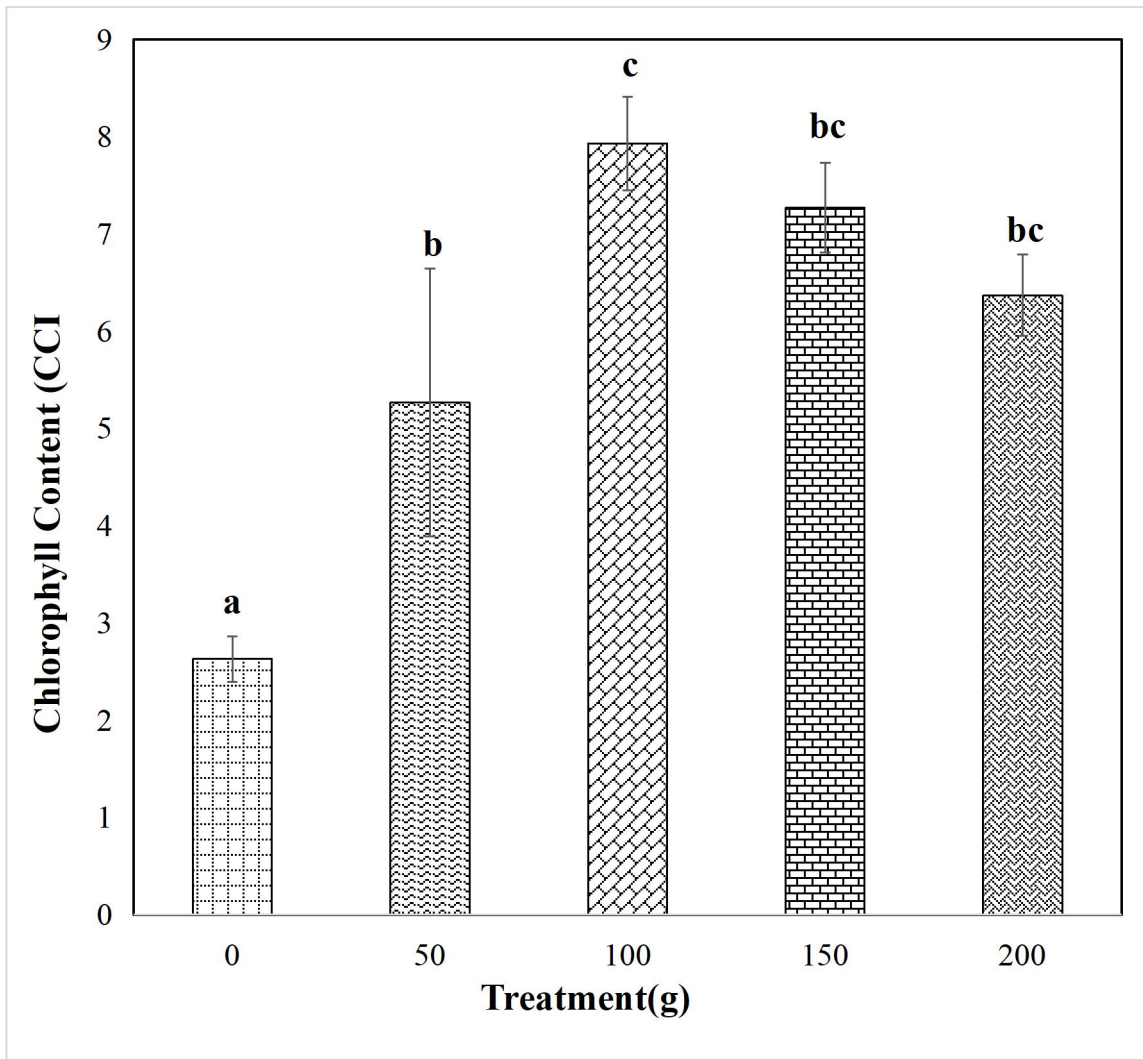


Figure 3.25: Chlorophyll Content Index of *Solanum macrocarpon* in NPK Enriched Soil on Day 12

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

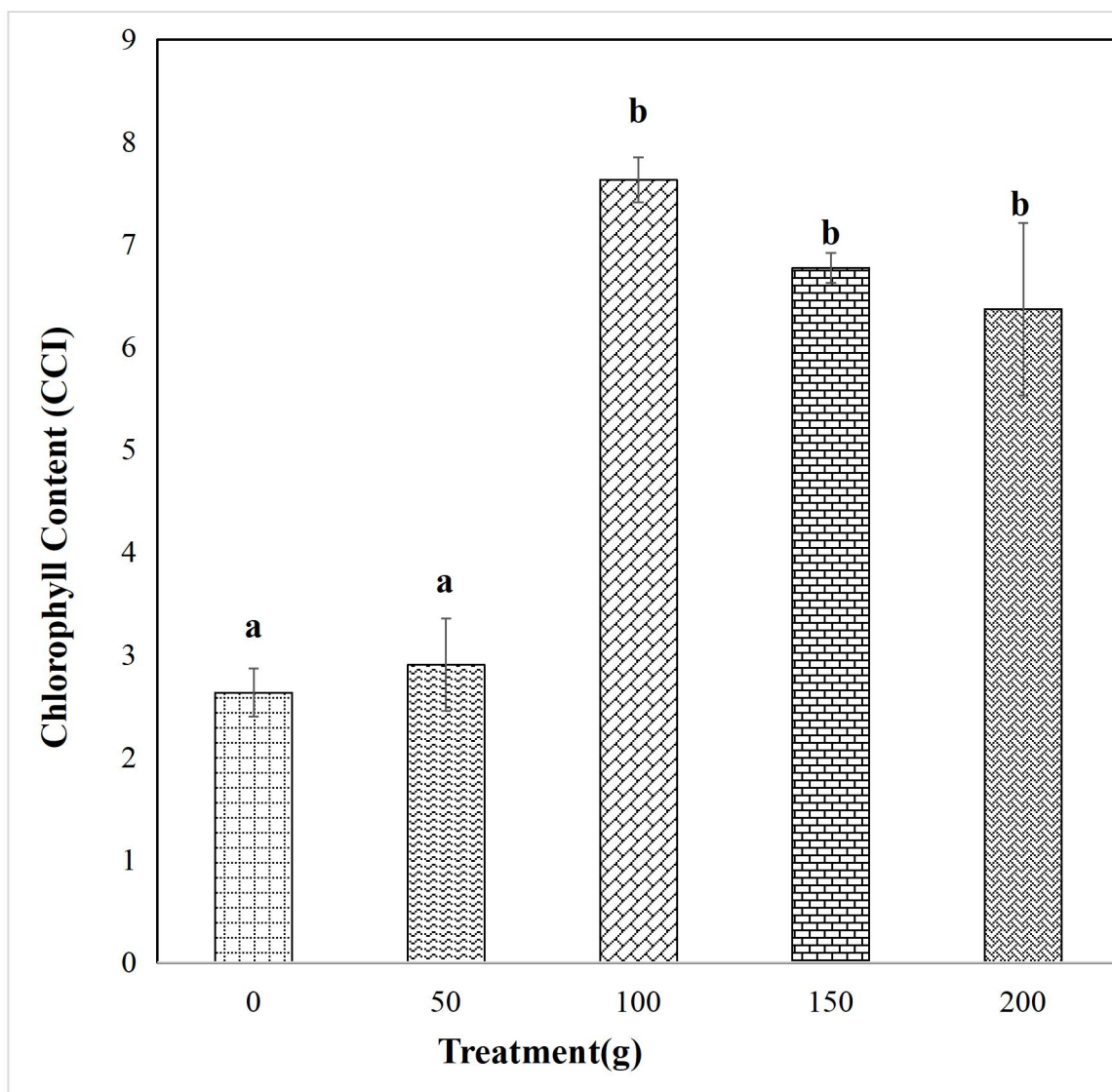


Figure 3.26: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 15

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

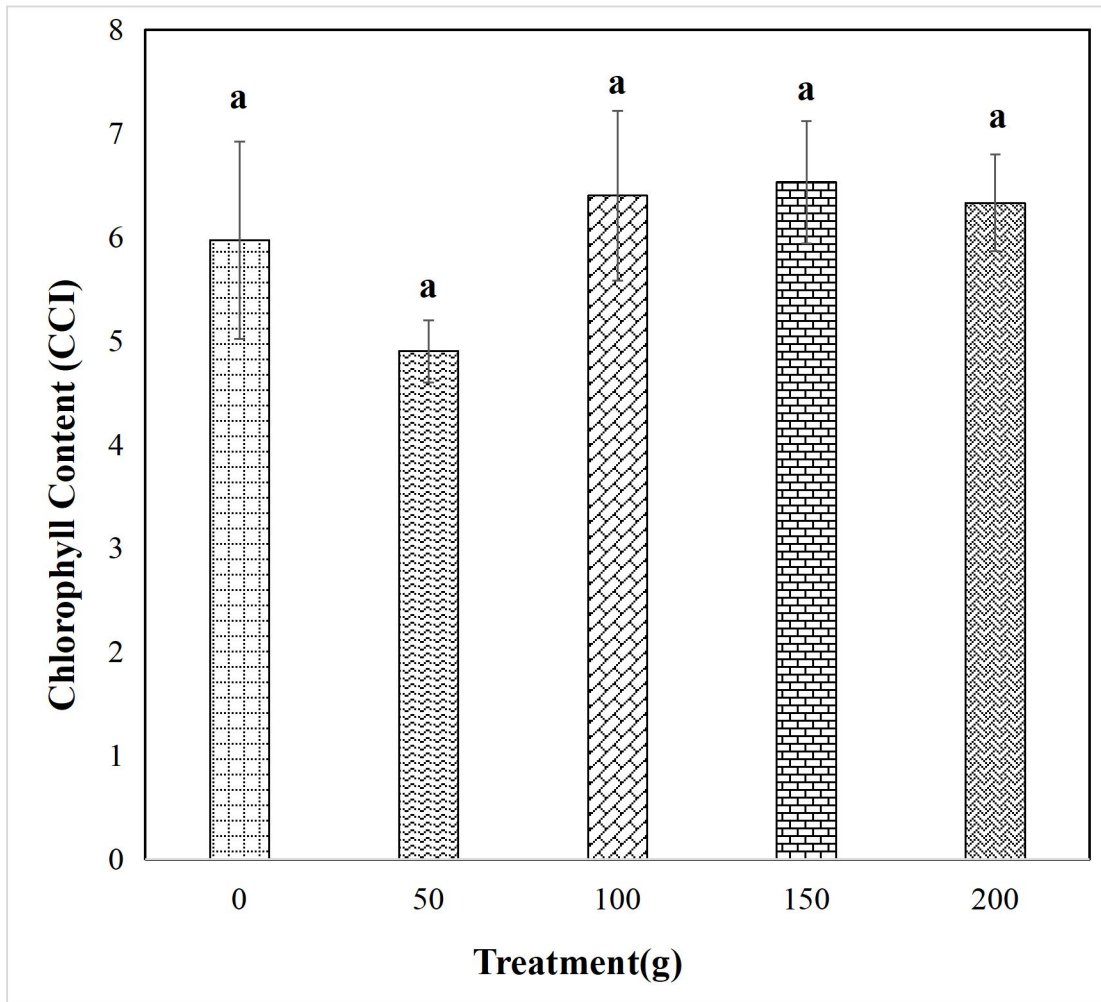
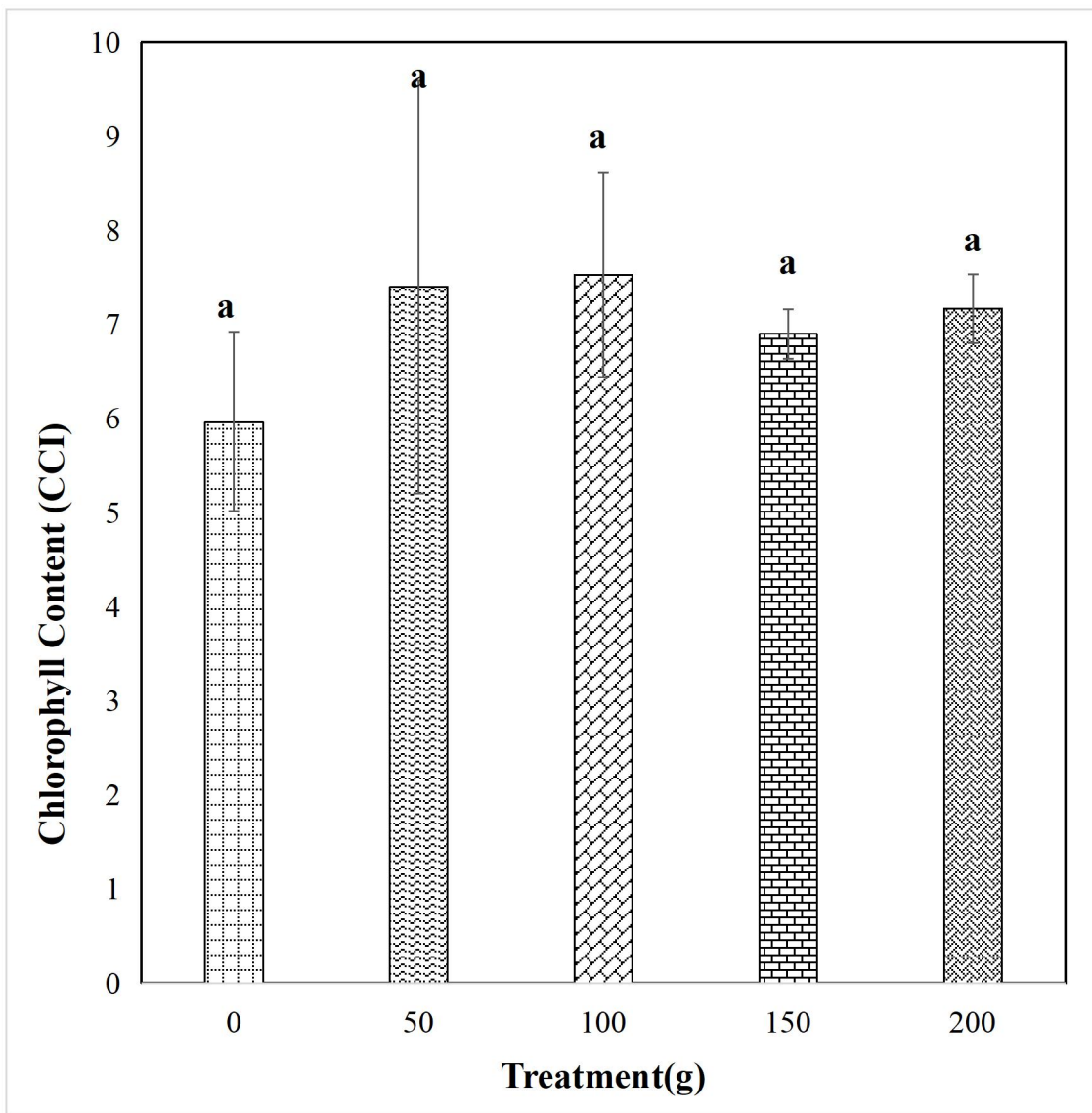


Figure 3.27: Chlorophyll Content

Content Index of *Solanum macrocarpon* in Poultry Dung Enriched Soil on Day 15

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )



Figure

3.28: Chlorophyll Content Index of *Solanum macrocarpon* in NPK Enriched Soil on Day 15

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each other ( $P > 0.05$ )

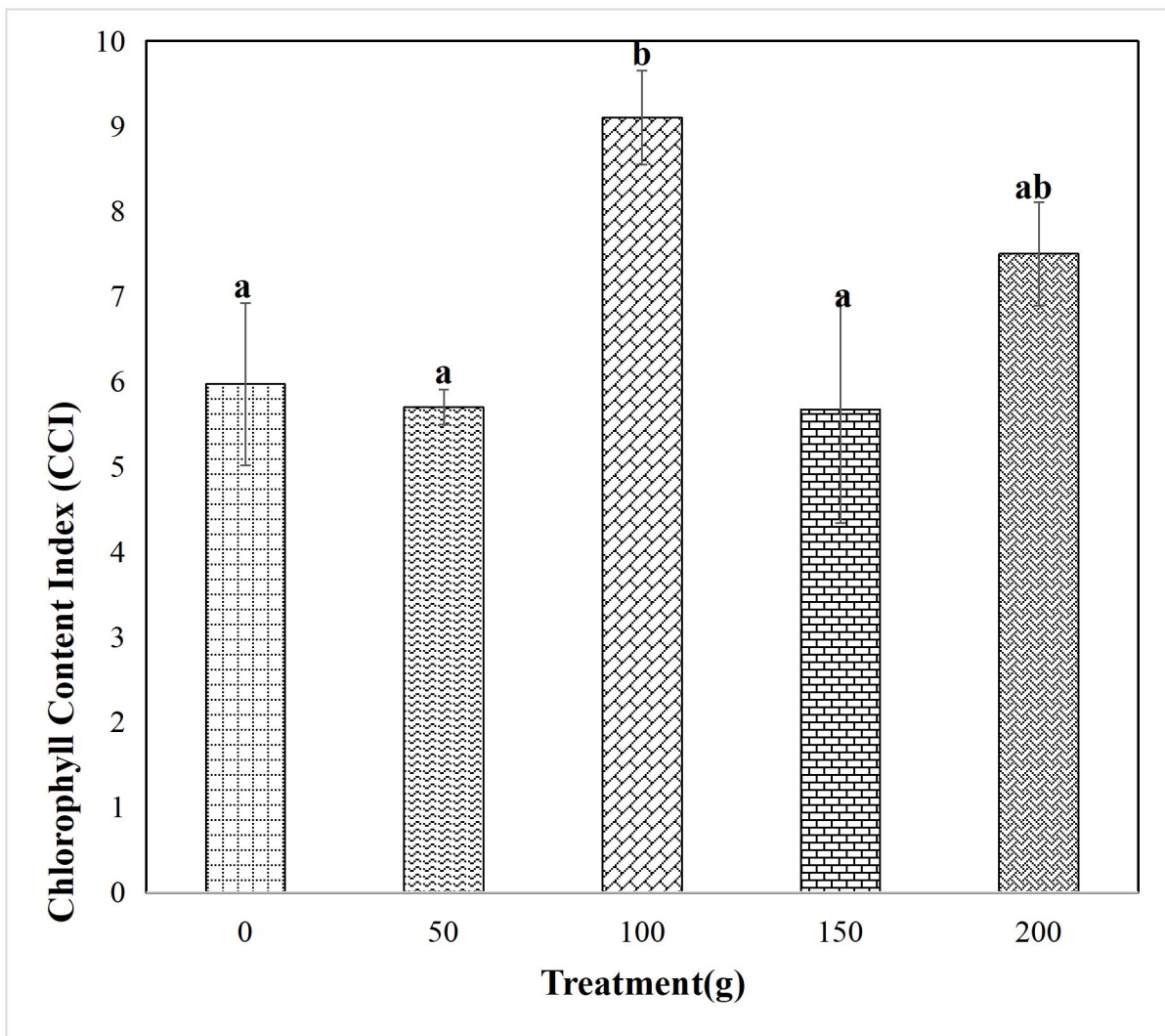


Figure 3.29: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each

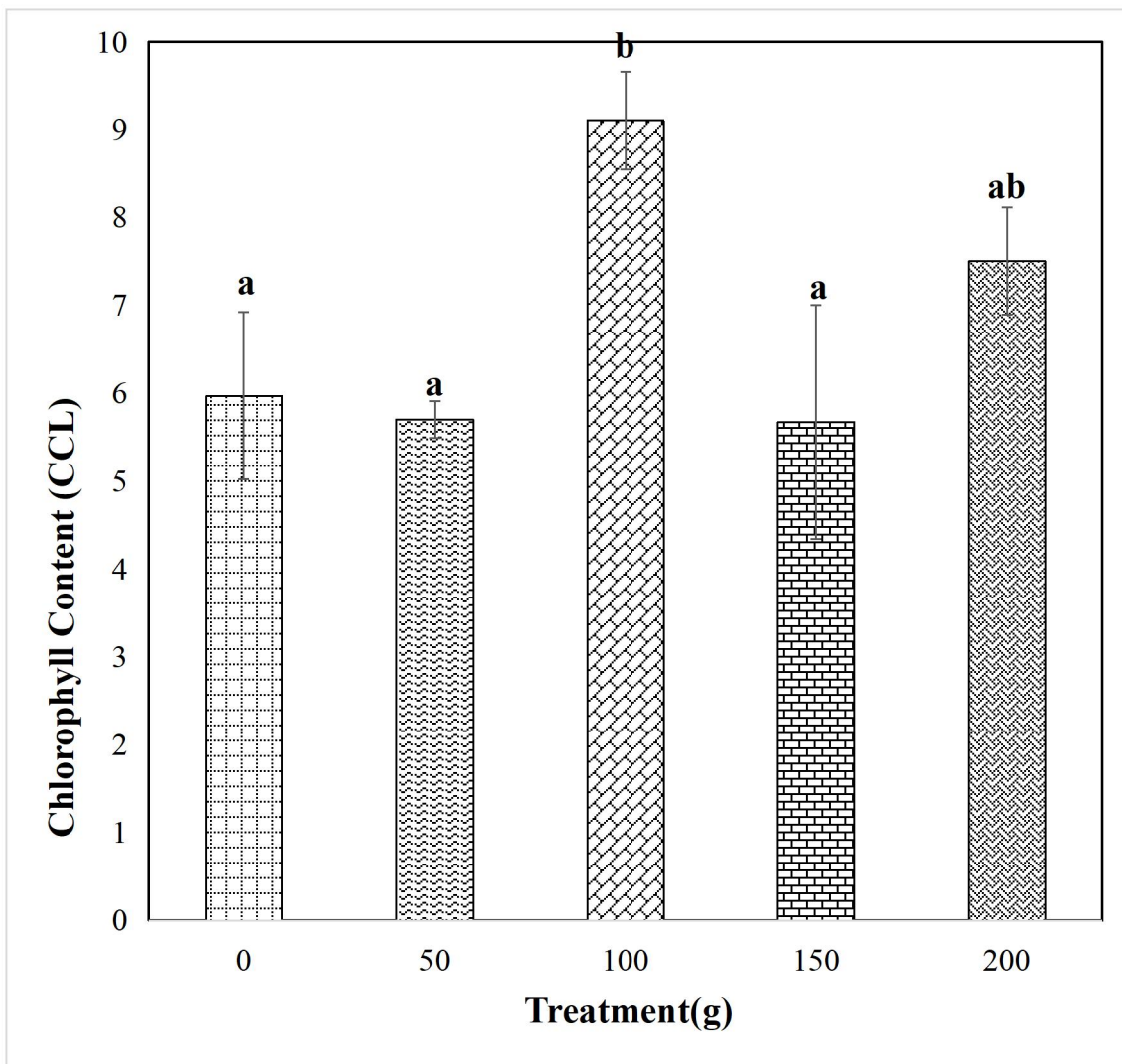


Figure 3.30: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each

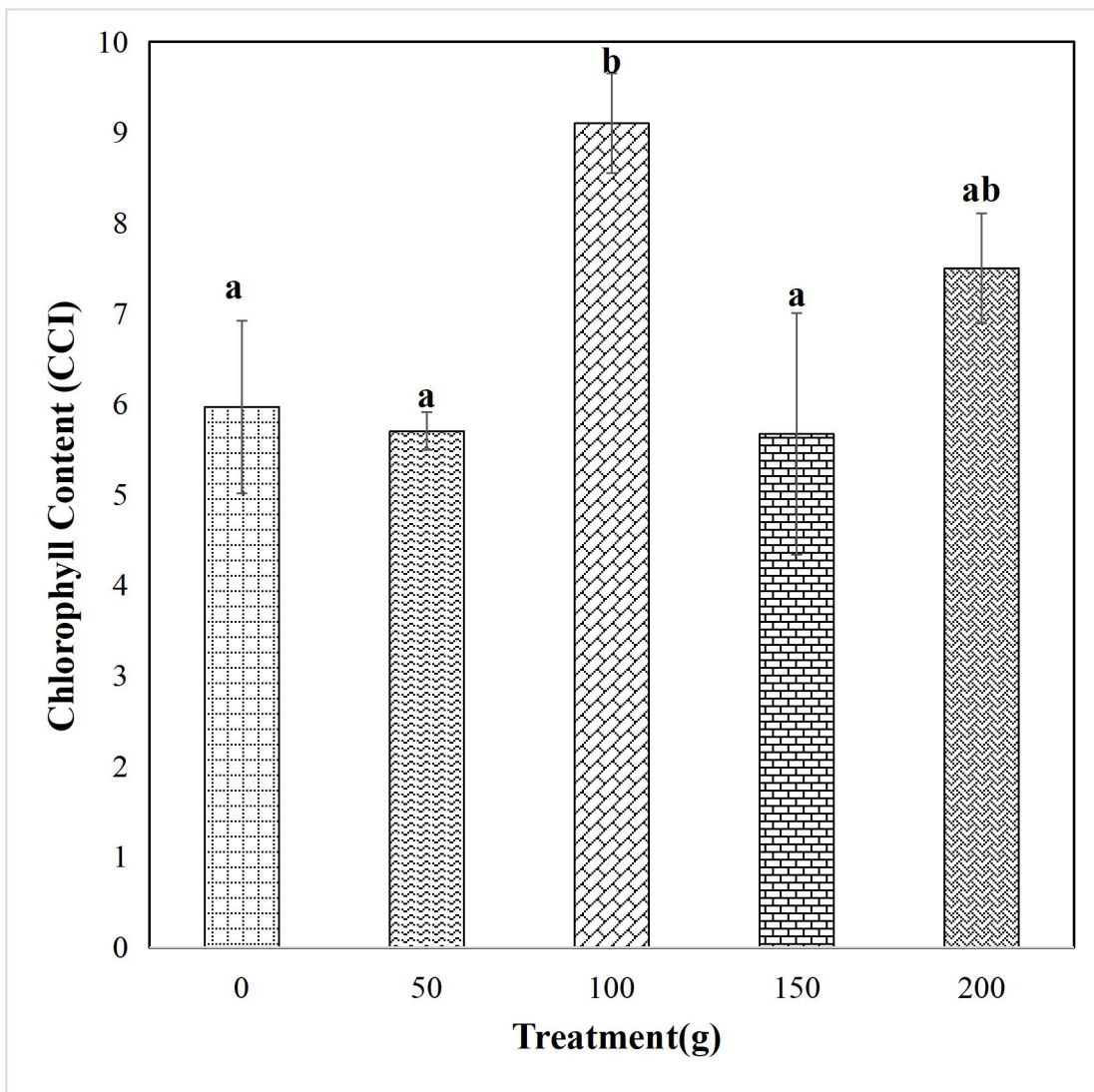


Figure 3.31: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each

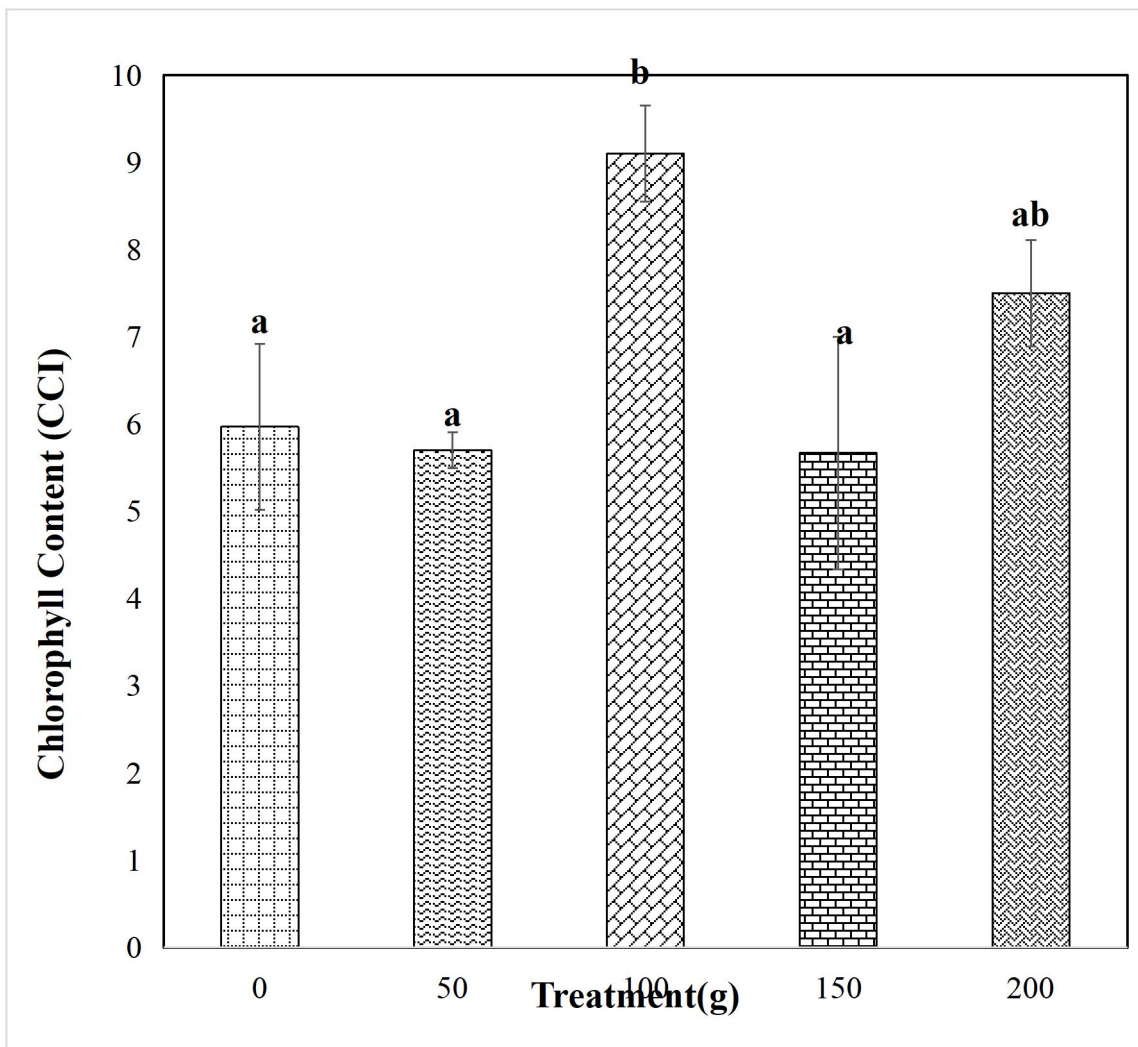


Figure 3.32: Chlorophyll Content Index of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each

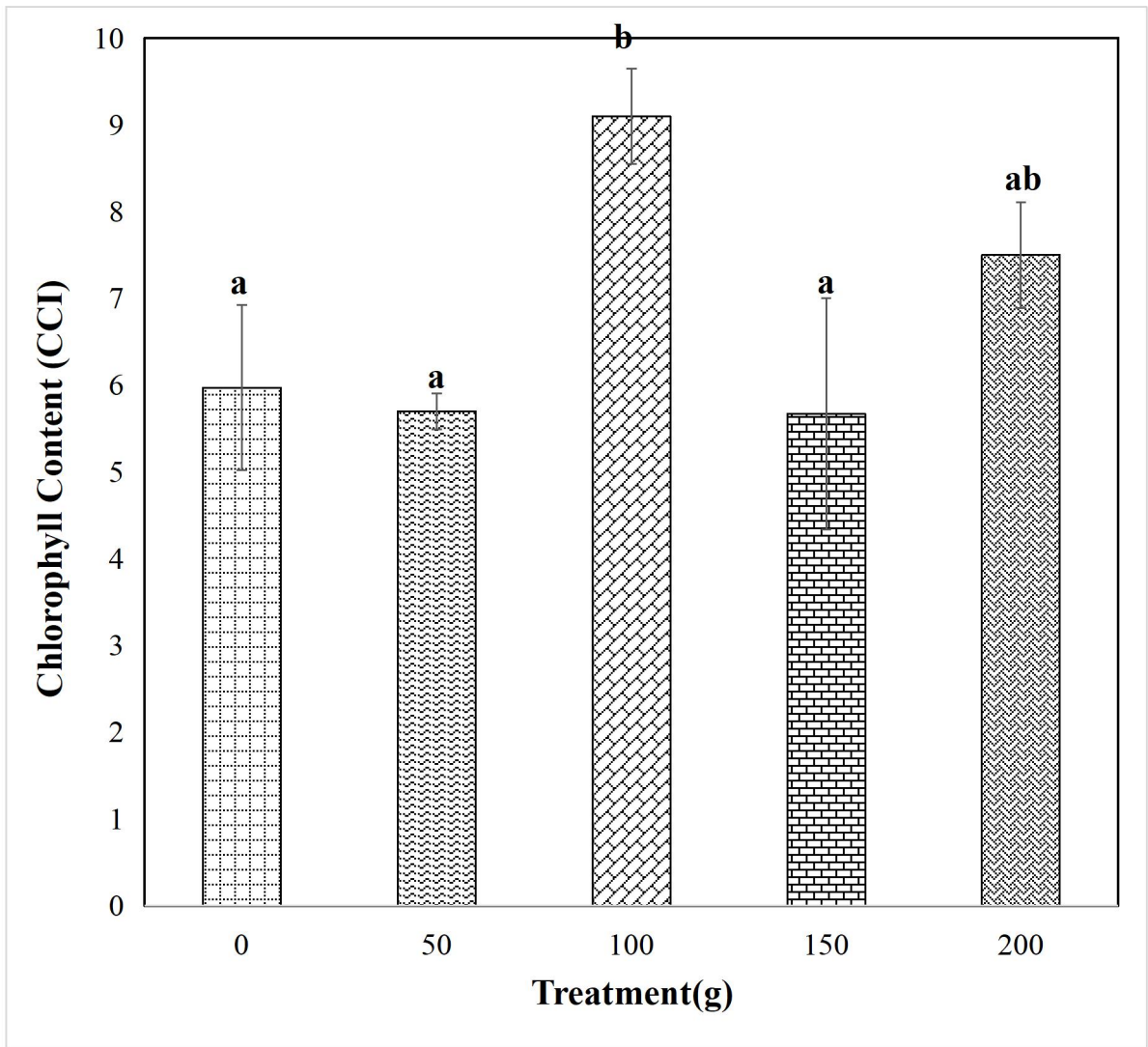


Figure 3.33: Chlorophyll content of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each

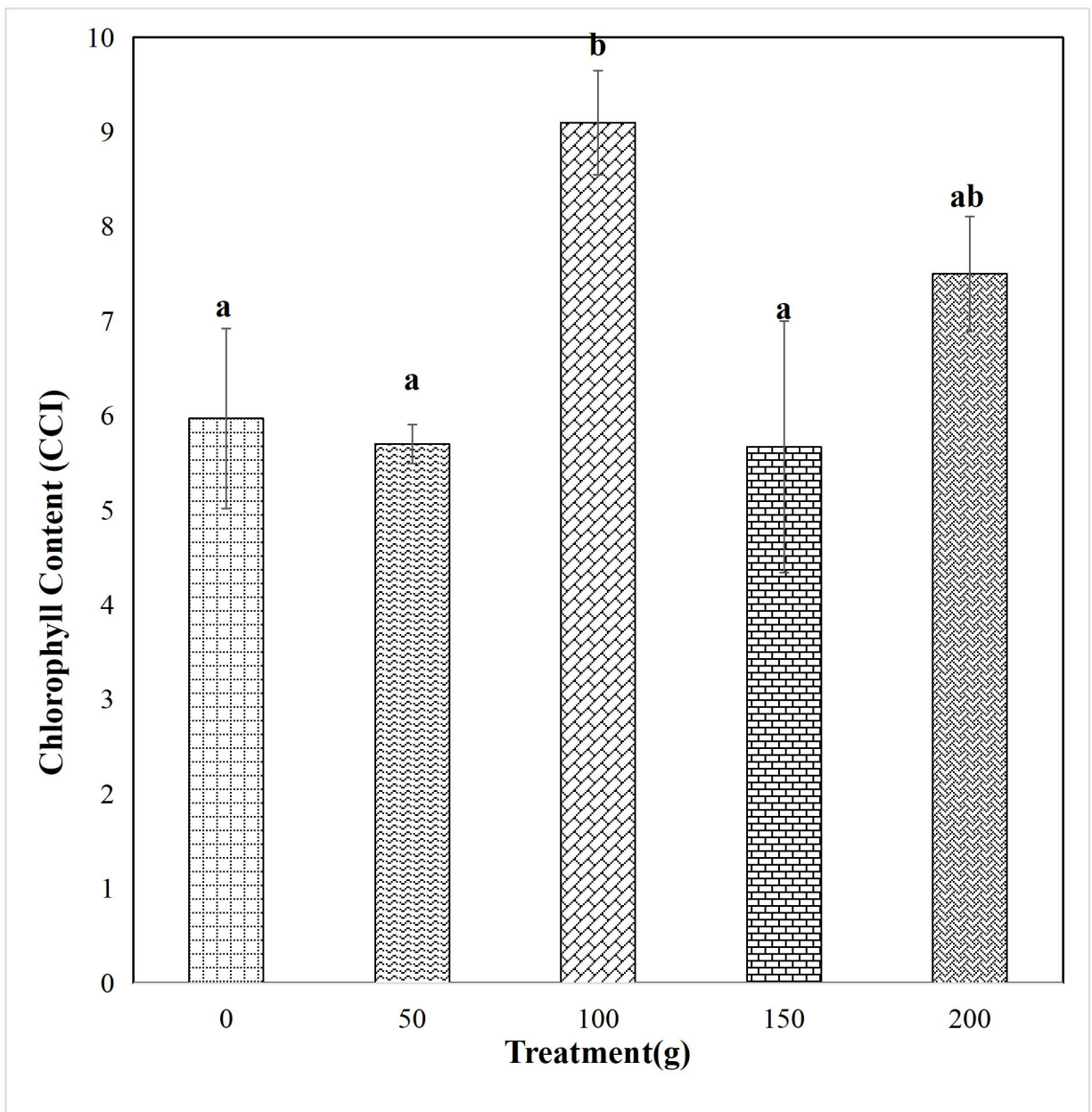


Figure 3.34: Chlorophyll content of *Solanum macrocarpon* in NPK and Poultry Dung Enriched Soil on Day 21

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each.

The mean of leaf number value for 50g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 3 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 3 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 150 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 3 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil Day 3 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean leaf number value for CONTROL (0 g) for Day 3 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

There was no significant difference between Control and other treatment of 50 g -200 g of poultry dung, because they were all grown. (Figure 3.35)

There was no significance difference between Control and other treatment of 50 g -200 g of NPK, because they were all grown (Figure 3.36)

There was no significance difference between Control and other treatment of 50 g - 200 g of poultry dung + NPK, because they were all grown.(Figure 3.37)

The mean of leaf number value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 6 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 6 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 150 g poultry dung, NPK, and poultry dung + NPK for Day 6 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The mean leaf number value for 200 g for 200 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 6 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

The leaf number value for CONTROL(0g) for Day 6 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  and  $2.00 \pm 0.00$  respectively.

There was significant difference between Control and 50 g – 200 g poultry dung treatments (Figure 3.38).

There was significant difference between Control and 200 g of NPK and all other treatment of NPK treated soil (Figure 3.39).

There was significant treatment between Control and 50 g -200 g poultry dung + NPK the treatments (Figure 3.40).

The mean leaf number value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil Day 9 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 9 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  respectively.

The mean leaf number value for 150 g poultry dung NPK, and poultry dung + NPK enriched soil on Day 9 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  respectively.

The mean of leaf number value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 9 were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  respectively.

The of leaf number value for CONTROL (0 g) for 9 Day were  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$ ,  $2.00 \pm 0.00$  respectively.

There was no significant difference between Control and 50 g - 200 g of poultry dung treatments (Figure 3.41).

There was no significant difference between Control and the treatment of 50 g - 200 g of NPK treated soil (Figure 3.42)

There was no significant difference between Control and the treatment of 50 g - 200 g of poultry dung + NPK treated soil (Figure 3.43)

The mean of leaf number value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 12 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.88$ ,  $4.67 \pm 0.33$  respectively.

The mean of leaf number value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil Day 12 were  $5.67 \pm 0.67$ ,  $6.00 \pm 0.58$ ,  $5.00 \pm 0.00$  respectively.

The mean of leaf number value for 150 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 12 were  $4.33 \pm 0.33$ ,  $5.00 \pm 0.00$ ,  $6.67 \pm 1.20$  respectively.

The mean of leaf number value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 12 were  $6.67 \pm 0.88$ ,  $5.00 \pm 0.58$  respectively.

The mean of leaf number value for CONTROL (0 g) for Day 12 were  $5.00 \pm 0.00$ ,  $5.00 \pm 0.00$ ,  $5.00 \pm 0.00$  respectively.

There was significant difference between 150 g - 200 g to all other treatment of poultry dung treated soil (Figure 3.44)

There was no significant difference between Control and treatment of 50 g - 200 g of NPK enriched soil (Figure 3.45)

There was no significant difference between Control and other treatment of 50 g - 200 g of poultry dung + NPK enriched soil (Figure 3.46)

The mean leaf number value for 50 g poultry dung, NPK, and poultry dung + NPK for Day 15 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.88$ ,  $7.33 \pm 0.88$

The mean leaf number value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 15 were  $5.67 \pm 0.67$ ,  $6.00 \pm 0.58$ ,  $8.33 \pm 3.33$  respectively.

The mean of leaf number value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 15 were  $4.33 \pm 0.33$ ,  $5.00 \pm 0.00$ ,  $8.00 \pm 0.58$  respectively.

The mean of leaf number value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 15 were  $6.67 \pm 0.88$ ,  $5.00 \pm 0.58$ ,  $6.00 \pm 1.00$  respectively.

The leaf number value for CONTROL (0 g) for Day 15 were  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$  respectively.

There was significant difference between 200 g of poultry dung to all other treatment of poultry dung treated soil (Figure 3.47)

There was no significant difference between the treatment 50g - 200g of NPK and Control (Figure 3.48)

There was no significant difference between the treatment 50 g -200 g of poultry dung + NPK enriched soil (Figure 3.49)

The mean leaf number value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 18 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.88$ ,  $7.33 \pm 0.88$  respectively.

The mean leaf number value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 18 were  $5.67 \pm 0.67$ ,  $6.00 \pm 0.58$ ,  $8.33 \pm 3.33$  respectively.

The mean of leaf number value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil in Day 18 were  $5.00 \pm 0.00$ ,  $5.00 \pm 0.00$ ,  $8.00 \pm 0.577$  respectively.

The mean of leaf number value for 200 g for 200 g poultry dung, NPK, poultry dung +NPK for Day 18 were  $6.67 \pm 0.88$ ,  $5.33 \pm 0.33$ ,  $6.00 \pm 1.00$  respectively.

The leaf number value for CONTROL (0 g) for Day 18 were  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$  respectively.

There was no significant difference between Control and other treatment of 50 g -200 g of poultry dung treated soil (Figure 3.50)

There was no significant difference between Control and other treatment of 50 g -200 g of NPK enriched soil (Figure 3.51)

There was no significant difference between Control and other treatment of 50 g – 200 g of poultry dung + NPK (Figure 3.52)

The mean leaf number value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $6.00 \pm 0.33$ ,  $5.67 \pm 0.88$ ,  $7.67 \pm 0.88$  respectively.

The mean leaf number value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $5.67 \pm 0.68$ ,  $6.00 \pm 0.58$ ,  $8.67 \pm 3.18$  respectively.

The mean of leaf number value for 150 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $5.00 \pm 0.00$ ,  $5.00 \pm 0.00$ ,  $8.00 \pm 0.57$  respectively.

The mean of leaf number value for 200 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 21 were  $7.00 \pm 1.00$ ,  $5.33 \pm 0.33$ ,  $6.00 \pm 1.00$  respectively.

The leaf number value for CONTROL (0 g) enriched soil on Day 21 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.33$ ,  $5.67 \pm 0.33$  respectively.

There was significant difference between 150 g and 200 g of treatment of poultry dung to all other treatment of poultry dung treated soil (Figure 3.53)

There was no significant difference between Control and all other treatment of 50 g - 200 g of treatment of NPK (Figure 3.54)

There was no significant difference between Control and all other treatment of 50 g -200 g of treatment of poultry dung + NPK (Figure 3.55)

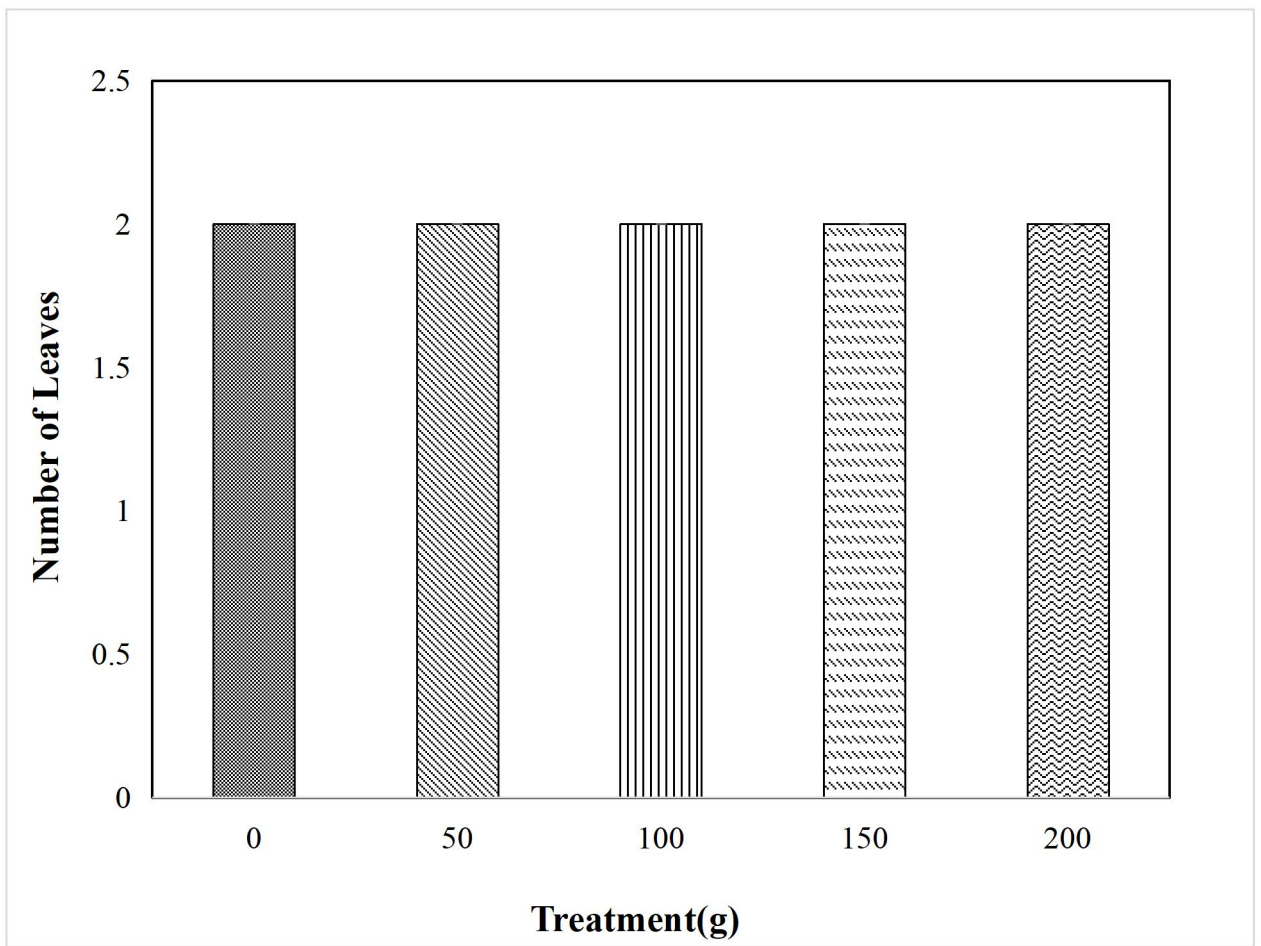


Figure 3.35: Number of leaves of *Solanum macrocarpon* in Poultry Dung on Day 3

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each.

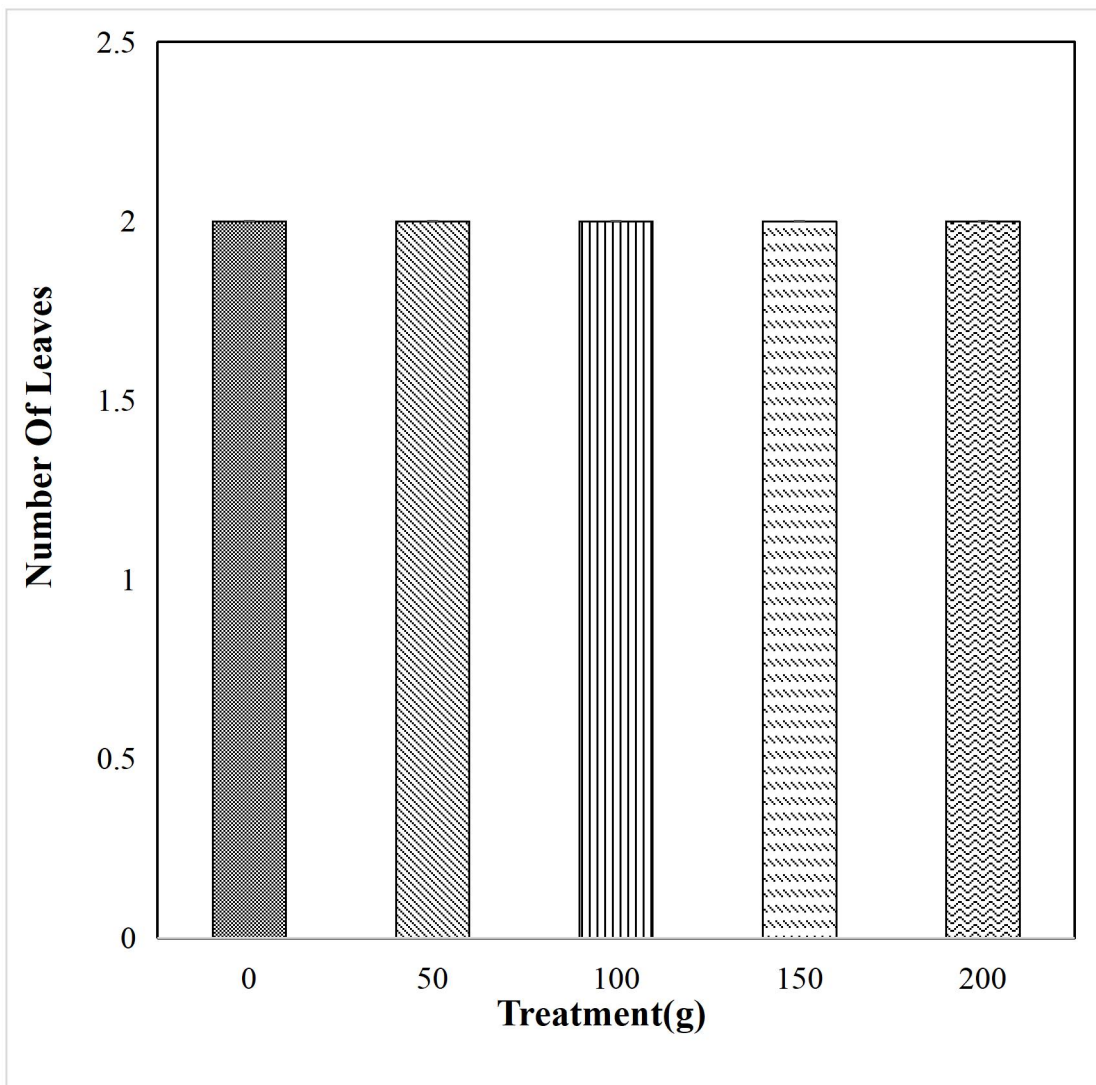


Figure 3.36: Number of leaves of *Solanum macrocarpon* in NPK on Day 3

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each.

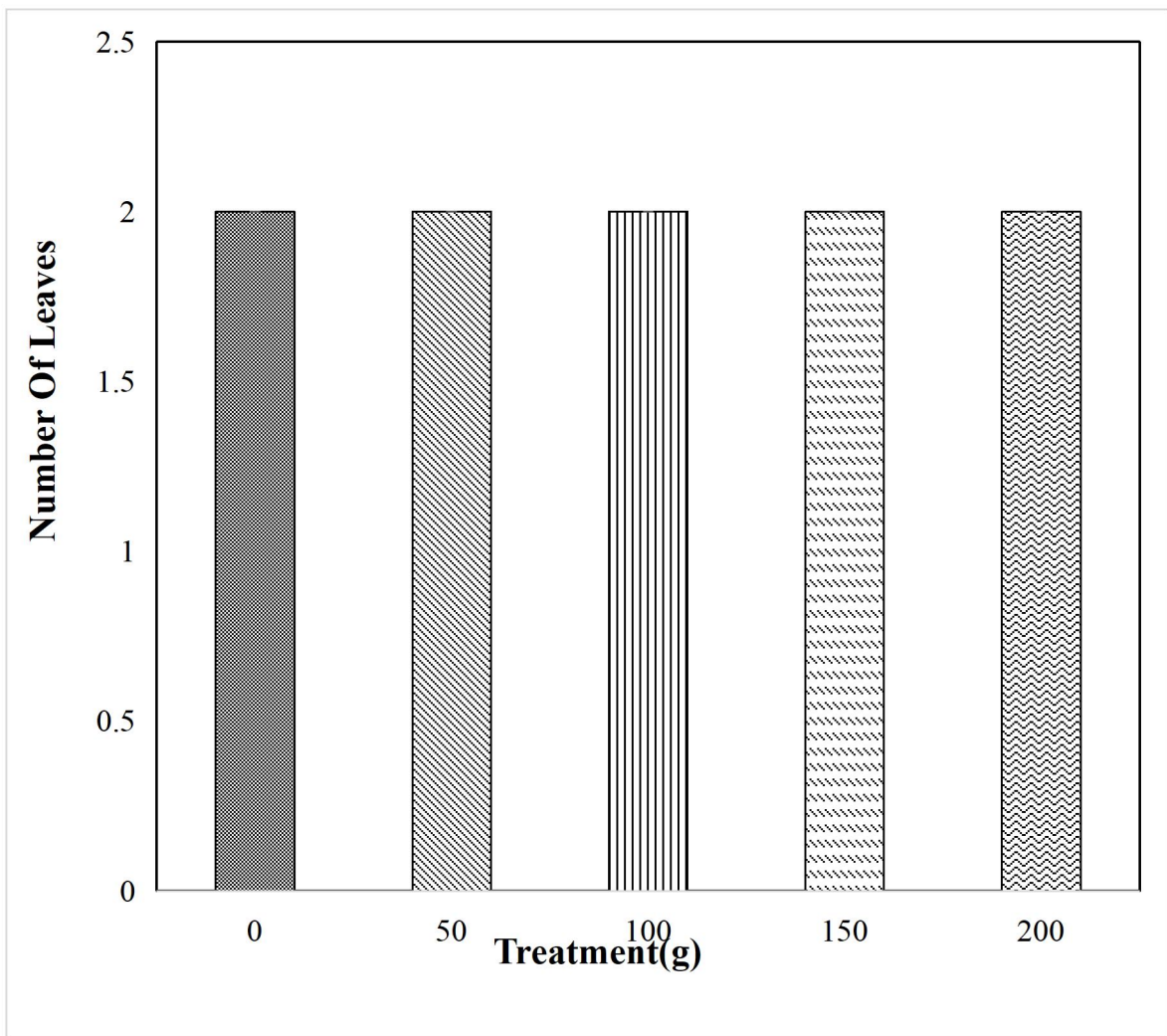


Figure 3.37: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of poultry dung + NPK on Day 3

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

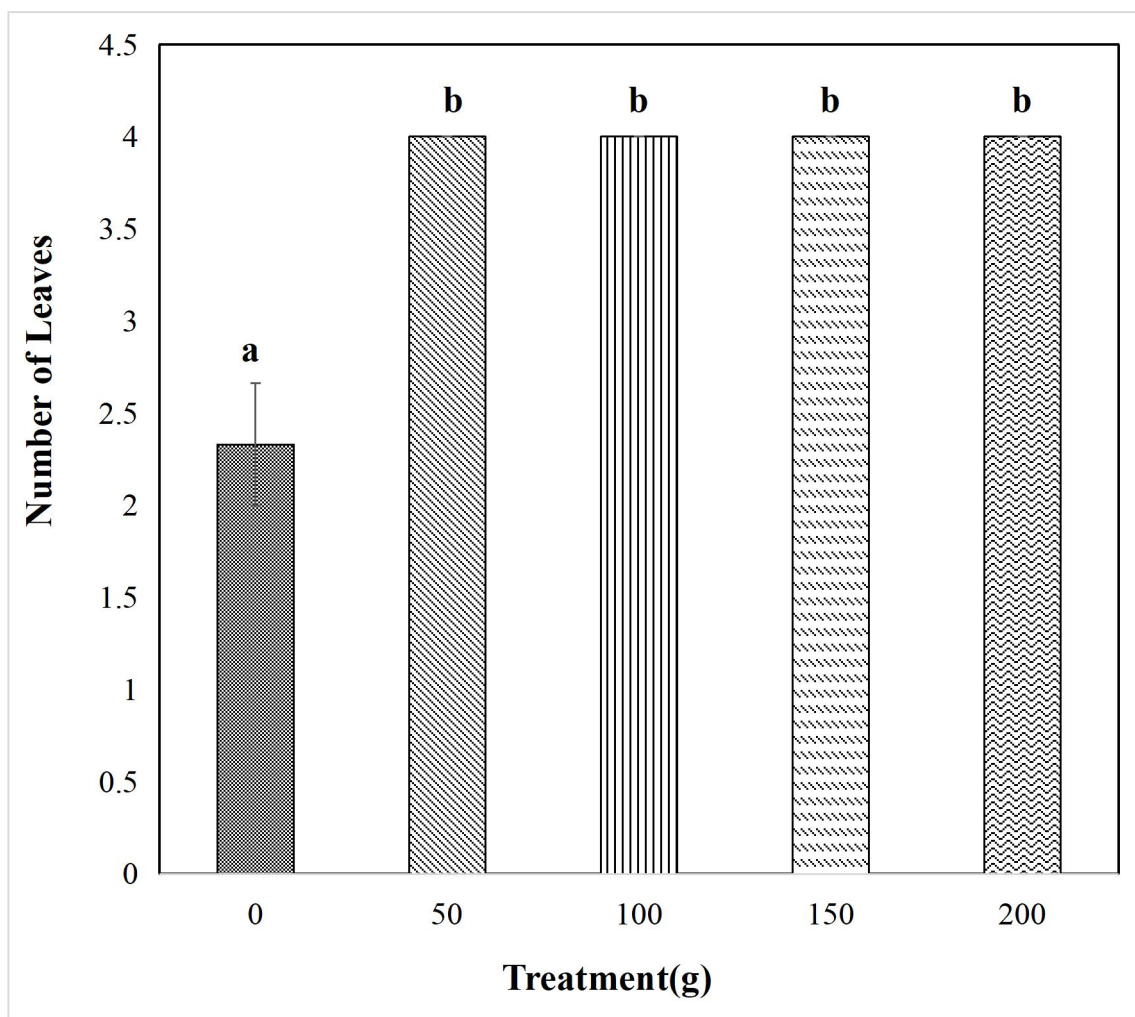


Figure 3.38: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of poultry dung Day 6

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

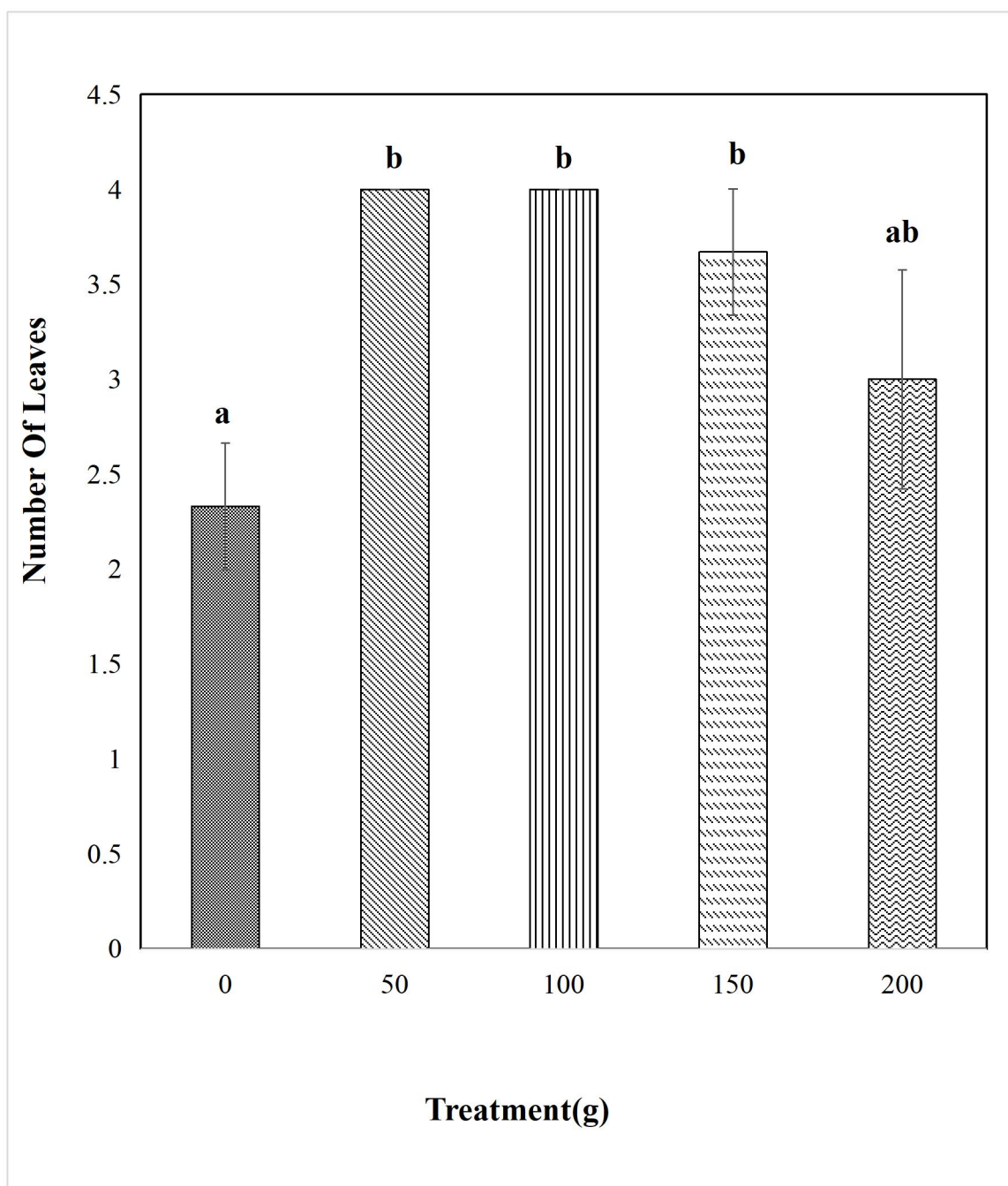


Figure 3.39: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of NPK on Day 6

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

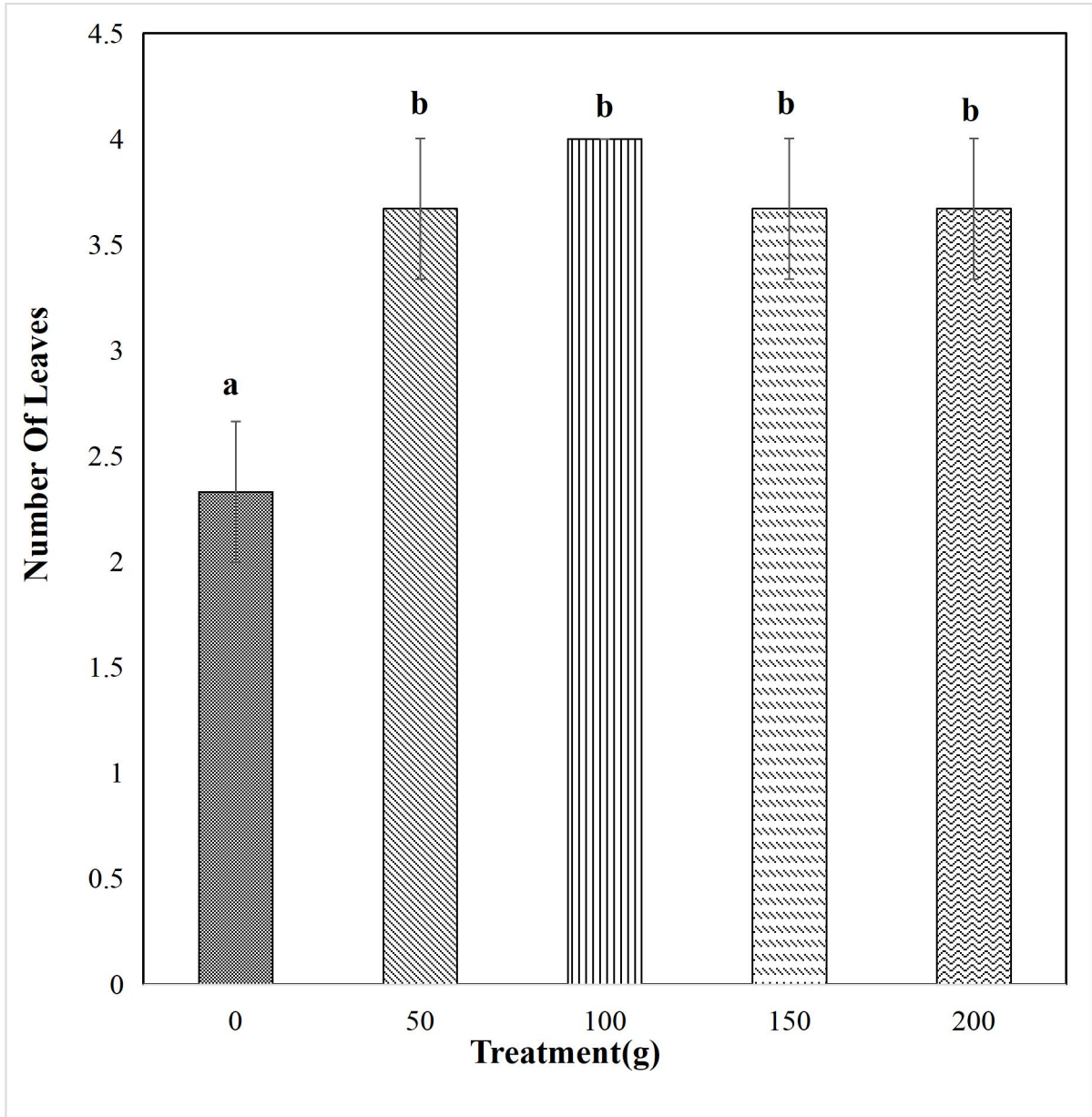


Figure 3.40; Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung + NPK on Day 6

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

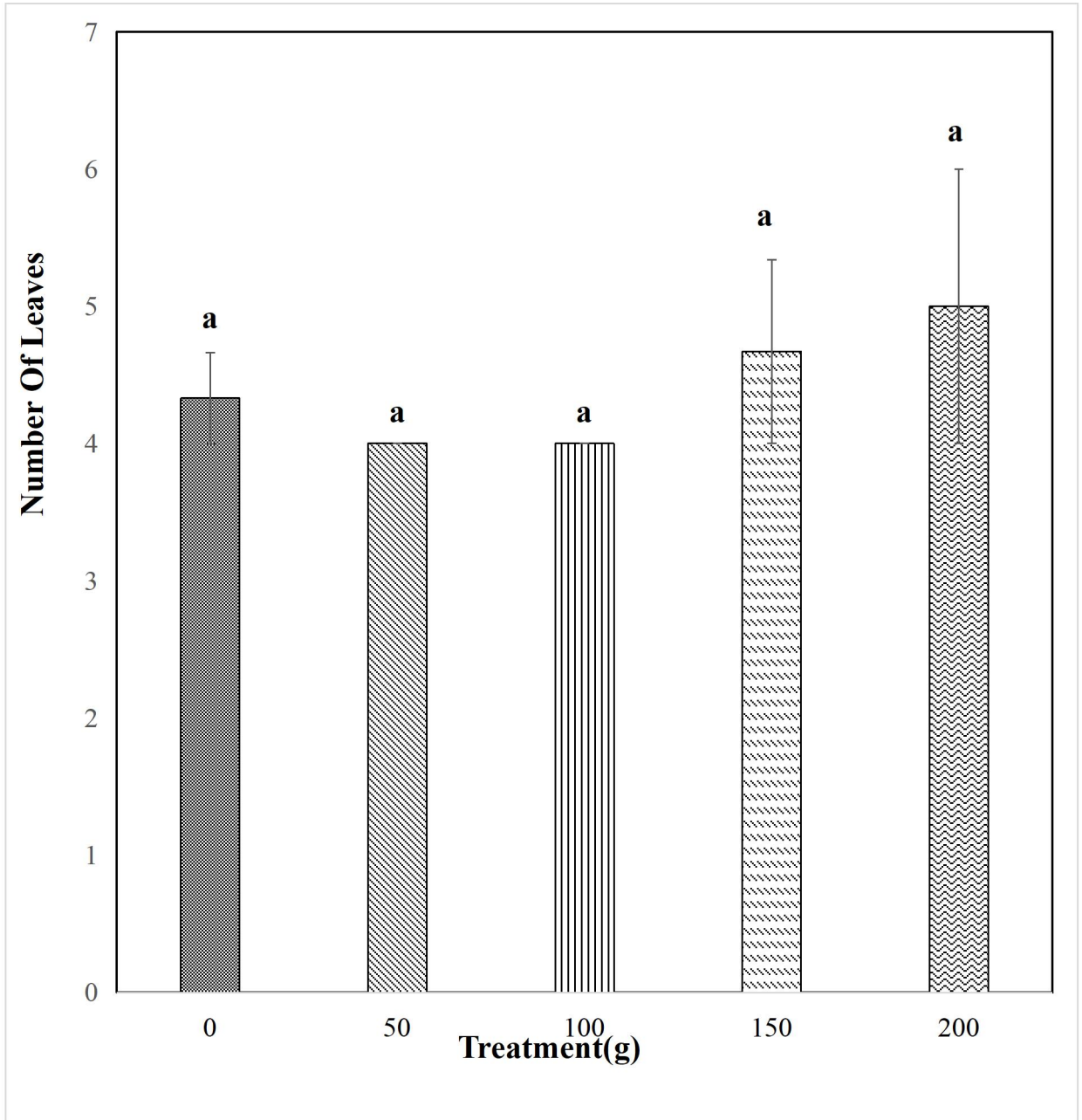


Figure 3.41; Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung on Day 9

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

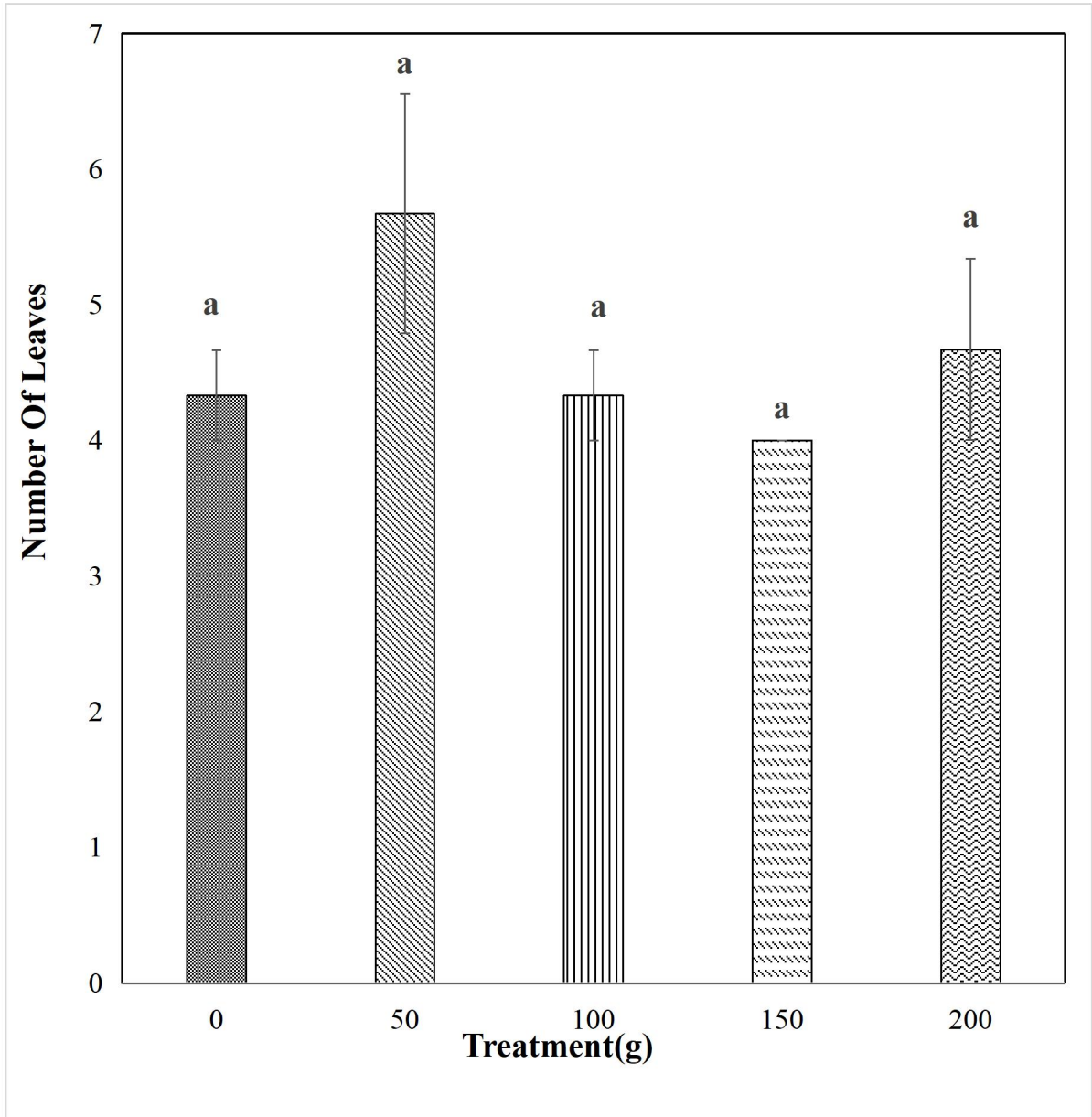


Figure 3.42: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of NPK on Day 9

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

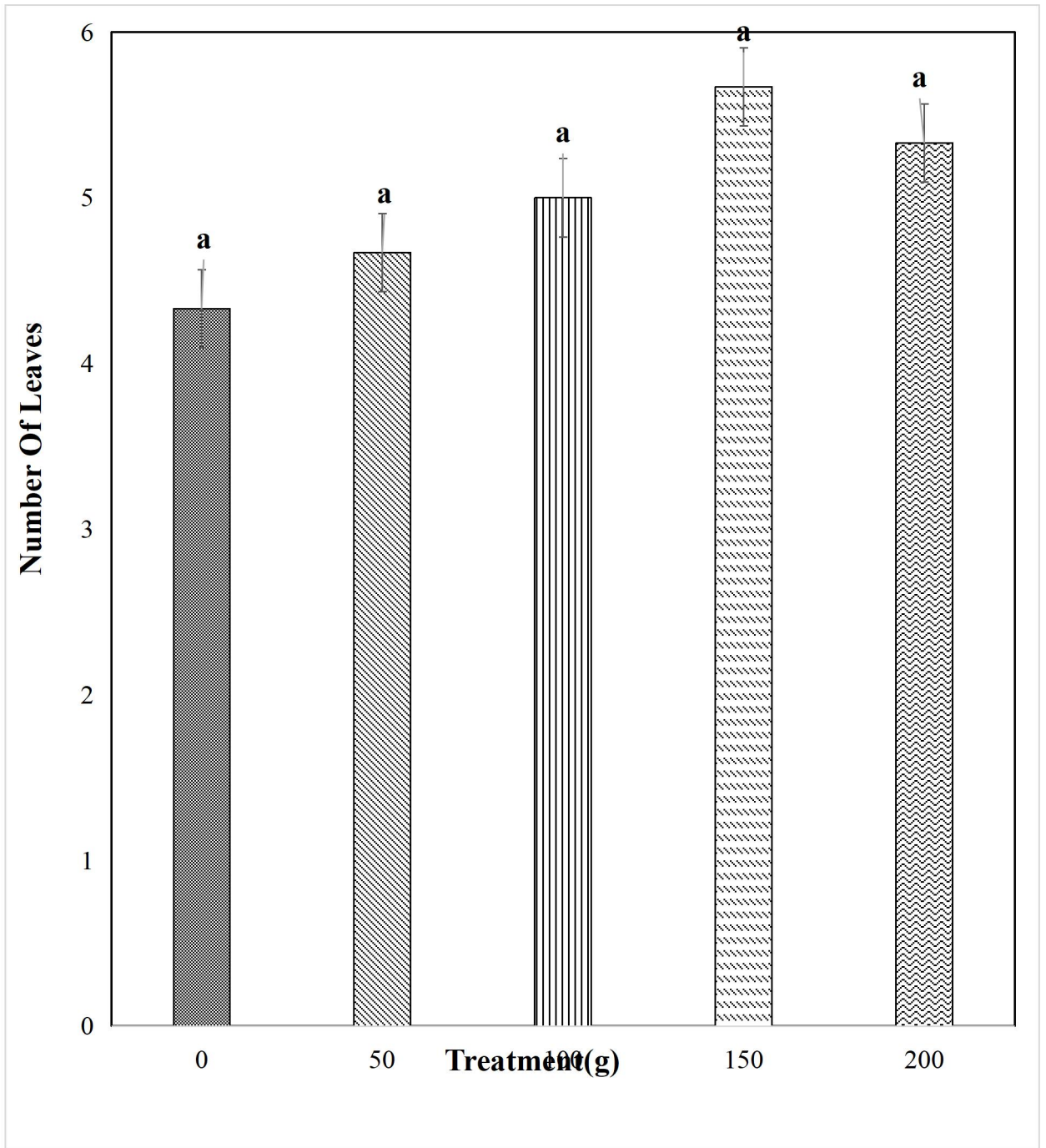


Figure 3.43: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung + NPK on Day 9

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

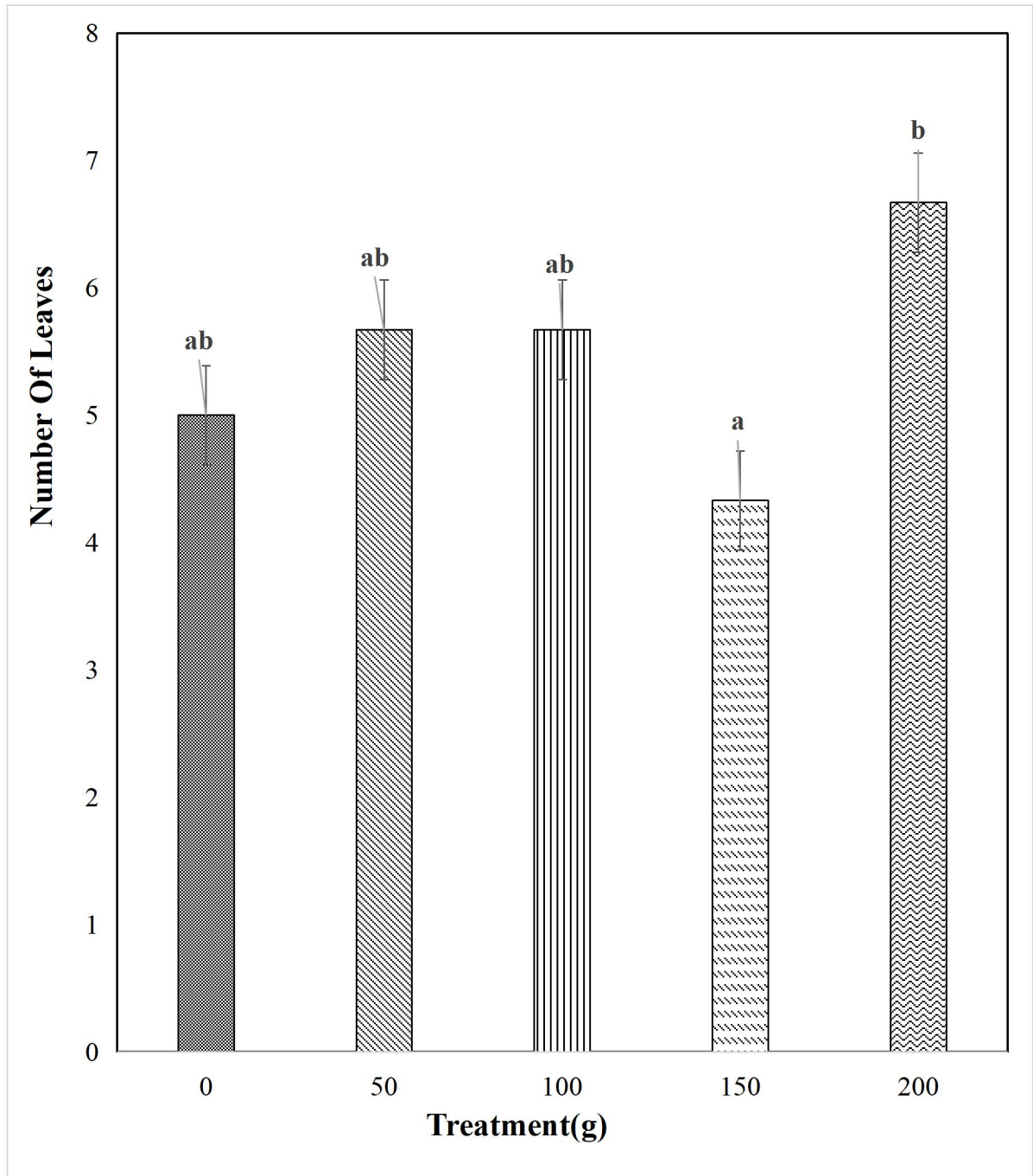


Figure 3.44: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung on Day 12

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

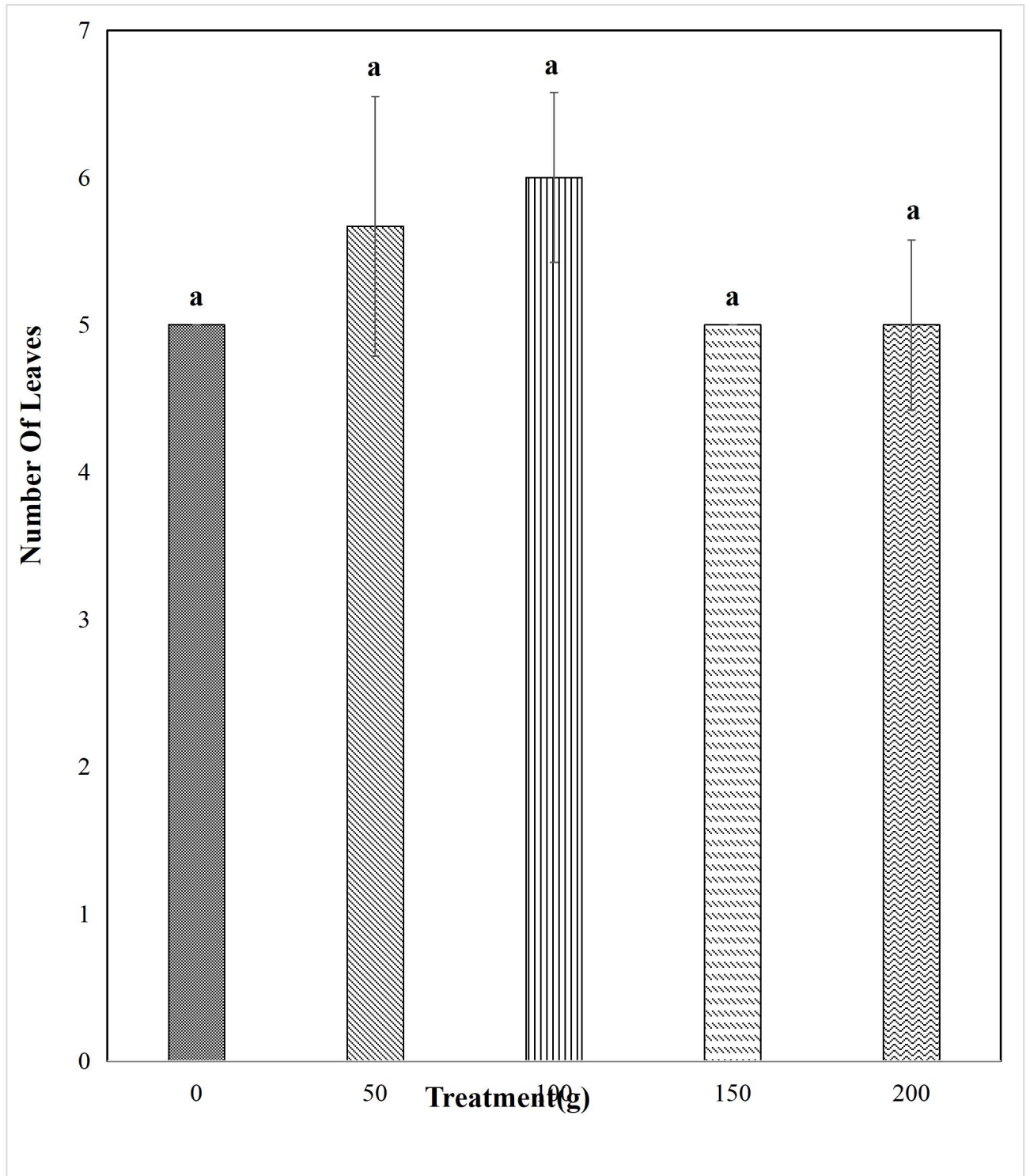


Figure 3.45: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of NPK on Day 12

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

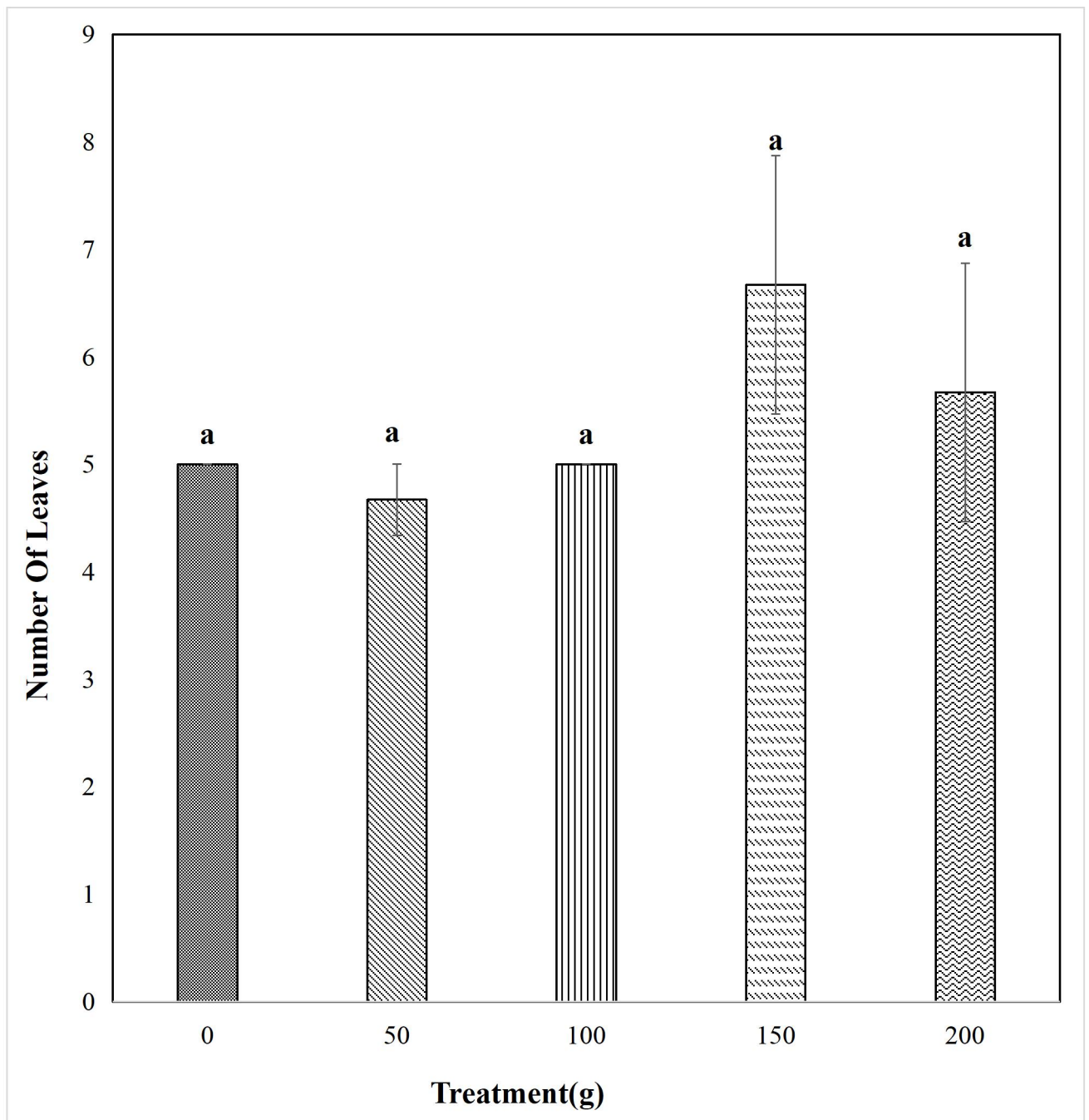


Figure 3.46: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of poultry dung + NPK on Day 12

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

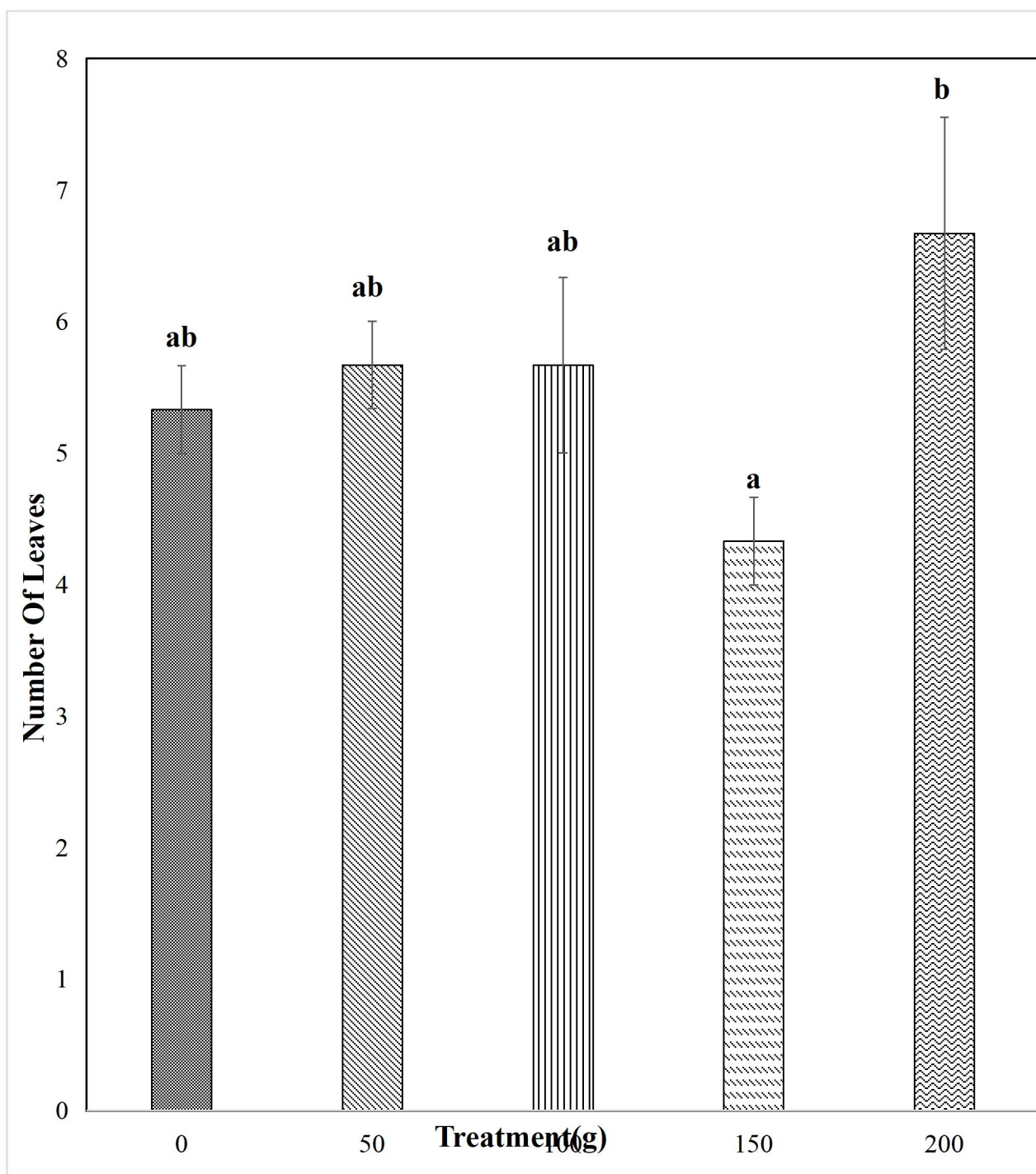


Figure 3.47: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung on Day 15

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

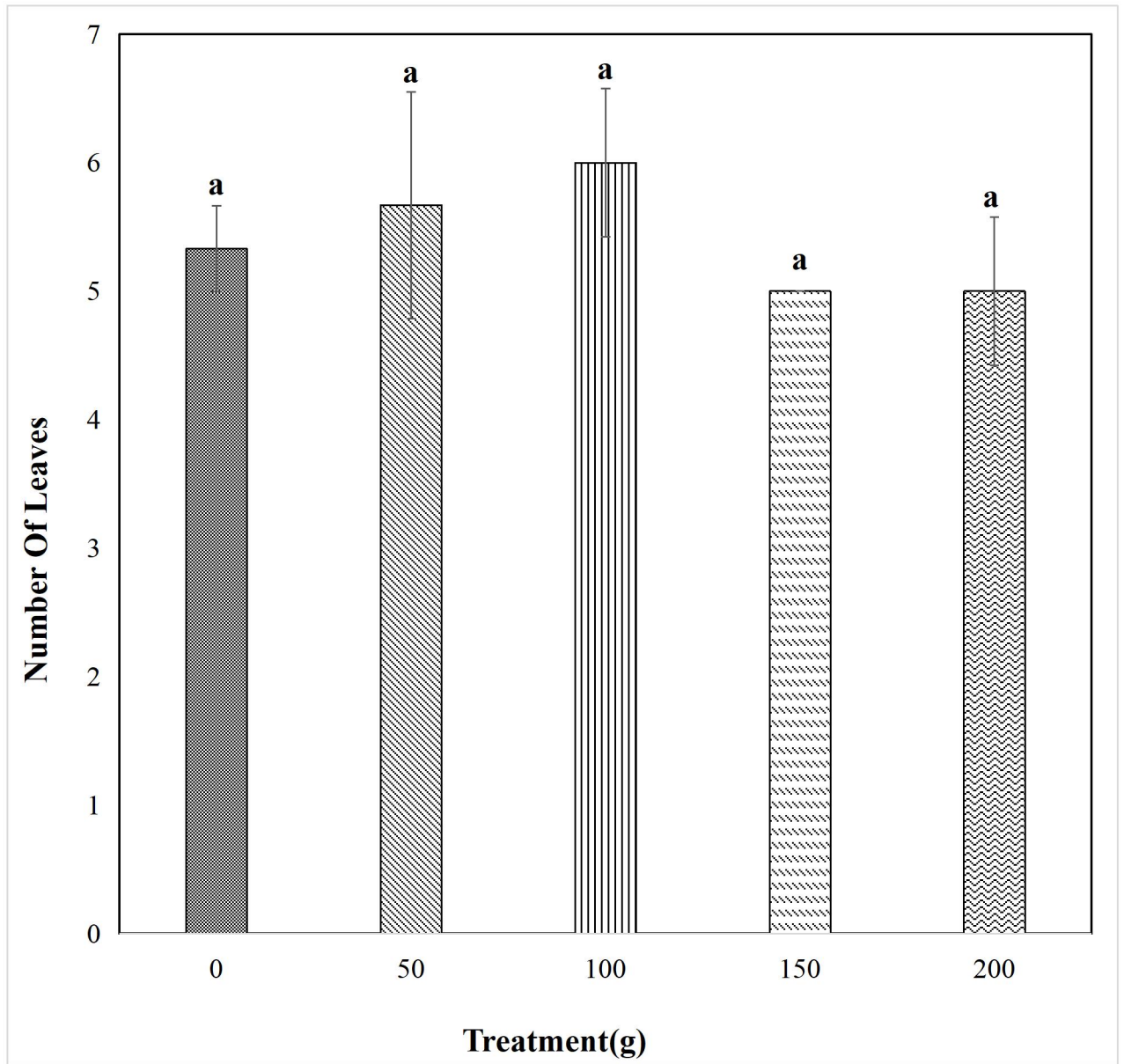


Figure 48: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of NPK on Day 15

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

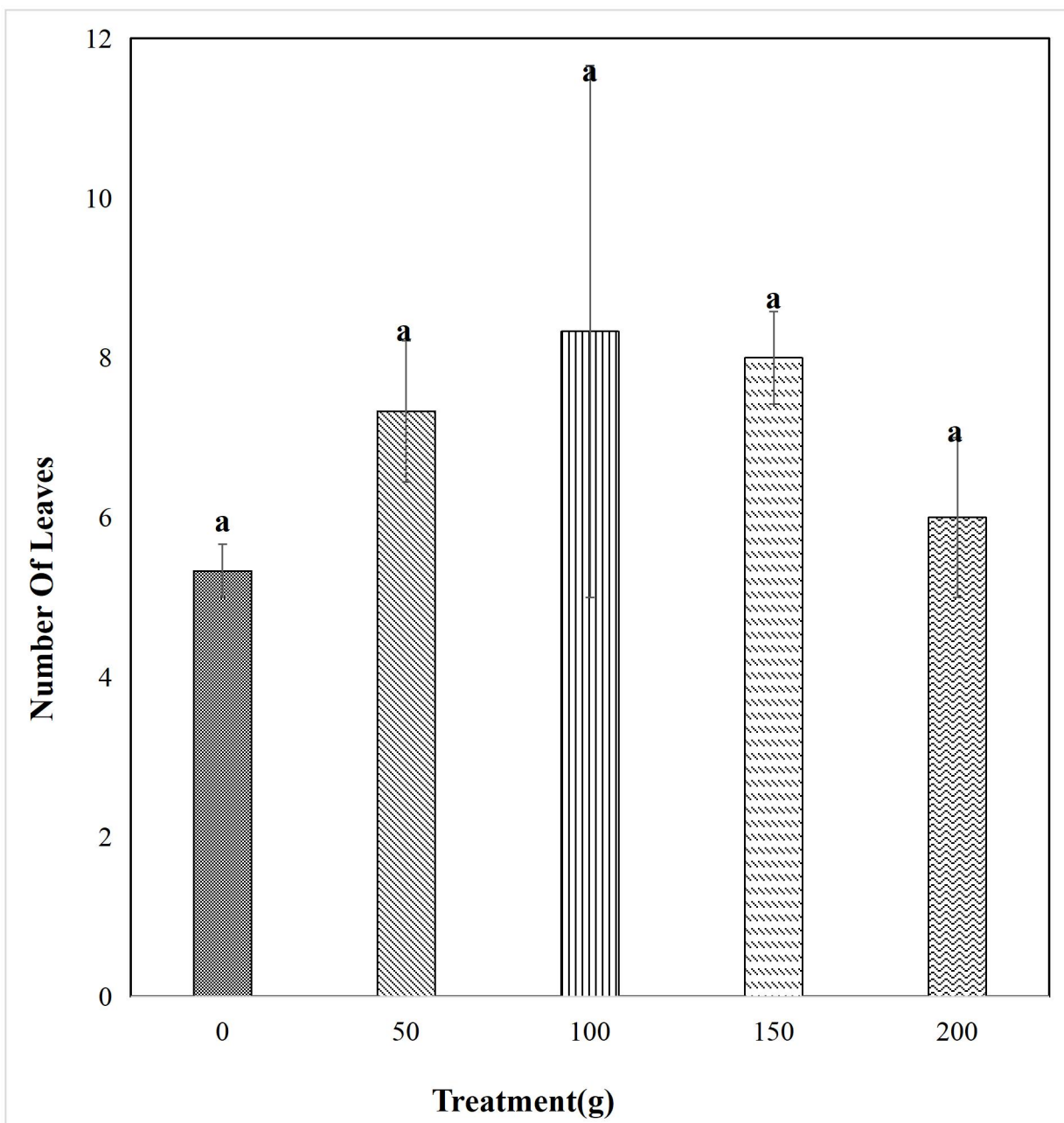


Figure 3.48: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung + NPK on Day 15

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

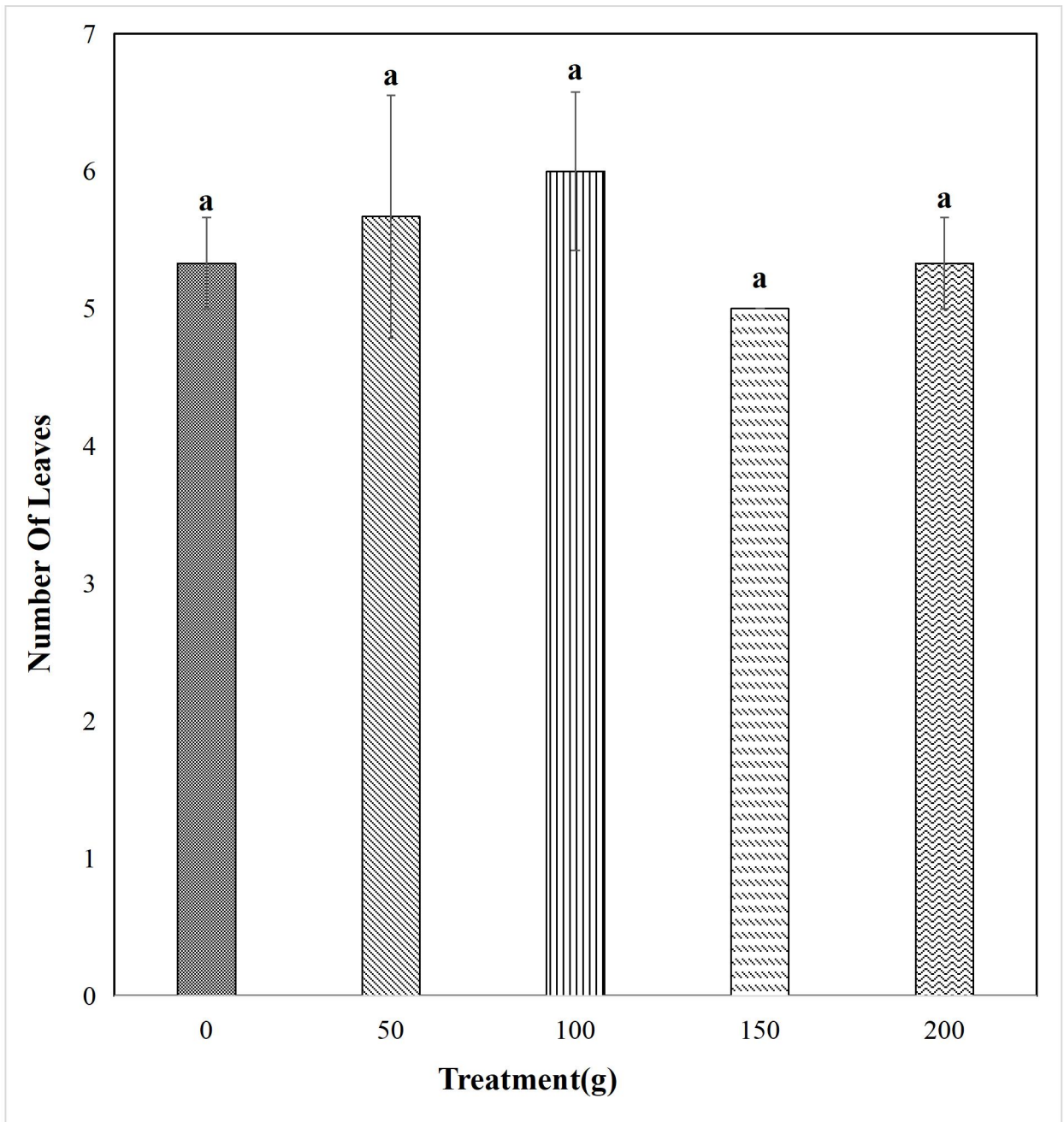


Figure 49: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

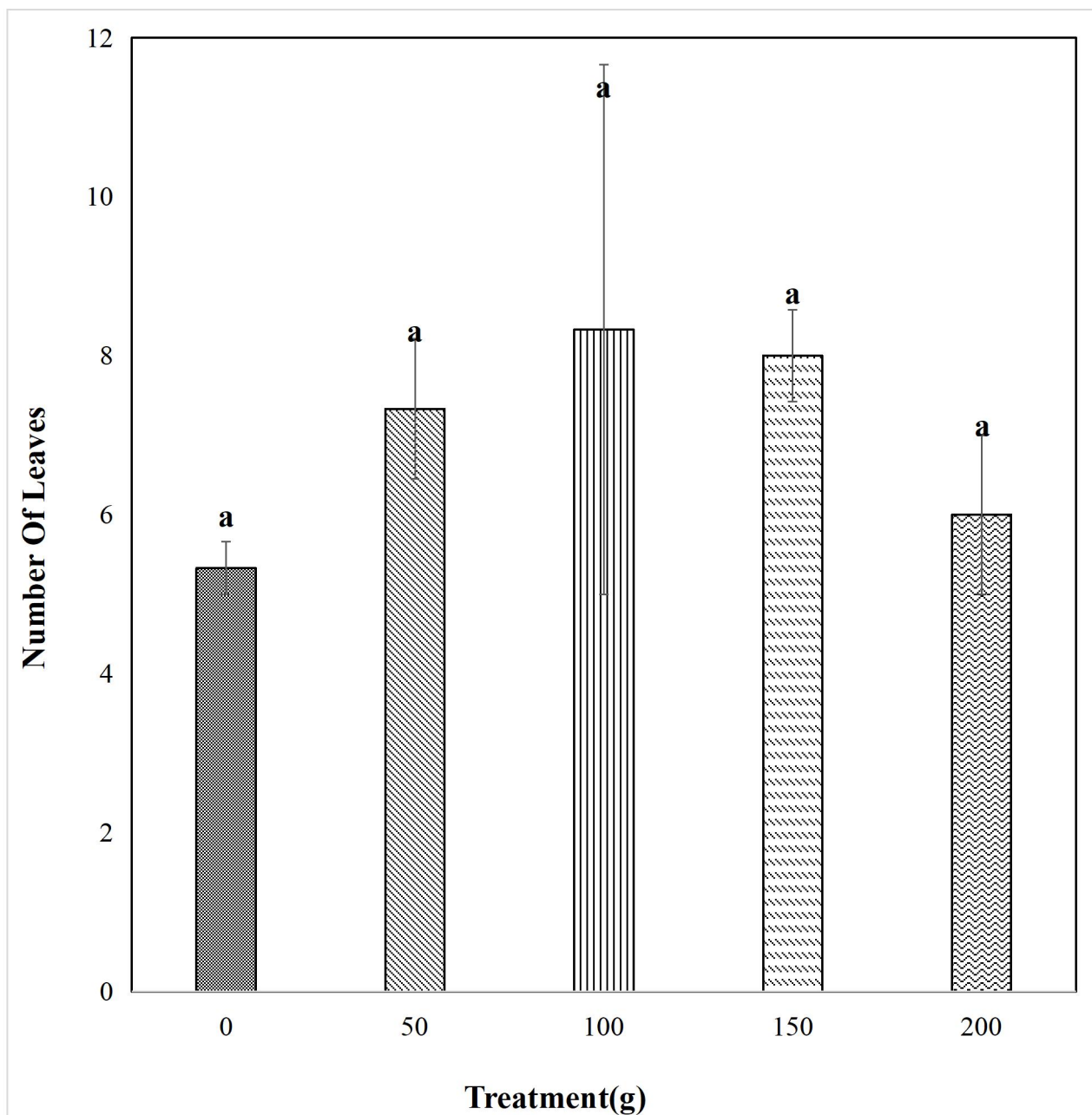


Figure 50: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of NPK on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

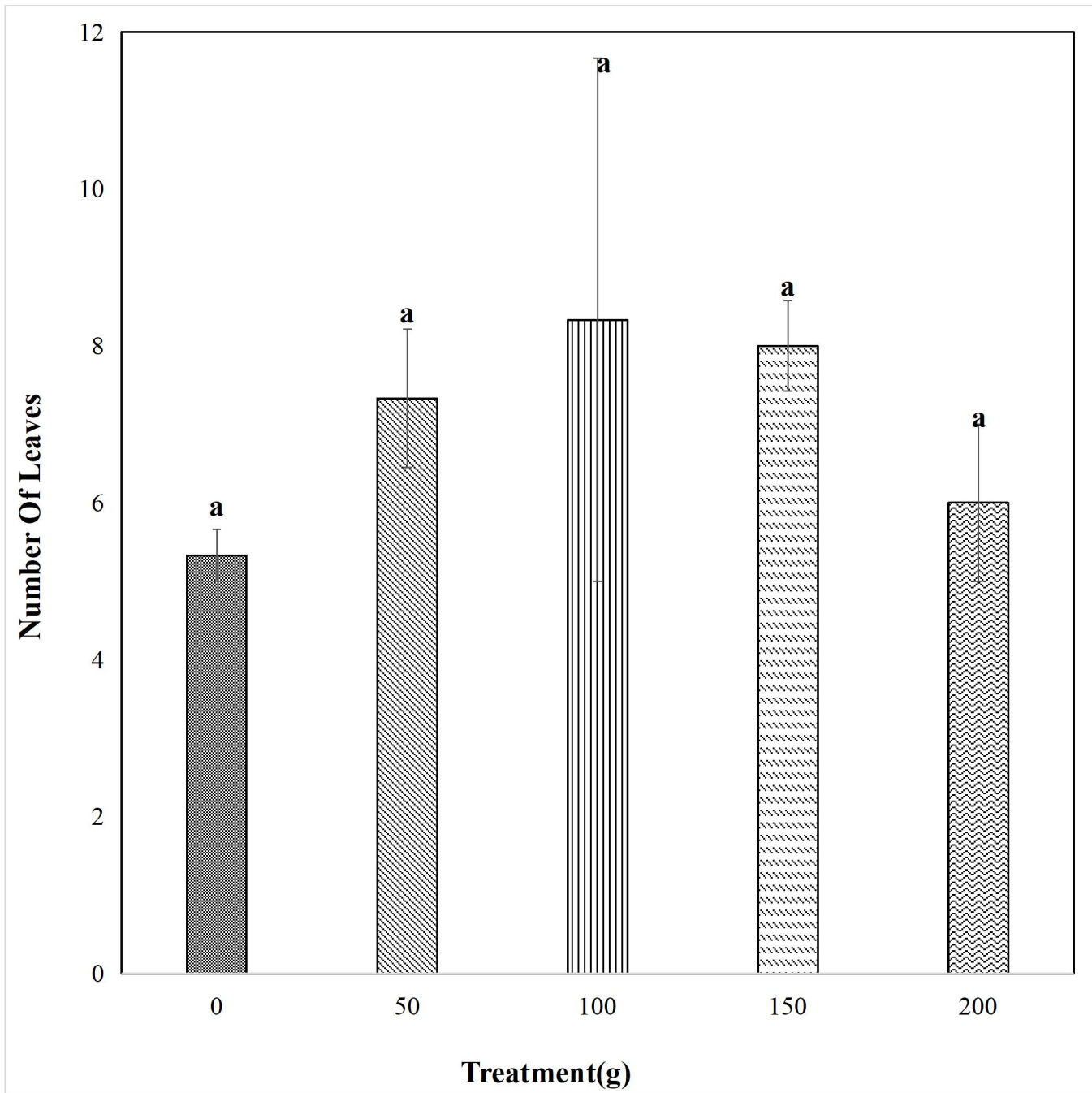


Figure 52: Number of leaves of *Solanum macrocarpon* in of 50 g - 200 g of Poultry Dung + NPK on Day 18

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

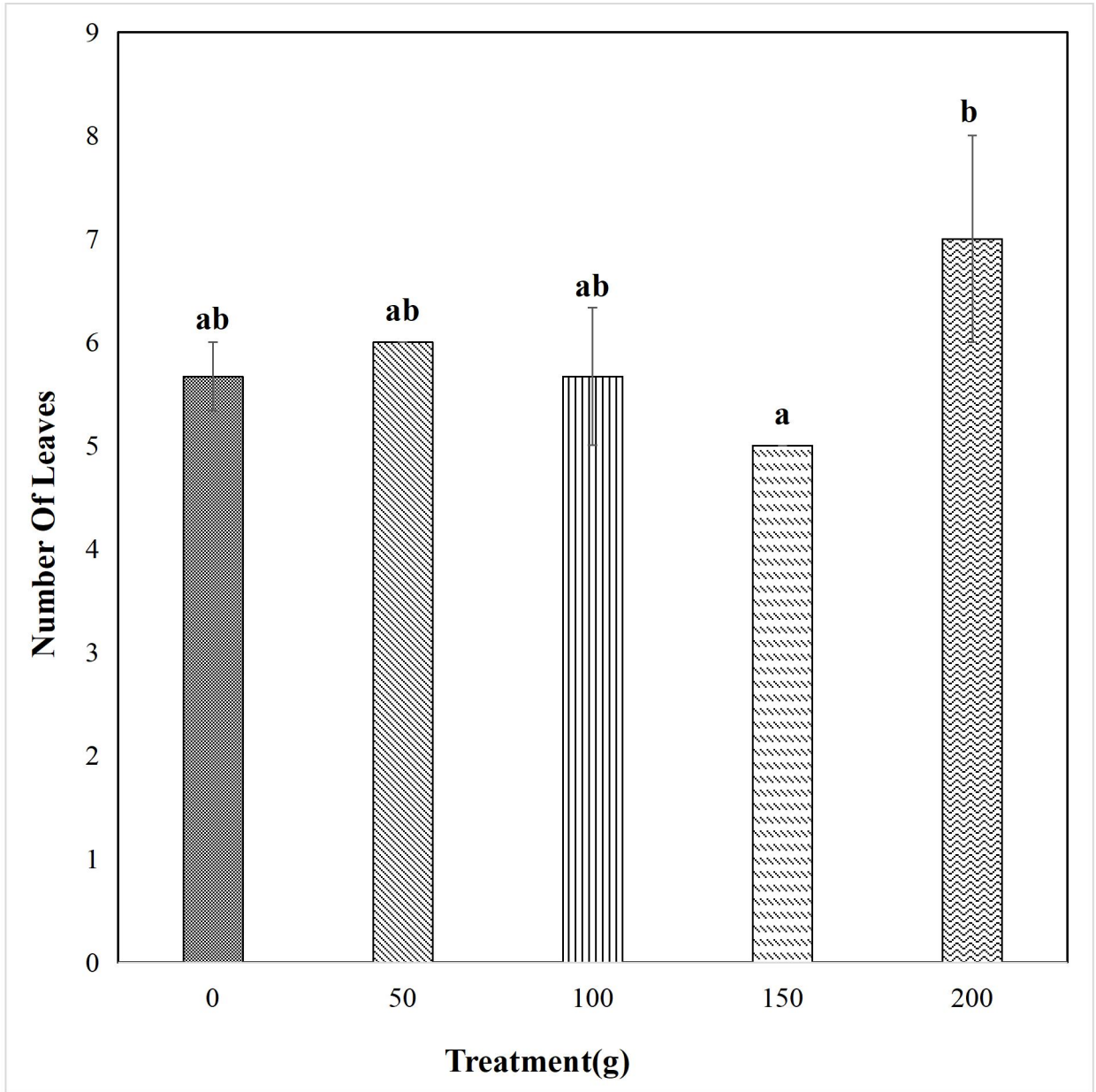


Figure 3.53; There was significant difference between 150 g and 200 g of treatment of poultry dung to all other treatment of poultry dung treated soil. Day 21

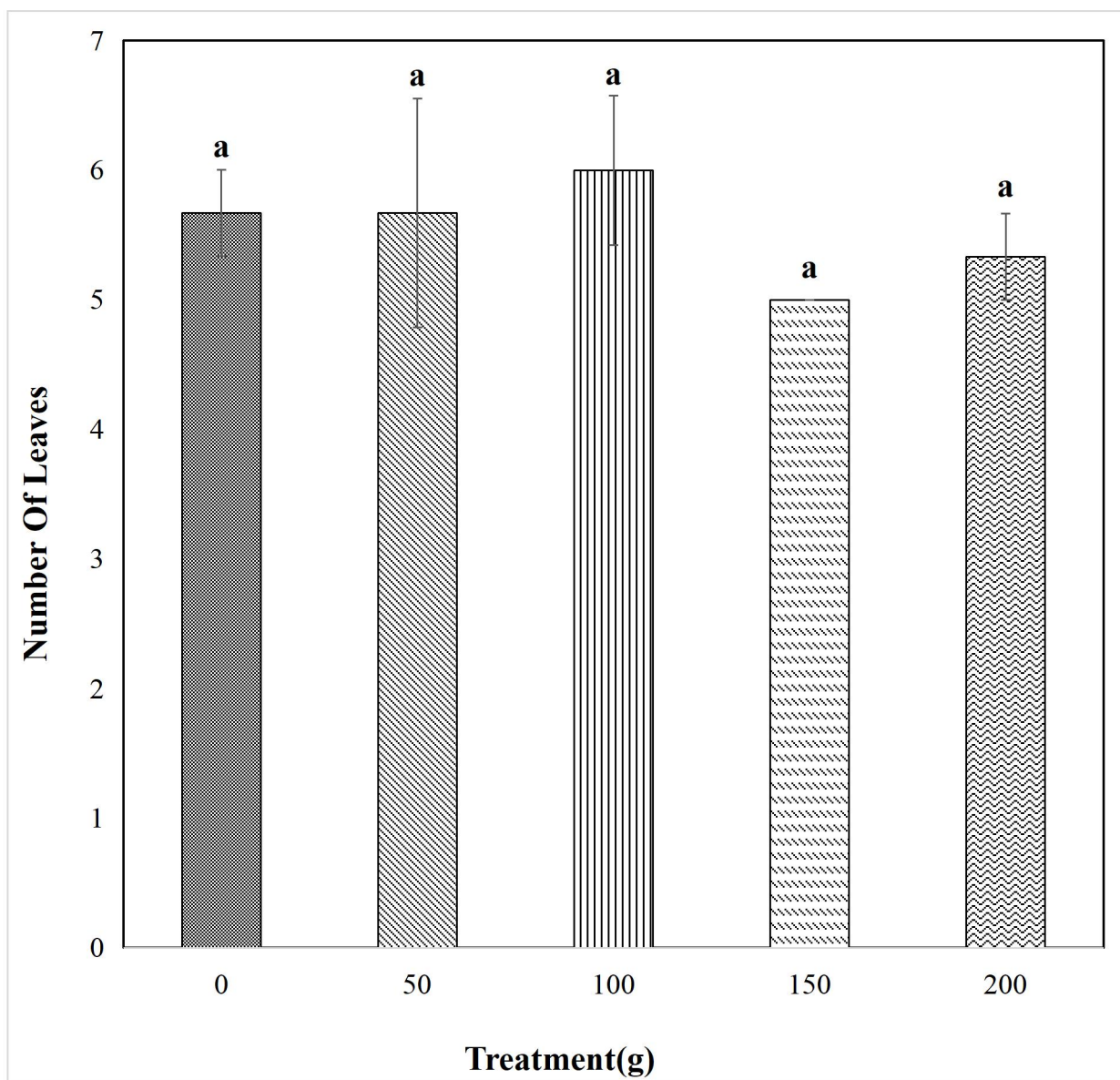


Figure 3.54; There was no significant difference between Control and all other treatment of 50 g - 200 g of treatment of NPK. Day 21

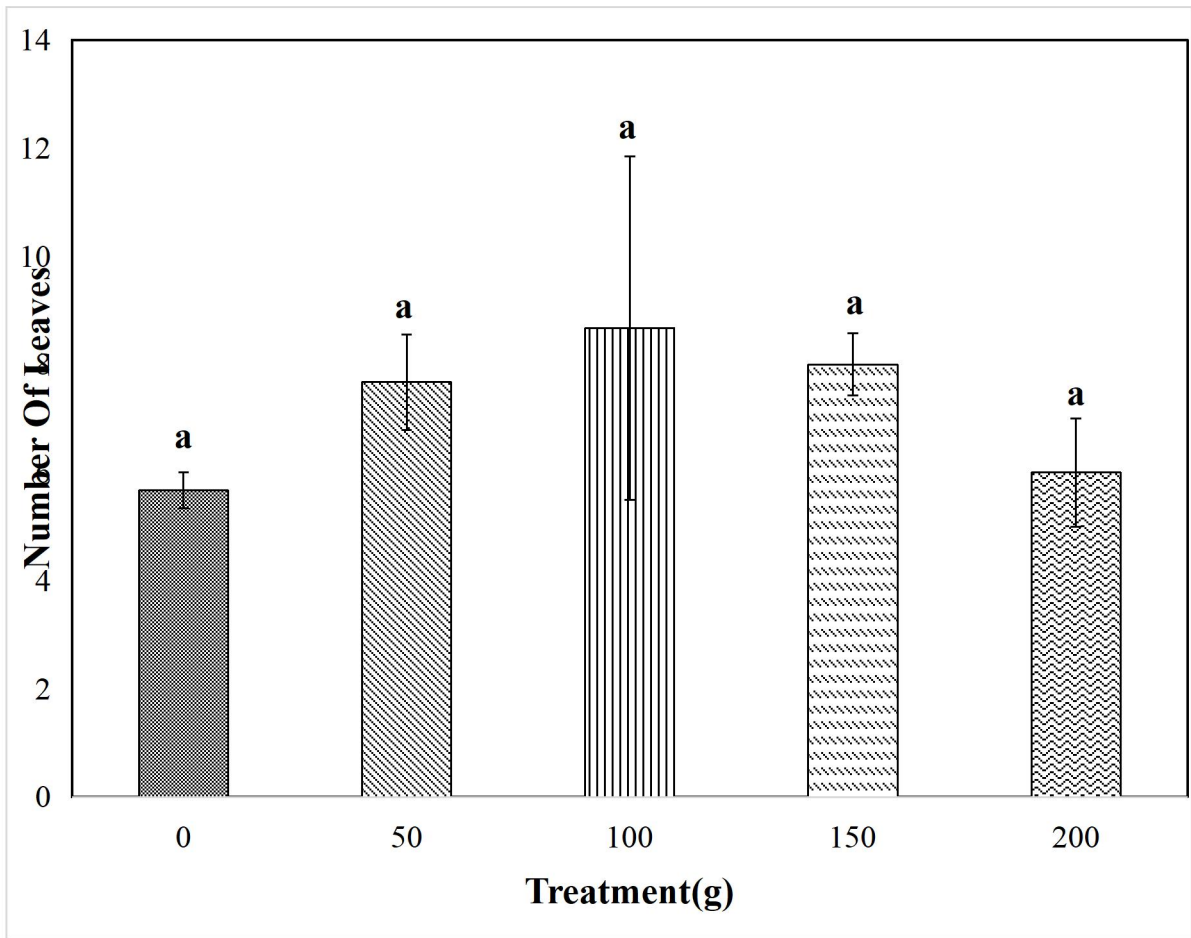


Figure 3.55; There was no significant difference between Control and all other treatment of 50 g -200 g of treatment of poultry dung + NPK. Day 21

At termination of the plant, the leaf area of CONTROL (0 g), 50 g, 100 g, 150 g, 200 g of treatment of poultry dung were  $11.30 \pm 2.88$ ,  $13.43 \pm 1.07$ ,  $19.88 \pm 2.16$ ,  $51.70 \pm 12.98$ ,  $51.97 \pm 12.93$  respectively, there was significant difference between Control (0 g), 50 g, 100 g of treatment of poultry dung with 150 g and 200 g of poultry dung, similarly there was significant difference between 150 g and 200 g treatment with Control, 50 g, 100 g (Figure 3.56)

At termination of the plant, the leaf area of CONTROL (0 g), 50 g, 100 g, 150 g, 200 g of treatment of NPK were  $11.30 \pm 2.86$ ,  $6.36 \pm 0.19$ ,  $10.32 \pm 0.85$ ,  $10.95 \pm 2.35$ ,  $34.4 \pm 5.46$  respectively, there was significant difference between Control (0 g), 50 g, 100 g, 150 g treatment of NPK with 200 g of NPK enriched soil. (Figure 3.57)

At termination of the plant, the leaf area of CONTROL (0 g), 50 g, 100 g, 150 g, 200 g of treatment of poultry dung + NPK were  $11.30 \pm 2.86$ ,  $46.58 \pm 37.52$ ,  $30.44 \pm 8.90$ ,  $17.01 \pm 1.18$ ,  $14.85 \pm 1.96$  respectively, there was no significant difference between Control and other treatment of NPK enrich soil. (Figure 3.58)

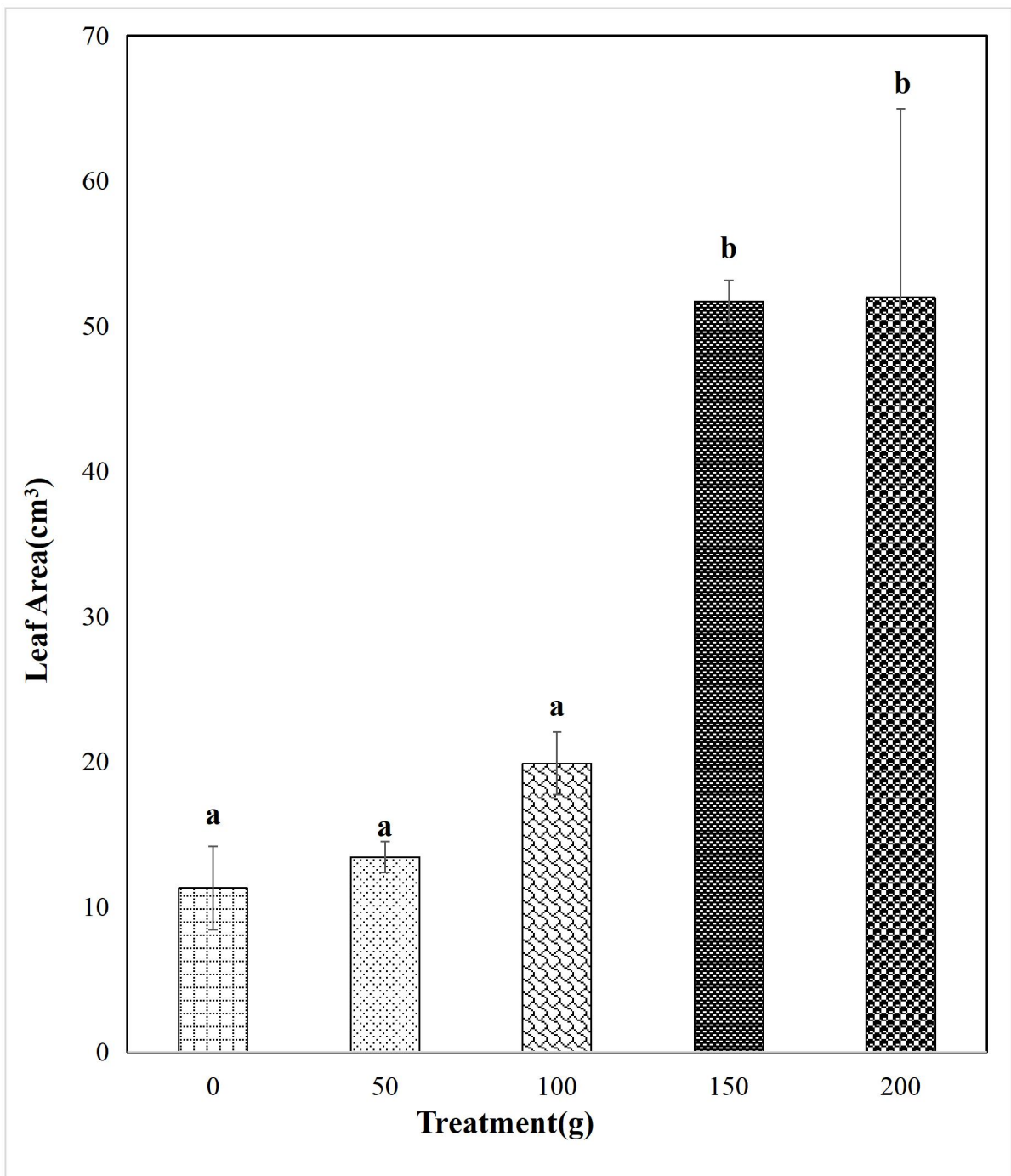


Figure 3.56: Leaf Area of *Solanum macrocarpon* in Poultry Dung treatment at the Termination of Experiment

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

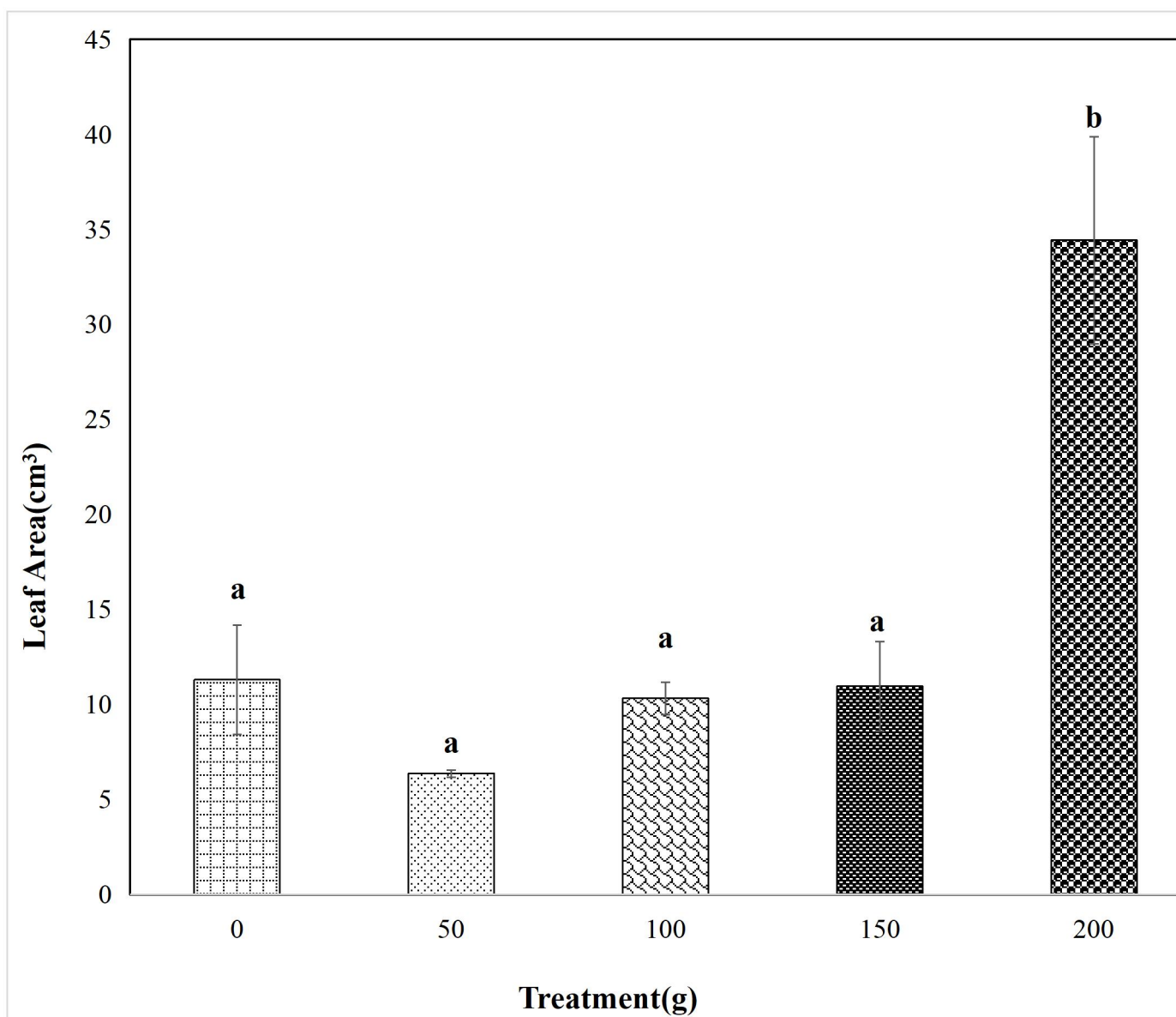


Figure 3.57: Leaf Area of *Solanum macrocarpon* in NPK treatment at the Termination of Experiment

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

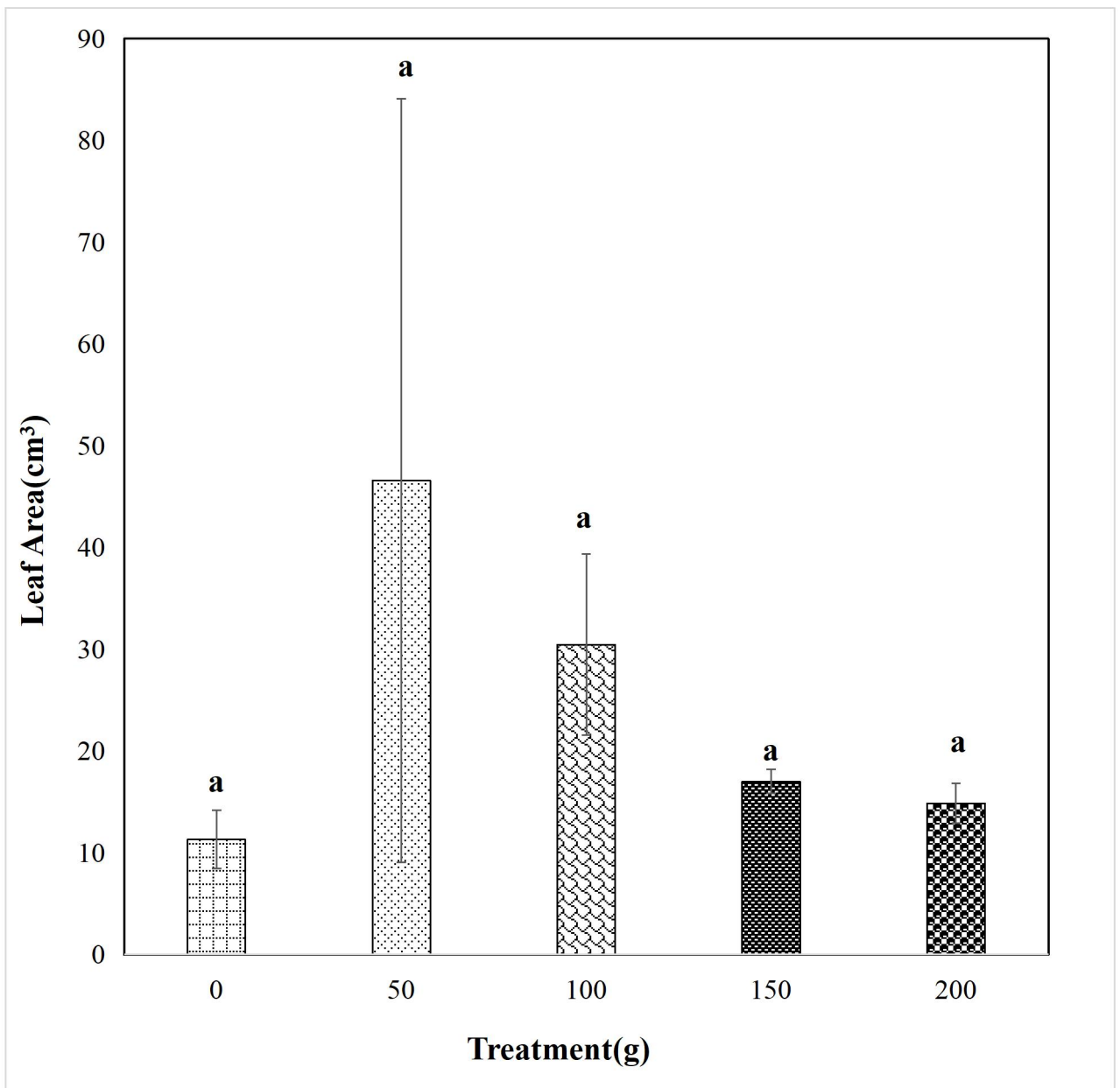


Figure 3.58: Leaf Area of *Solanum macrocarpon* in Poultry Dung + NPK treatment at the Termination of Experiment

\*Bars showing mean values  $\pm$  standard error of mean with similar alphabets are not significantly different from each ( $P > 0.05$ ).

The mean stem girth value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 6 were  $4.70 \pm 0.15$ ,  $5.40 \pm 0.42$  and  $4.13 \pm 0.20$  respectively.

The mean stem girth value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 6 were  $4.83 \pm 0.08$ ,  $4.50 \pm 0.58$  and  $4.47 \pm 0.27$  respectively.

The mean stem girth value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 6 were  $4.73 \pm 0.29$ ,  $4.03 \pm 0.30$  and  $3.63 \pm 0.27$  respectively.

The mean stem girth value for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 6 were  $5.10 \pm 0.17$ ,  $4.40 \pm 0.32$  and  $4.13 \pm 0.20$  respectively.

The mean stem girth value for CONTROL (0 g) for Day 6 were  $3.50 \pm 0.21$ ,  $0.00 \pm 0.00$ ,  $0.00 \pm 0.00$

There was significant difference between Control and other treatment of 50 g – 200 g Of poultry dung (Figure 3.59). Similarly, there was significant difference between Control and other treatment of NPK, similarly there is significant differences between 50 g, 100 g, 200g, to the treatment of NPK (3.60)

There was significant difference between Control and 100 g of treatment of poultry dung and NPK , similarly there was significant differences between 100 g and 150 g Of poultry dung and NPK enriched soil (Figure 3.61).

The mean stem girth value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 9 were  $4.73 \pm 0.133$ ,  $5.40 \pm 0.42$  and  $4.23 \pm 0.23$  respectively, and the mean stem girth value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 9 were  $4.83 \pm 0.88$ ,  $4.50 \pm 0.58$  and  $4.57 \pm 0.22$  respectively.

The mean stem girth value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 9 were  $4.73 \pm 0.29$ ,  $4.03 \pm 0.03$  and  $3.77 \pm 0.15$  respectively.

The mean stem girth value for 200 g for 200 g poultry dung, NPK, poultry dung +NPK enrich soil on Day 9 were  $5.20 \pm 0.15$ ,  $4.40 \pm 0.32$  and  $4.10 \pm 0.12$  respectively.

The mean stem girth value for CONTROL (0 g) were  $0.00 \pm 0.00$ ,  $0.00 \pm 0.00$  and  $0.00 \pm 0.00$

There was significant difference between Control and other treatment of 50 g – 200 g of poultry dung (Figure 3.62)

Control is significantly different from all NPK treatment, similarly 50 g enriched soil is significantly different from all treatment of NPK, but there is no significant difference between 100 g, 150 g, 200 g NPK enriched soil (Figure 3.63)

Control was significantly different from all treatment of poultry dung, similarly 100 g and 150 g is significantly different from 50 g and 200 g of poultry and NPK enriched soil (Figure 3.64).

The mean stem girth value for 50g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 12 were  $4.80 \pm 0.20$ ,  $5.40 \pm 0.42$  and  $4.23 \pm 0.23$  respectively.

The mean stem girth value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 12 were  $4.87 \pm 0.07$ ,  $4.50 \pm 0.06$  and  $4.67 \pm 0.18$  respectively.

The mean stem girth value for 150 g poultry dung NPK, and poultry dung + NPK enriched soil on Day 12 were  $4.90 \pm 0.32$ ,  $4.07 \pm 0.07$  and  $4.13 \pm 0.24$  respectively.

The mean of stem girth value for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 12 were  $5.23 \pm 0.19$ ,  $4.40 \pm 0.32$  and  $4.63 \pm 0.20$  respectively.

The stem girth value for Control (0 g) for Day 12 were  $3.60 \pm 0.20$ ,  $0.00 \pm 0.00$  and  $0.00 \pm 0.00$

There was significant difference between Control and the treatment of 50 g – 200 g of poultry dung (Figure 3.65)

Control was significantly different from all NPK treated soil, similarly 50 g enriched soil is significantly different from 100 g, 150 g, 200 (Figure 3.66).

There was no significance difference between Control and other treatment of 50 g - 200 g of poultry dung + NPK, because they were all grown. (Figure 3.67).

The mean of stem girth value for 50 g poultry dung, NPK, and poultry dung + NPK for Day 15 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.88$  and  $7.33 \pm 0.88$  respectively, and the mean of stem girth value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 15 were  $5.67 \pm 0.67$ ,  $6.00 \pm 0.58$ ,  $8.33 \pm 3.33$  respectively.

The mean of stem girth value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil on Day 15 were  $4.33 \pm 0.33$ ,  $5.00 \pm 0.00$ ,  $8.00 \pm 0.58$  respectively.

The mean of stem girth value for 200 g for 200 g poultry dung, NPK, poultry dung + NPK enriched soil on Day 15 were  $6.67 \pm 0.88$ ,  $5.00 \pm 0.58$ ,  $6.00 \pm 1.00$  respectively.

The stem girth value for CONTROL (0 g) for Day 15 were  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$  respectively.

There was significant difference between 200 g of poultry dung to all other treatment of poultry dung treated soil (Figure 3.68), while there was no significant difference between the treatment 50g - 200g of NPK and Control (Figure 3.69).

There was no significant difference between the treatment 50 g -200 g of poultry dung + NPK enriched soil (Figure 3.70).

The mean of stem girth value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 18 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.88$ ,  $7.33 \pm 0.88$  respectively.

The mean of stem girth value for 100 g of poultry dung, NPK, and poultry dung +NPK enriched soil on Day 18 were  $5.67 \pm 0.67$ ,  $6.00 \pm 0.58$ ,  $8.33 \pm 3.33$  respectively.

The mean of stem girth value for 150 g poultry dung, NPK, and poultry dung +NPK enriched soil in Day 18 were  $5.00 \pm 0.00$ ,  $5.00 \pm 0.00$ ,  $8.00 \pm 0.577$  respectively.

The mean of stem girth value for 200 g for 200 g poultry dung, NPK, poultry dung +NPK for Day 18 were  $6.67 \pm 0.88$ ,  $5.33 \pm 0.33$ ,  $6.00 \pm 1.00$  respectively.

The mean stem girth value for Control (0 g) for Day 18 were  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$ ,  $5.33 \pm 0.33$  respectively.

There was no significant difference between Control and other treatment of 50 g -200 g of poultry dung treated soil (Figure 3.71). Similarly, there was no significant difference between Control and other treatment of 50 g -200 g of NPK enriched soil (Figure 3.72).

There was no significant difference between Control and other treatment of 50 g – 200 g of poultry dung + NPK (Figure 3.73).

The mean stem girth value for 50 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $6.00 \pm 0.33$ ,  $5.67 \pm 0.88$ ,  $7.67 \pm 0.88$  respectively.

The mean stem girth value for 100 g of poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $5.67 \pm 0.68$ ,  $6.00 \pm 0.58$ ,  $8.67 \pm 3.18$  respectively.

The mean of stem girth value for 150 g poultry dung, NPK, and poultry dung + NPK enriched soil on Day 21 were  $5.00 \pm 0.00$ ,  $5.00 \pm 0.00$ ,  $8.00 \pm 0.57$  respectively.

The mean of stem girthvalue for 200 g poultry dung, NPK, poultry dung +NPK enriched soil on Day 21 were  $7.00 \pm 1.00$ ,  $5.33 \pm 0.33$ ,  $6.00 \pm 1.00$  respectively.

The stem girth value for CONTROL (0 g) enriched soil on Day 21 were  $5.67 \pm 0.33$ ,  $5.67 \pm 0.33$ ,  $5.67 \pm 0.33$  respectively.

There was significant difference between 150 g and 200 g of treatment of poultry dung to all other treatment of poultry dung treated soil (Figure 3.74)

There was no significant difference between Control and all other treatment of 50 g - 200 g of treatment of NPK (Figure 3.75)

There was no significant difference between Control and all other treatment of 50 g -200 g of treatment of poultry dung + NPK (Figure 3.76)

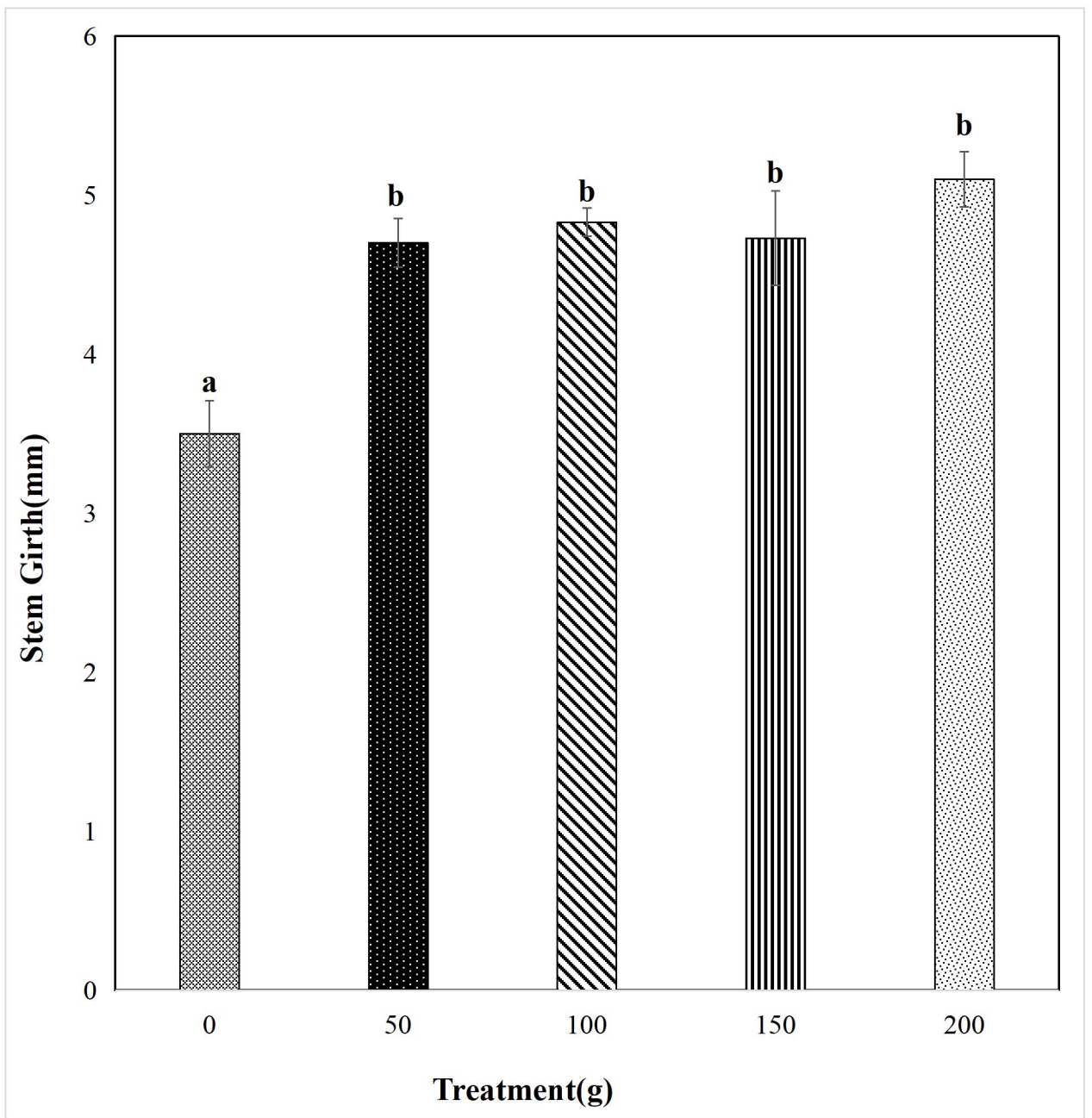


Figure 3.59; There was significant difference between Control and other treatment of 50 g – 200 g of poultry dung. Day 6

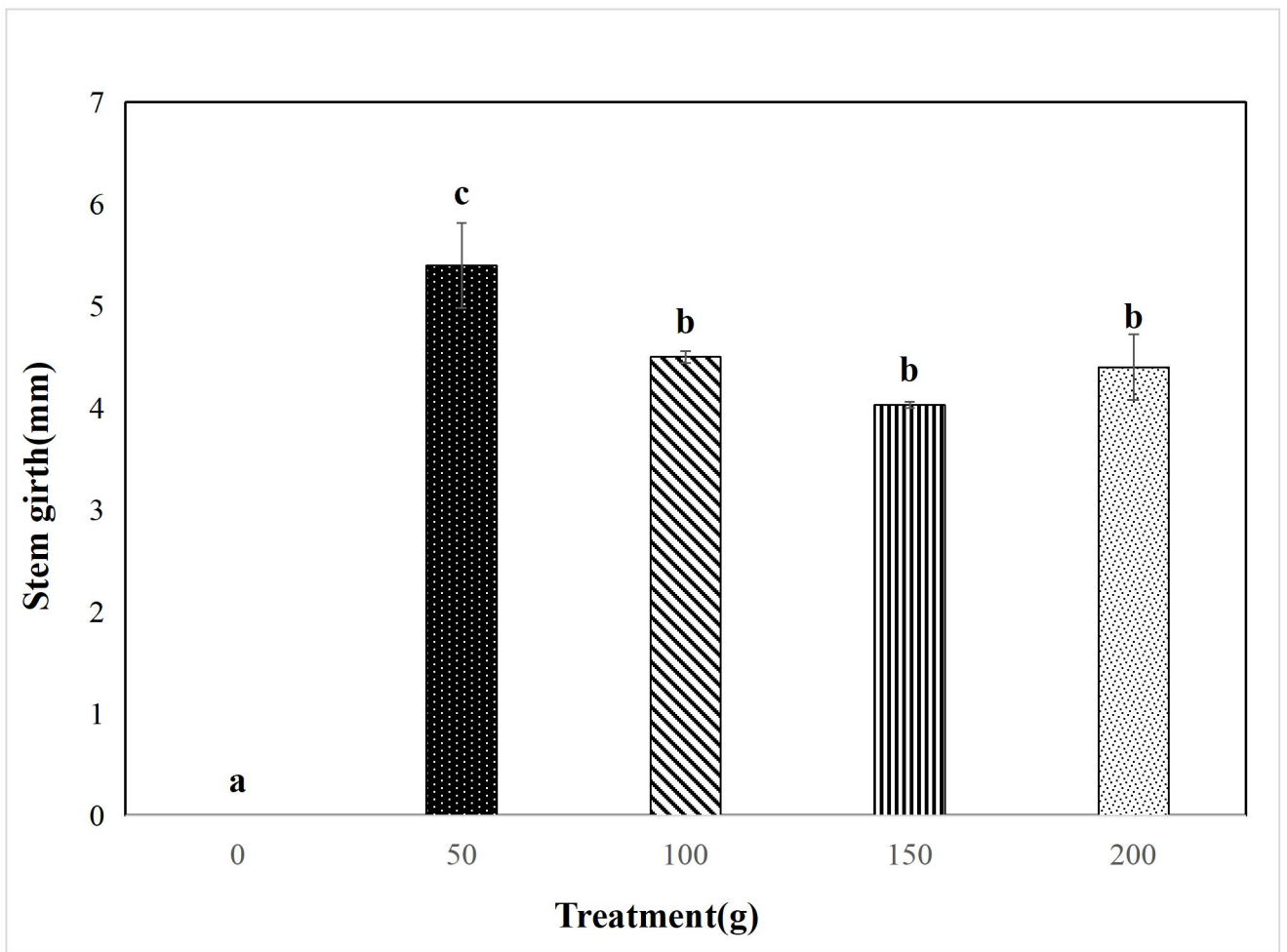


Figure 3.60; There was significant difference between Control and other treatment of NPK, similarly there is significant differences between 50 g, 100 g, 200g, to the treatment of NPK. Day 6

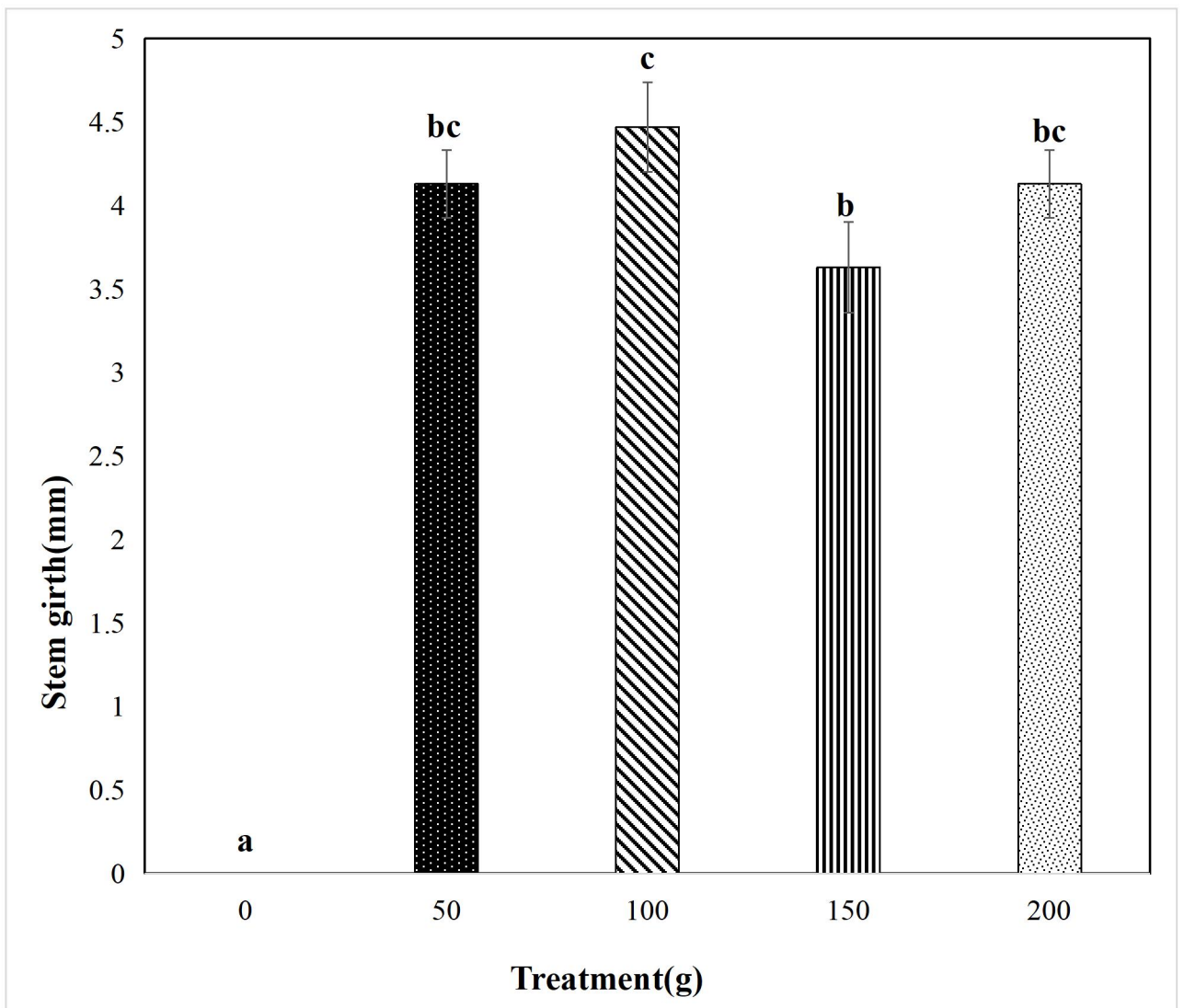


Figure 3.61; There was significant difference between Control and 100 g of treatment of poultry dung and NPK, similarly there was significant differences between 100 g and 150 g of poultry dung and NPK enriched soil. Day 6

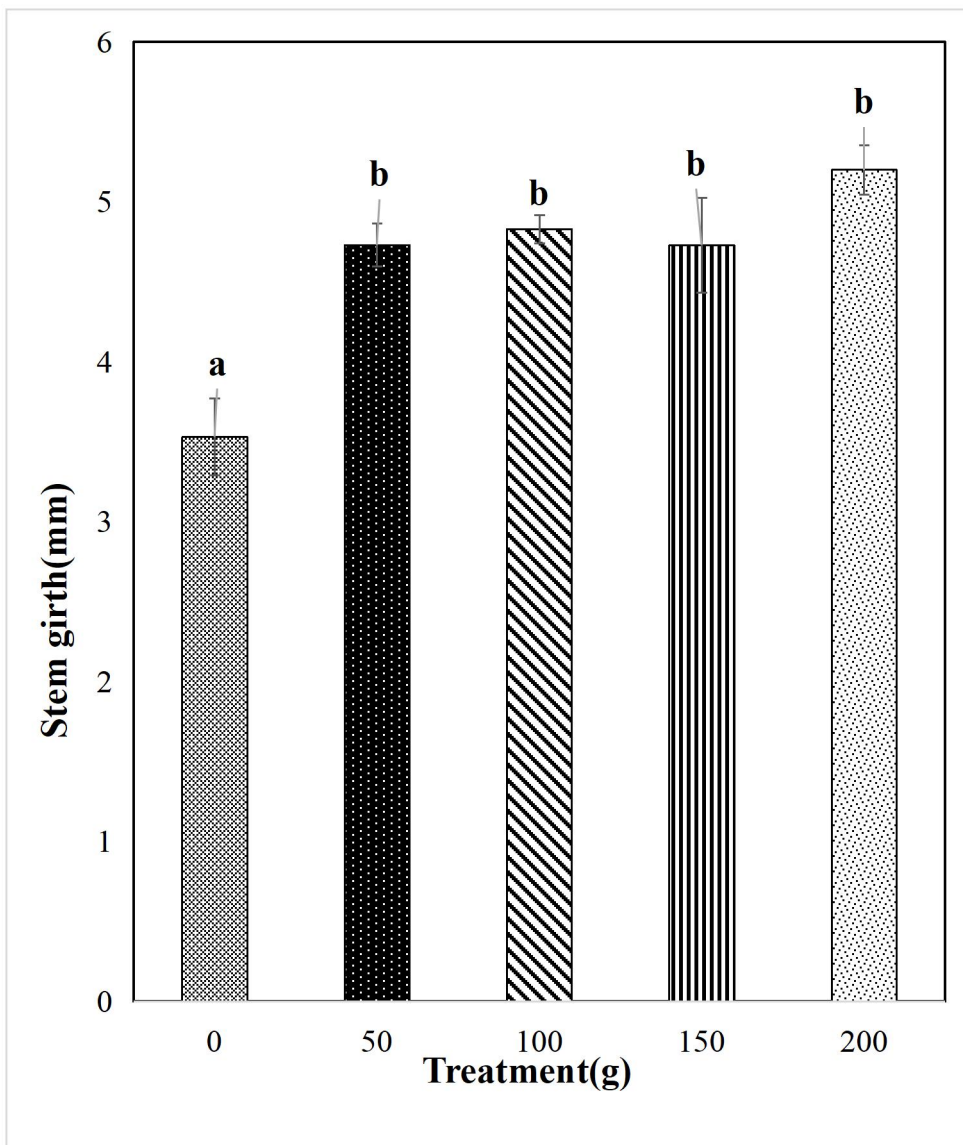


Figure 3.62; There was significant difference between Control and other treatment of 50 g – 200 g of poultry dung. Day 9

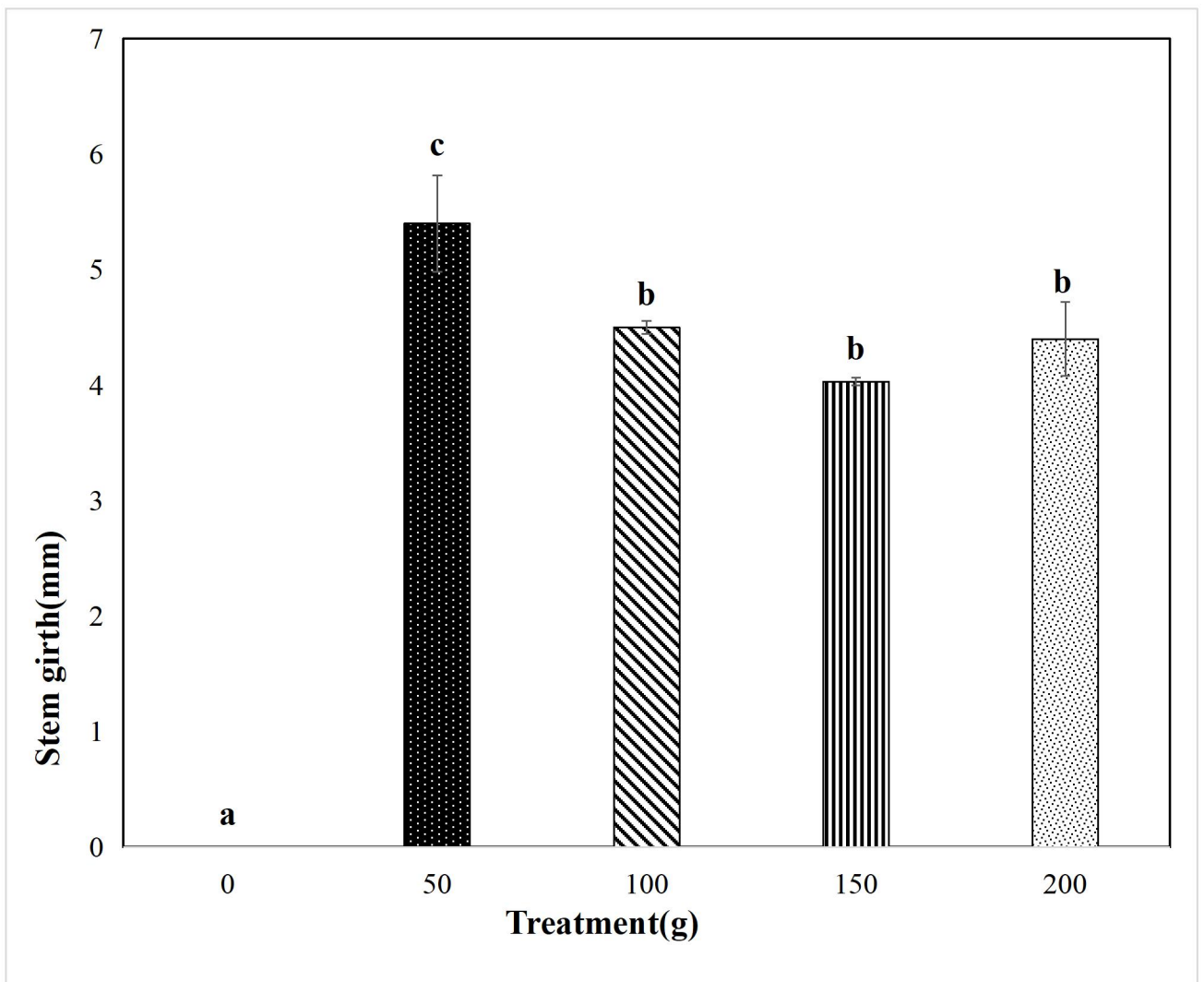


Figure 3.36; Control is significantly different from all NPK treatment, similarly 50 g enriched soil is significantly different from all treatment of NPK, but there is no significant difference between 100 g, 150 g, 200 g NPK enriched soil. Day 9

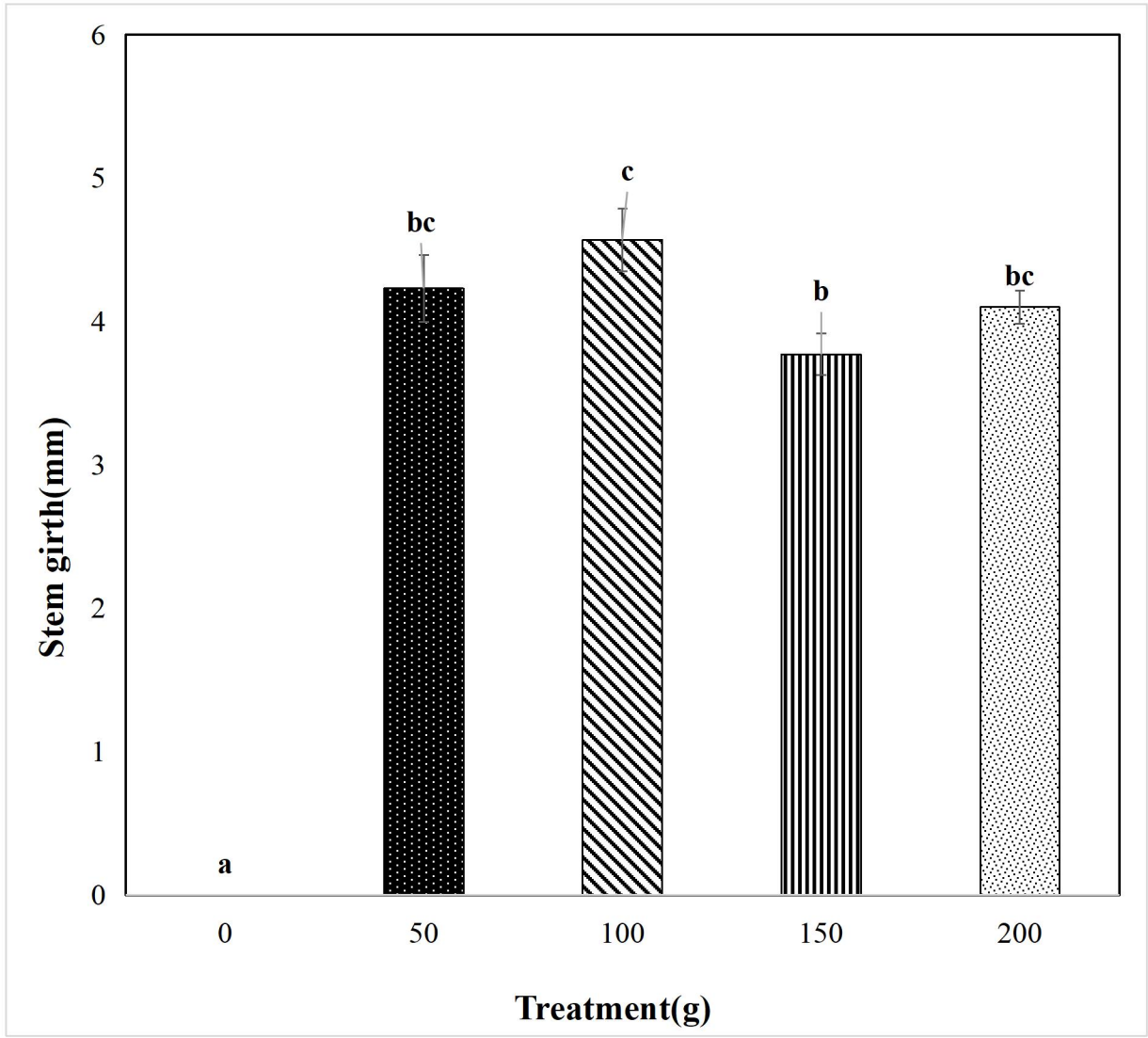


Figure 3.64; Control is significantly different from all treatment of poultry dung, similarly 100 g and 150 g is significantly different from 50 g and 200 g of poultry and NPK enriched soil. Day 9

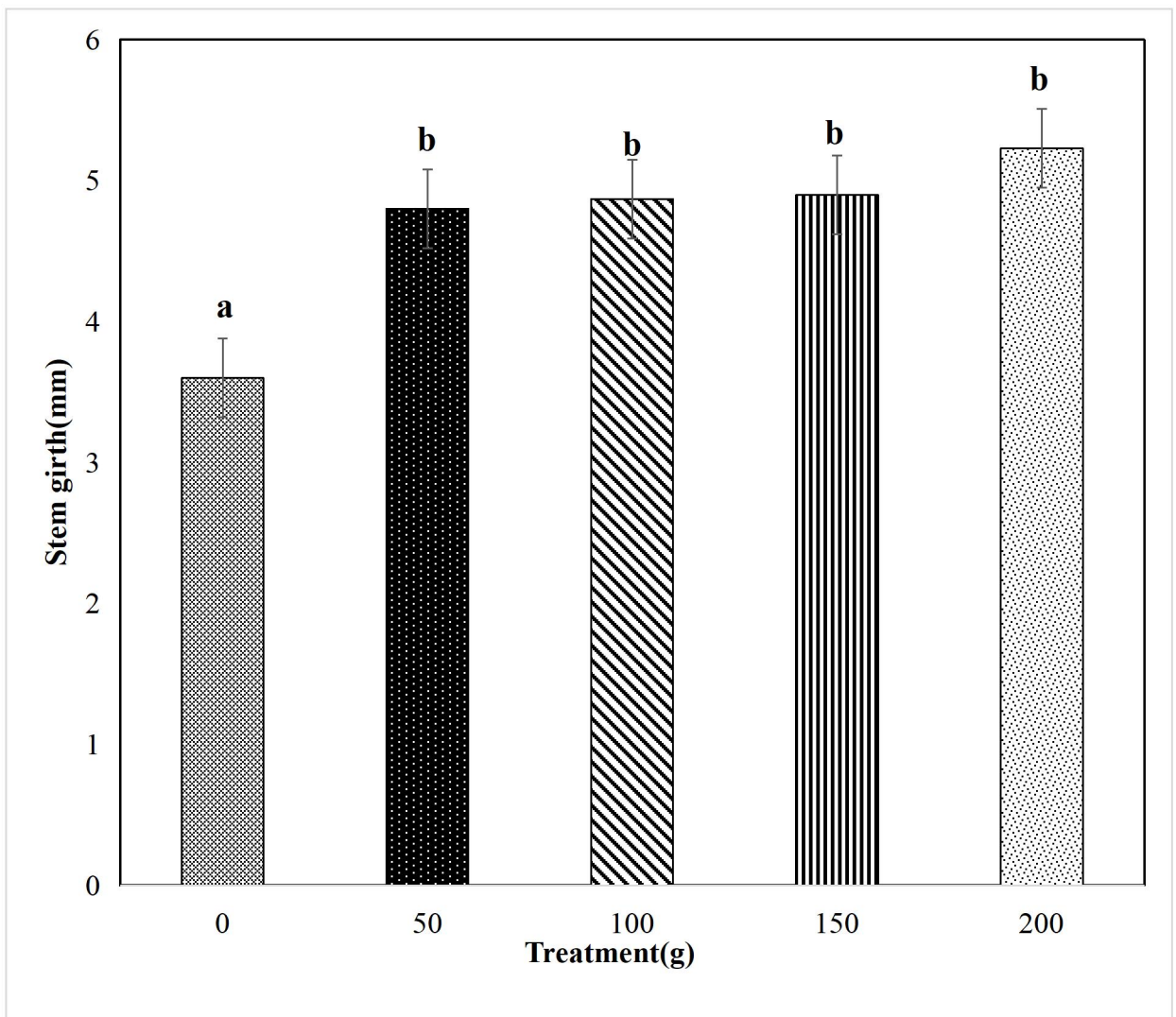


Figure 3.65; There was significant difference between Control and the treatment of 50 g – 200 g of poultry dung. Day 12

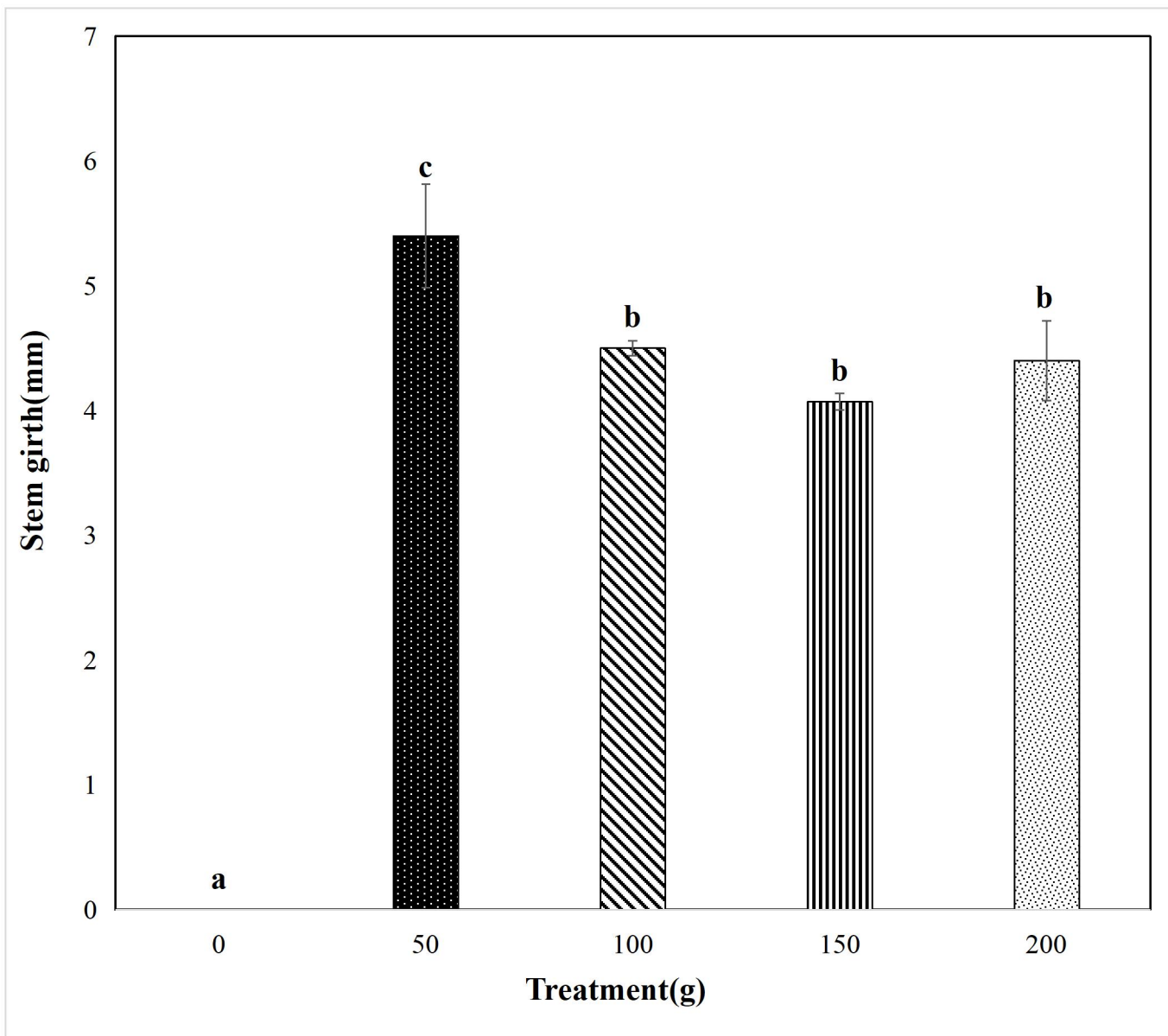


Figure 3.36; Control was significantly different from all NPK treated with soil, similarly 50 g enriched soil is significantly different from 100 g, 150 g, 200 g Day 12

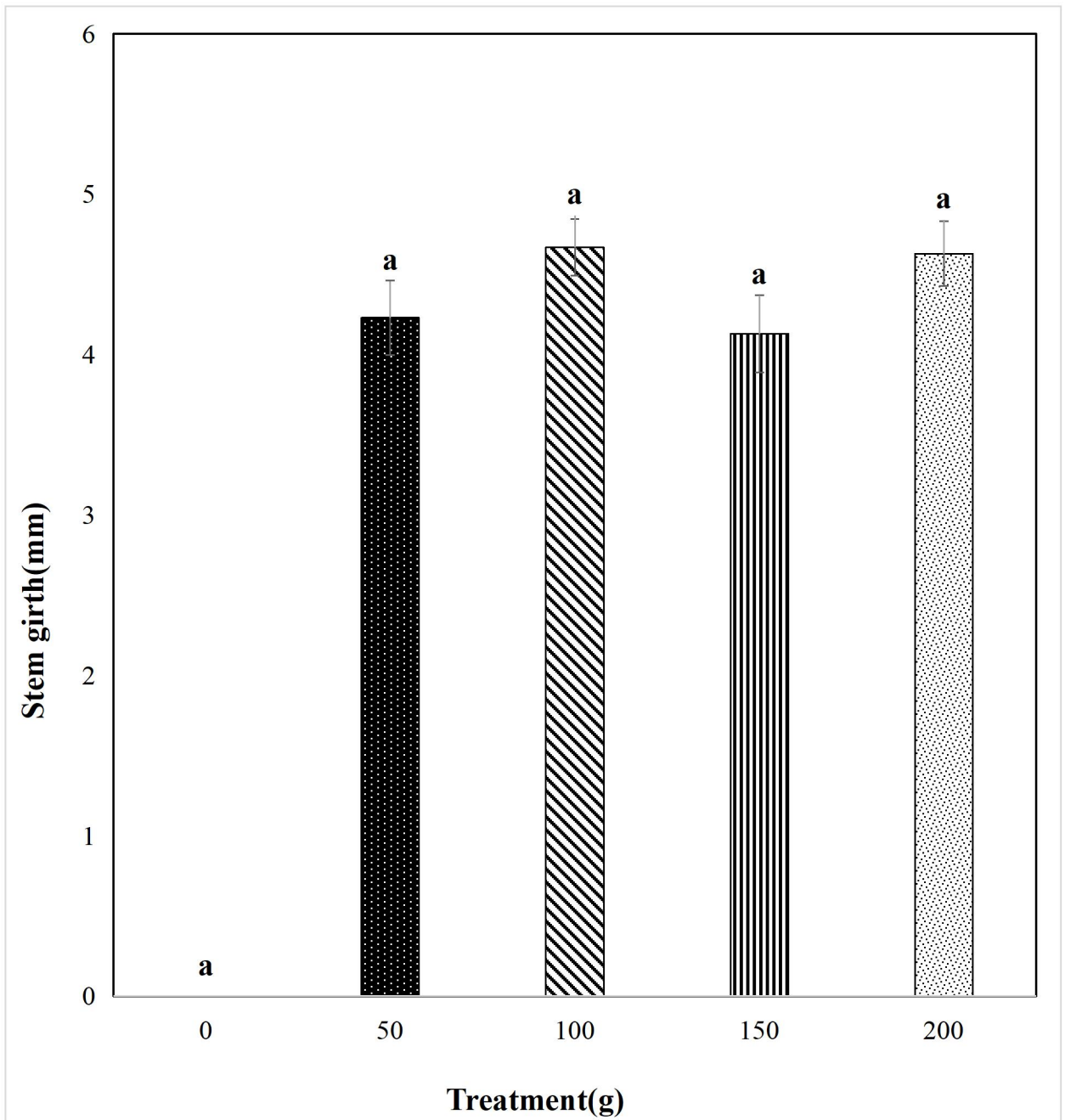


Figure 3.67: There was no significant difference between Control and other treatment of 50 g - 200 g of poultry dung + NPK, because they were all grown. Day 12

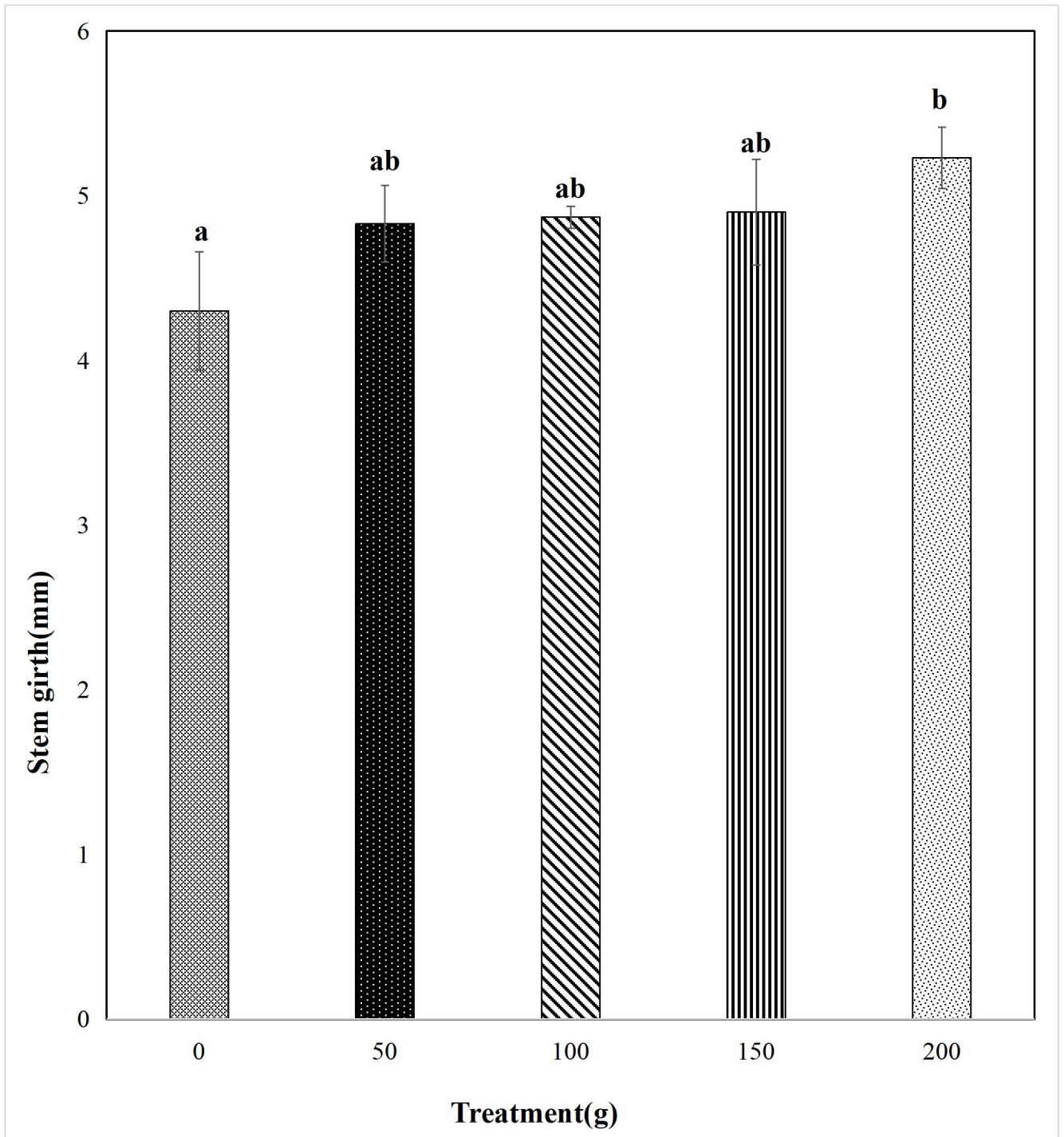


Figure 3.68: There was significant difference between 200 g of poultry dung to all other treatment of poultry dung treated soil. Day 15

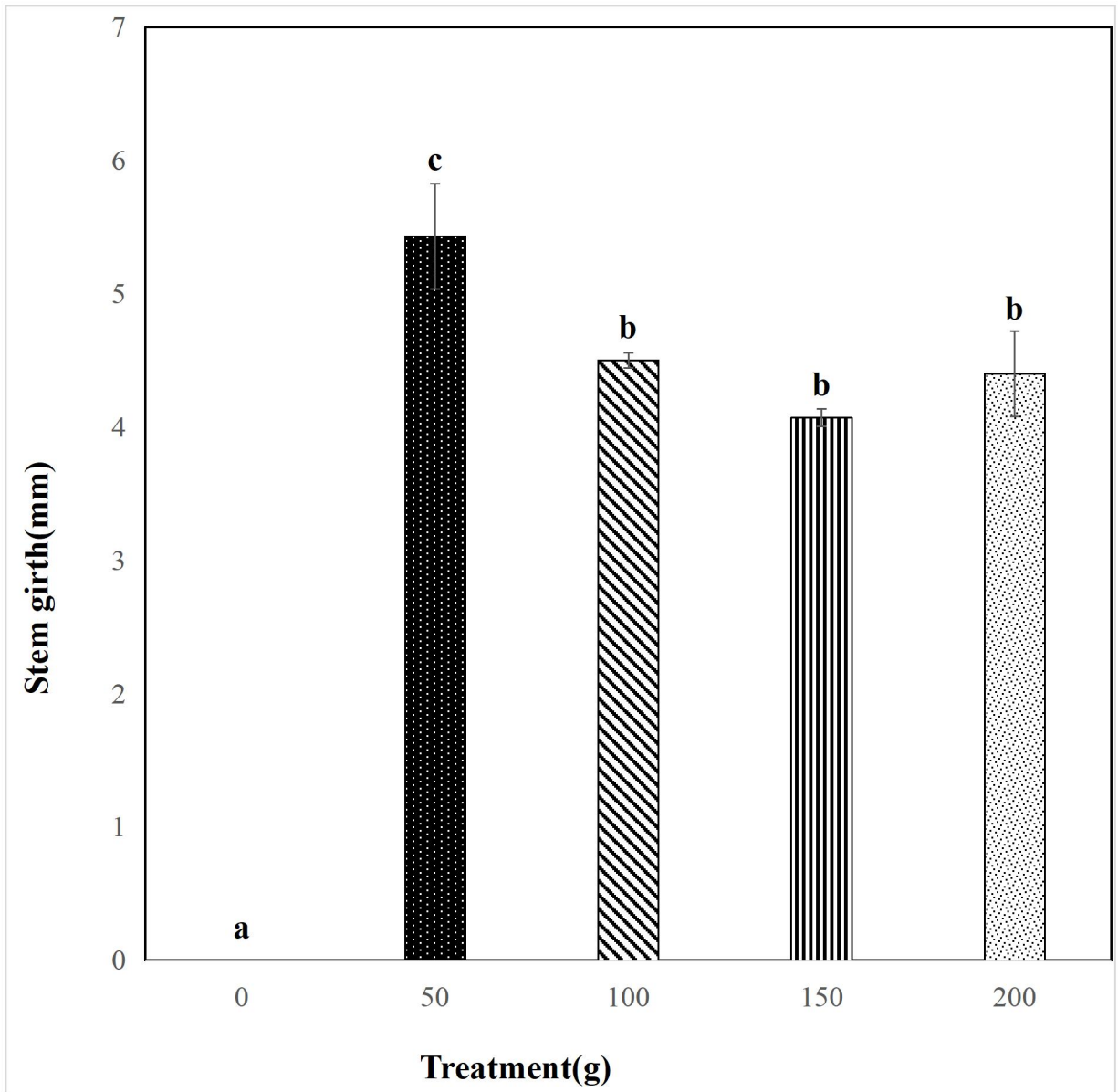


Figure 3.69: There was no significant difference between the treatment 50g - 200g of NPK and Control

Day 15

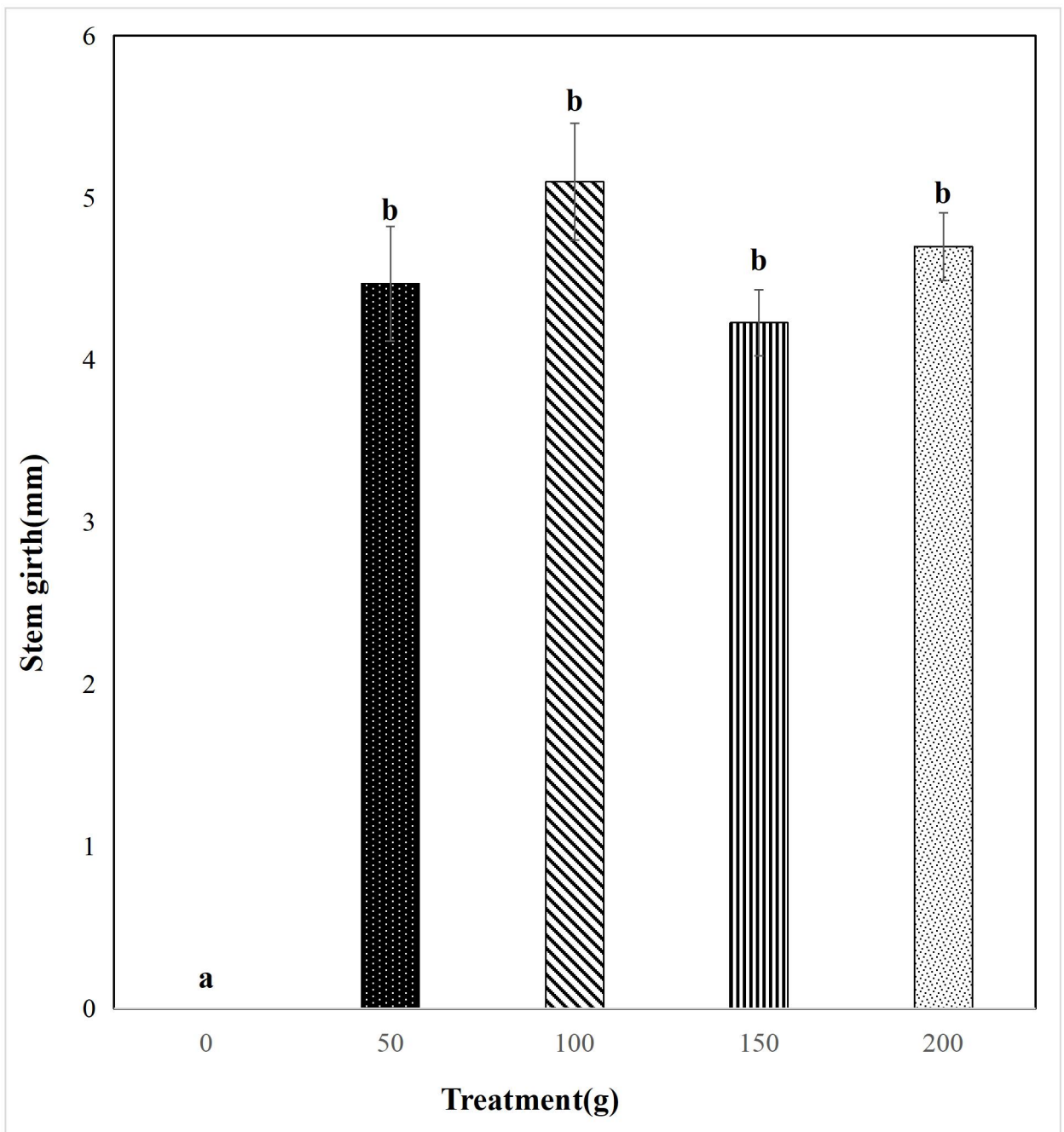


Figure 3.70: There was no significant difference between the treatment 50 g -200 g of poultry dung + NPK enriched soil. Day 15

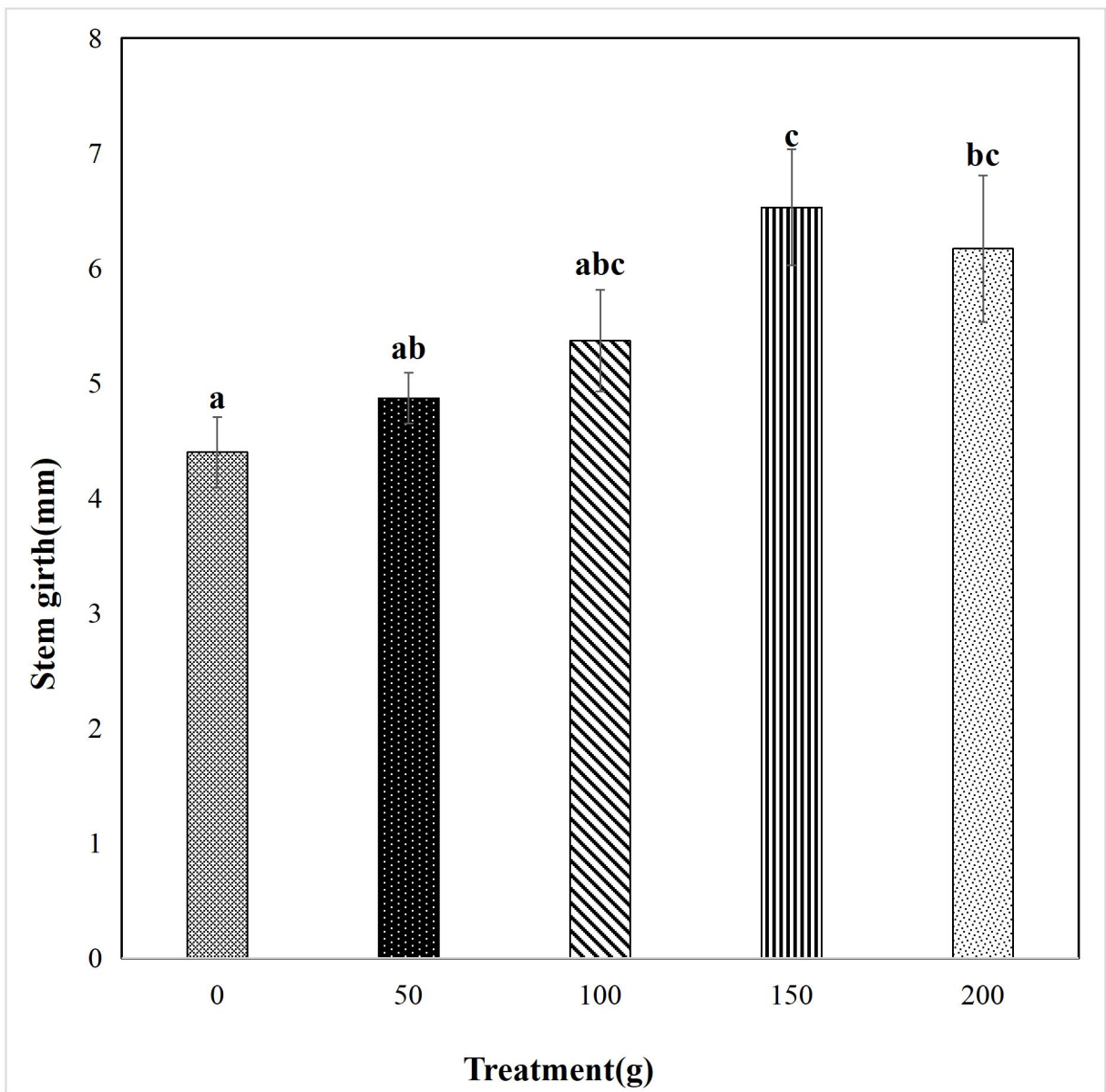


Figure 3.71: There was no significant difference between Control and other treatment of 50 g -200 g of poultry dung treated soil. Day 18

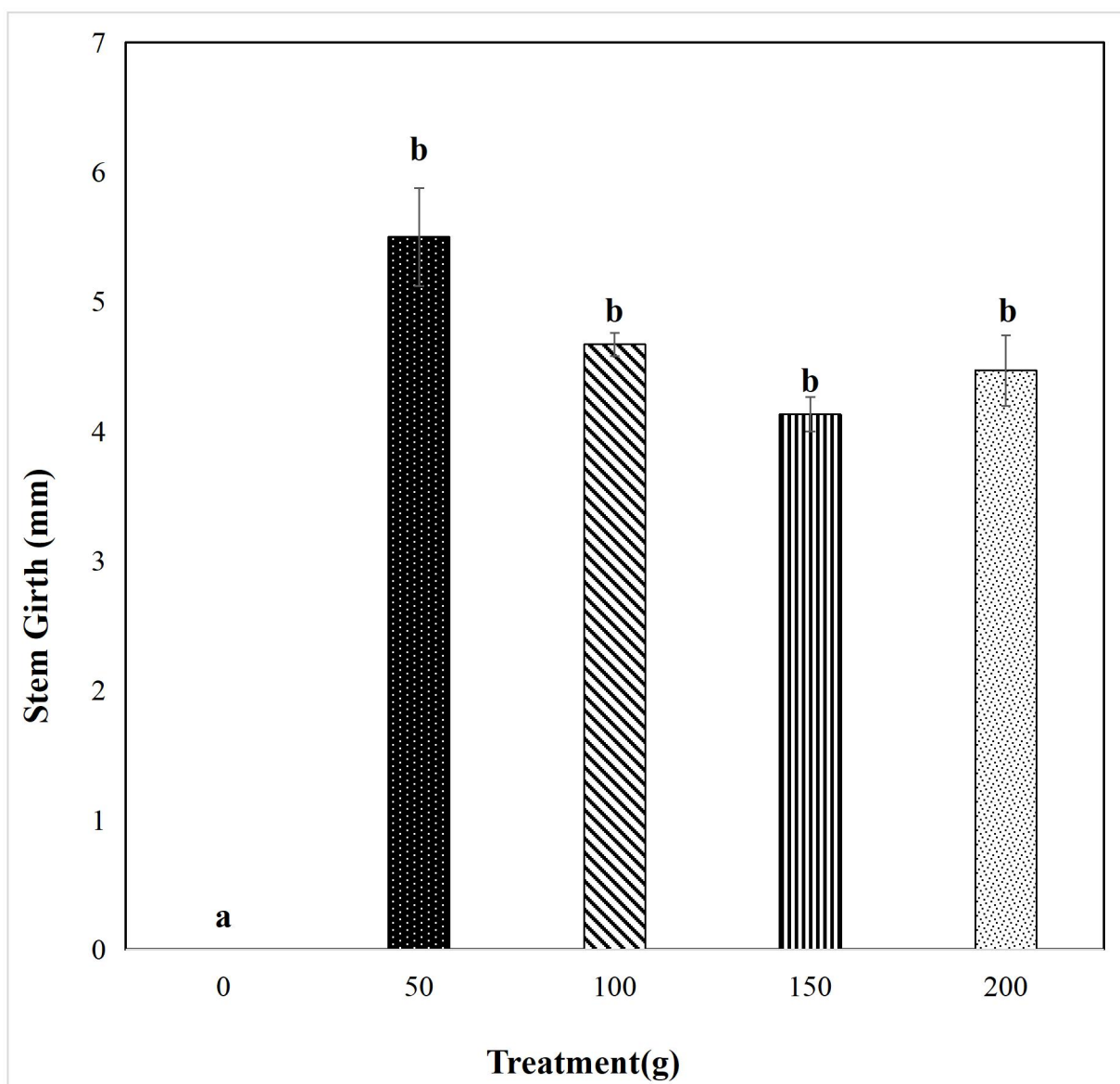


Figure 3.72: There was no significant difference between Control and other treatment of 50 g -200 g of NPK enriched soil .Day 18

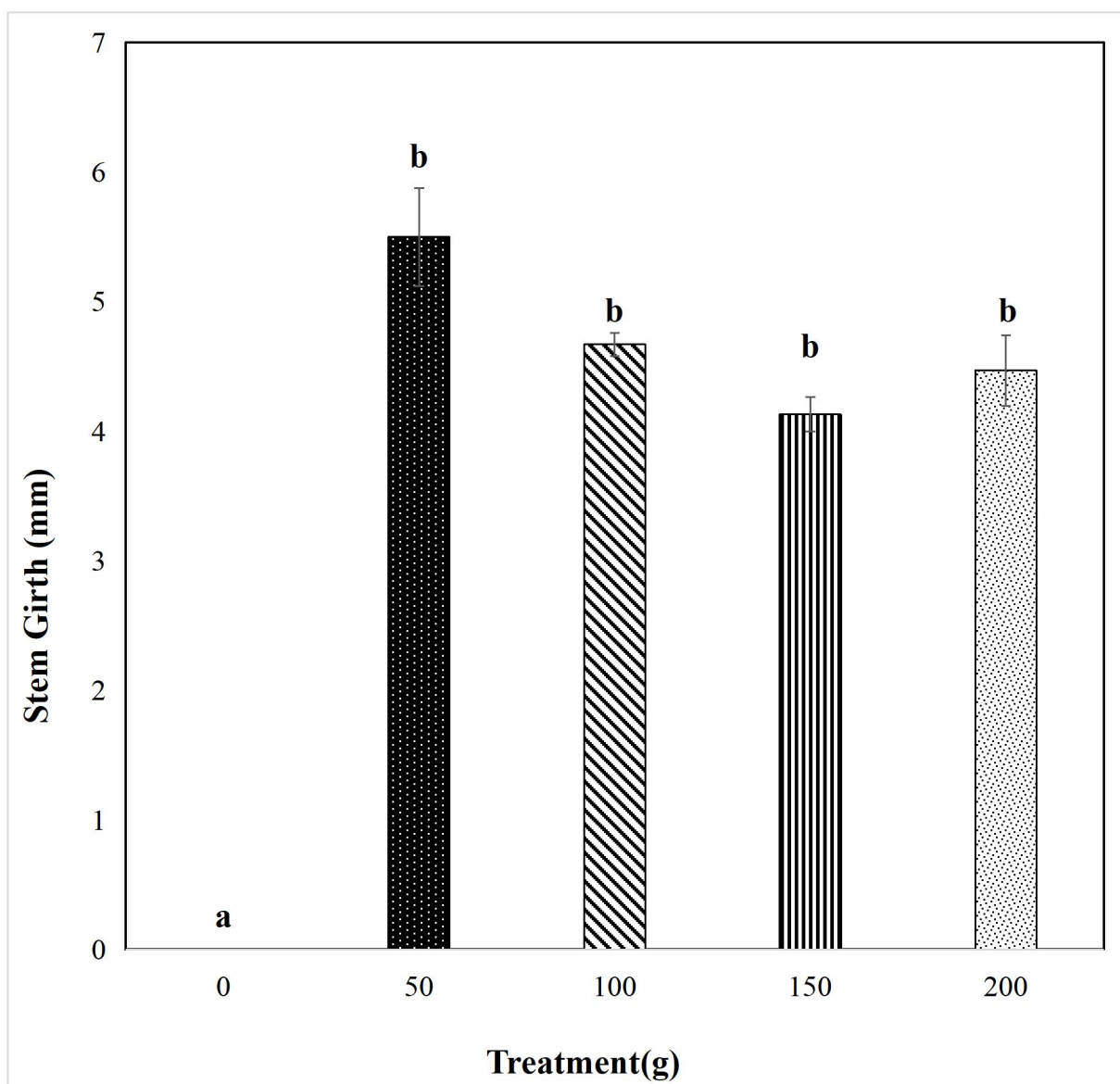


Figure 3.72: There was no significant difference between Control and other treatment of 50 g -200 g of NPK enriched soil. Day 18

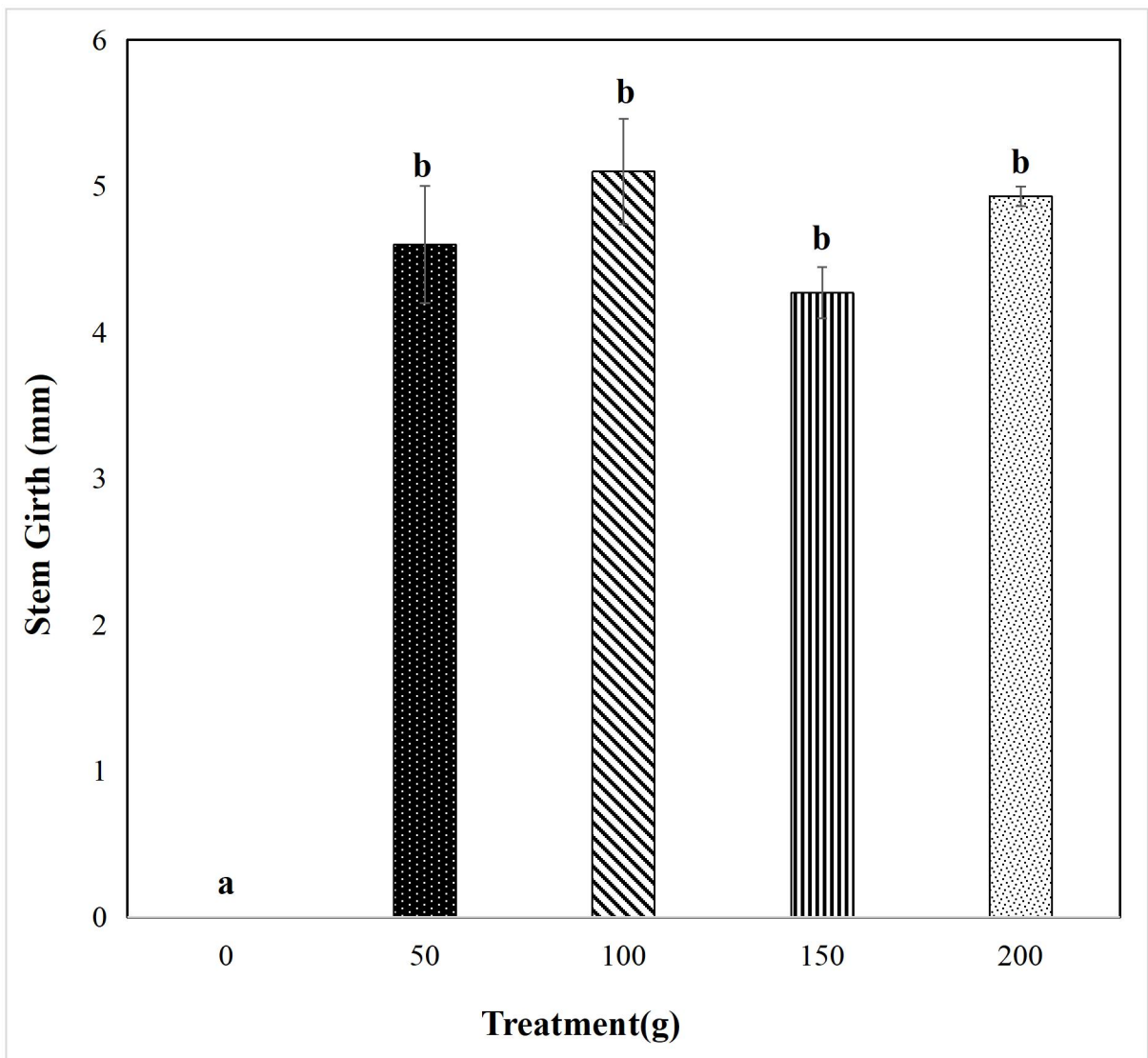


Figure 3.73: There was no significant difference between Control and other treatment of 50 g – 200 g of poultry dung + NPK .Day 18

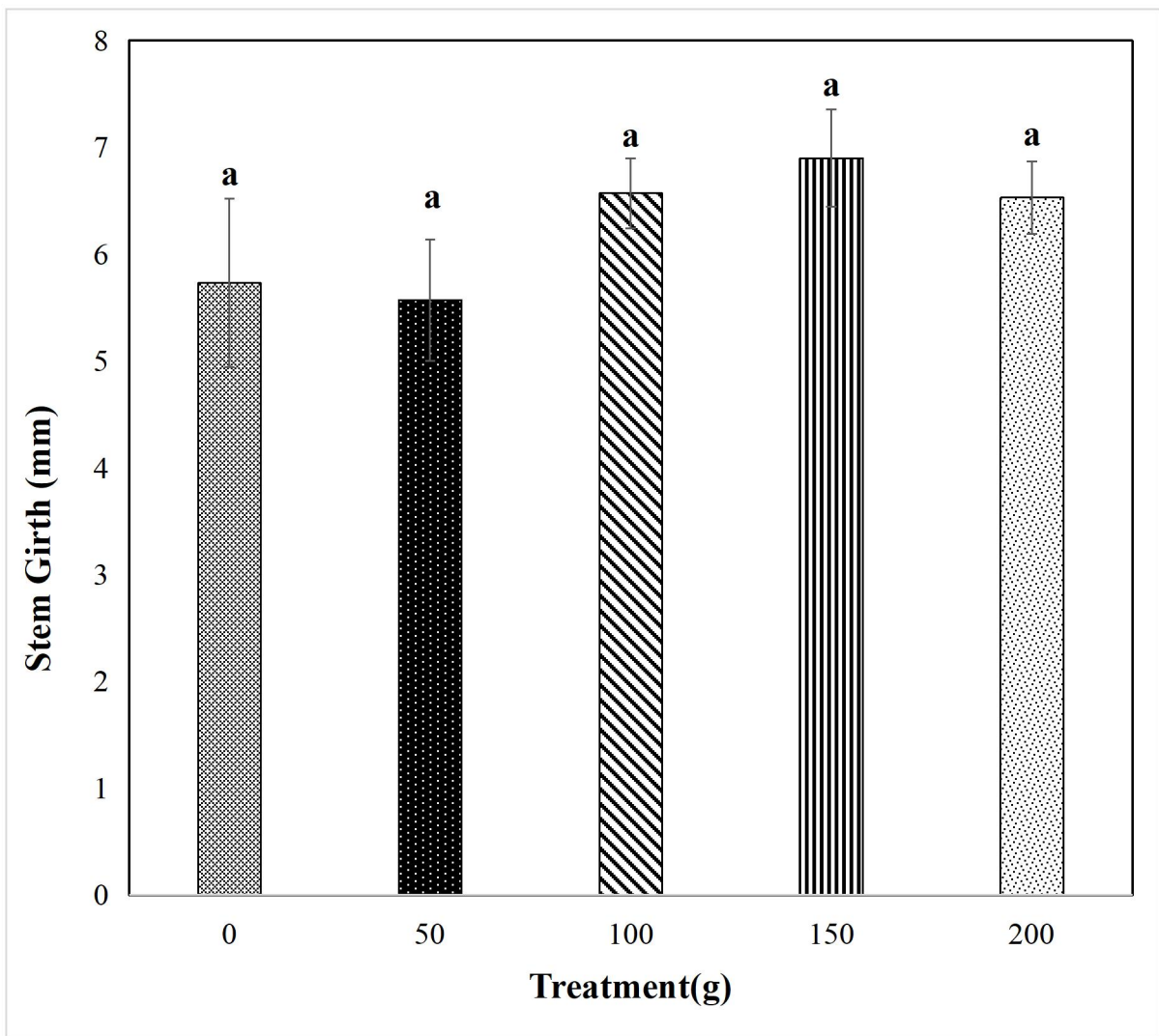


Figure 3.74: There was significant difference between 150 g and 200 g of treatment of poultry dung to all other treatment of poultry dung treated soil. Day 21

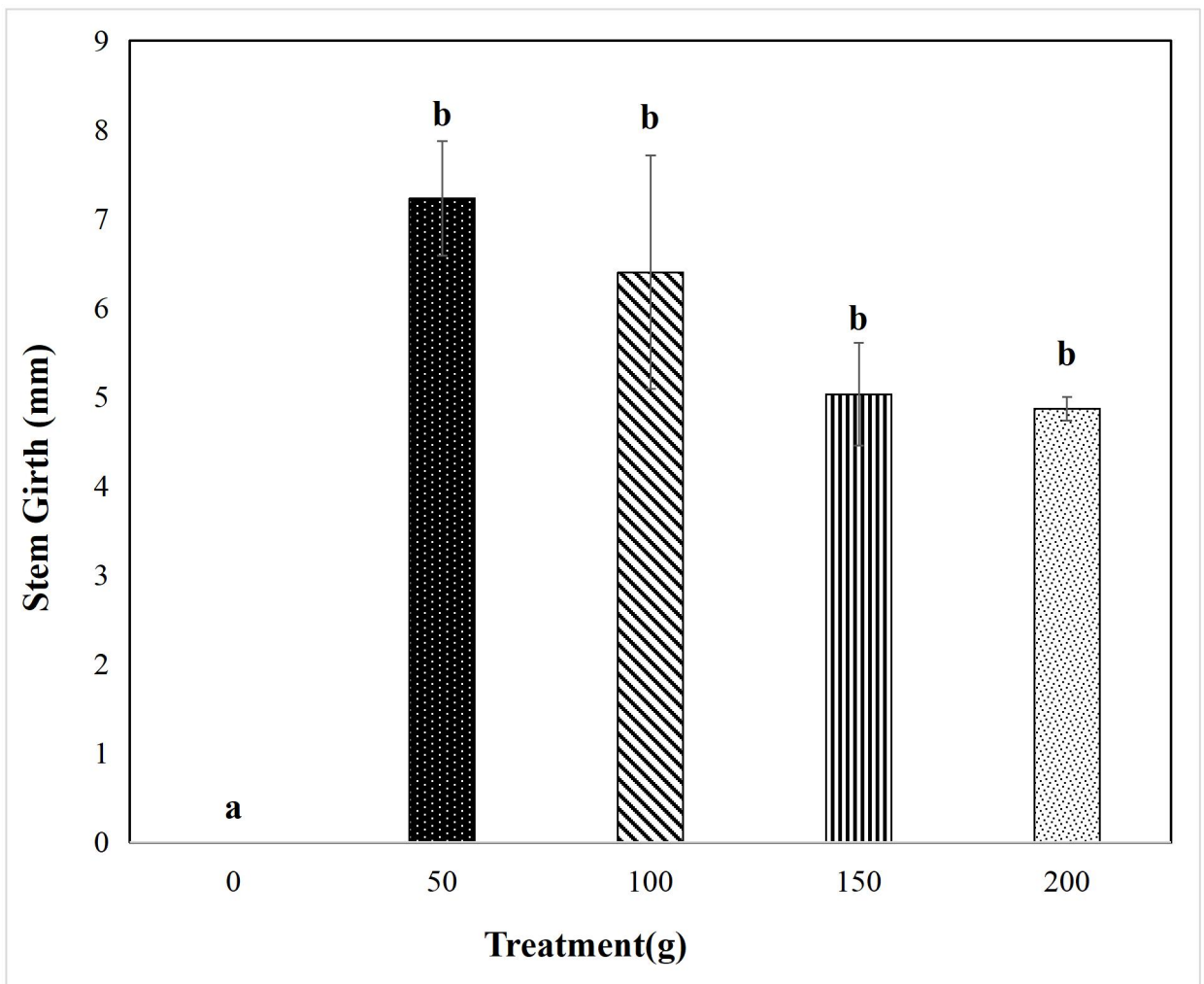


Figure 3.75: There was no significant difference between Control and all other treatment of 50 g - 200 g of treatment of NPK. Day 21

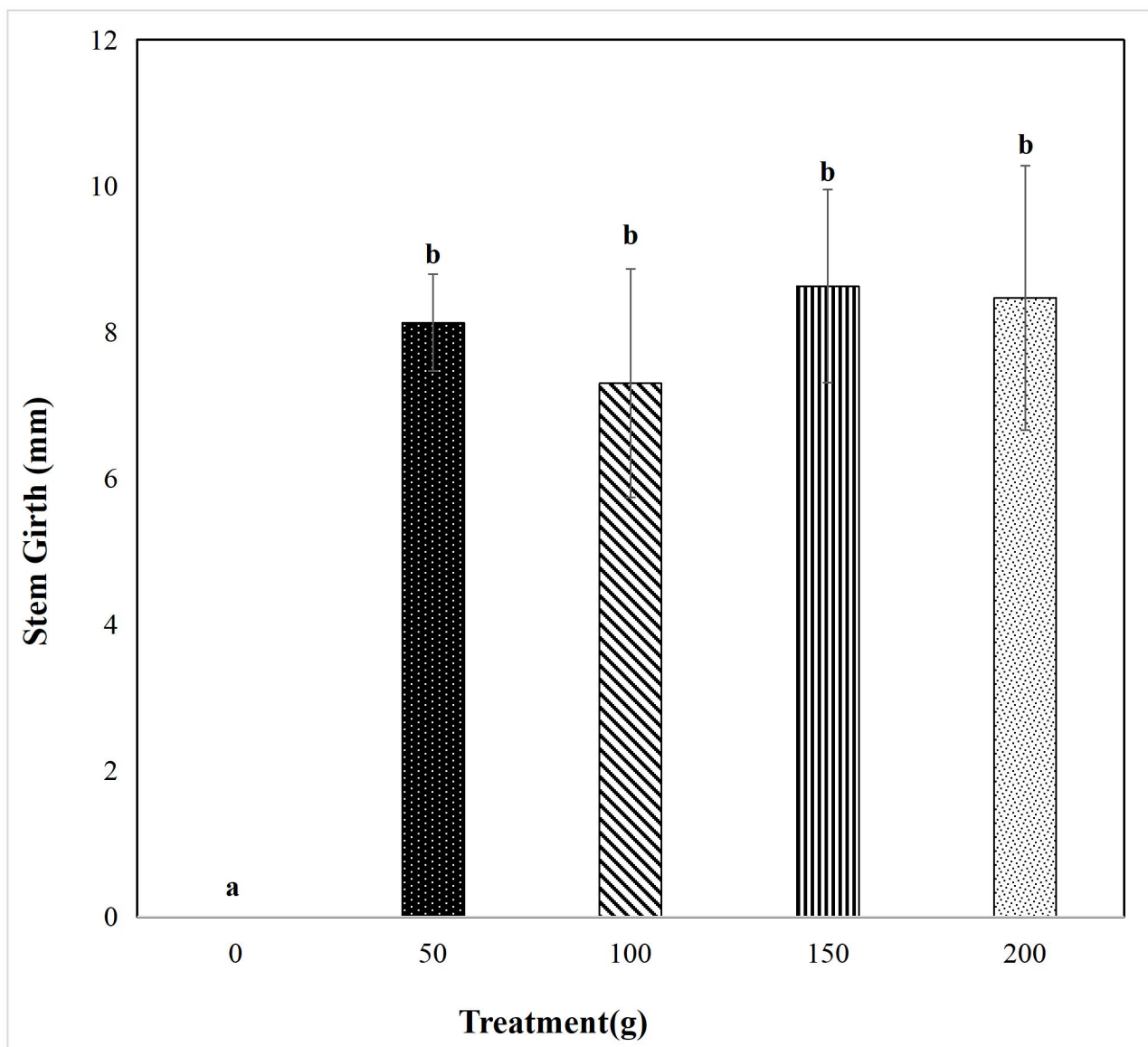


Figure 3.76: There was no significant difference between Control and all other treatment of 50 g -200 g of treatment of poultry dung + NPK .Day 21

## CHAPTER FOUR

### 4.0

### DISCUSSION

The results of this study provide insights into the comparative effects of organic and inorganic fertilizers on the growth and yield of *Solanum macrocarpon*. The findings highlight variations in germination rate, leaf number, chlorophyll content, and overall plant growth under different fertilizer treatments. This chapter interprets these results in relation to previous research, explaining their implications for sustainable agricultural practices.

The germination results revealed that seeds grown in soil enriched with NPK fertilizer had a slightly higher germination rate compared to those treated with poultry dung and the Control group. This aligns with previous studies indicating that inorganic fertilizers provide readily available nutrients, which can enhance initial seedling development (Marschner, 2012). However, poultry dung-treated soil also showed competitive germination rates, suggesting that organic fertilizers, although slower in nutrient release, still contribute to seed viability and early plant growth (Agegnehu *et al.*, 2016). The Control group exhibited the lowest germination rates, emphasizing the importance of soil nutrient enrichment for optimal seedling establishment.

Plant height, stem girth, and leaf number were key growth parameters analyzed in this study. The results indicated that plants treated with inorganic fertilizer (NPK) exhibited more vigorous growth compared to those treated with poultry dung or the Control group. This is expected, as inorganic fertilizers provide essential nutrients in readily available forms, thereby stimulating rapid vegetative growth (Ju *et al.*, 2009). However, poultry dung-treated plants demonstrated steady and sustained growth over time, which suggests long-term soil fertility benefits associated with organic amendments (Schipanski *et al.*, 2017). Additionally, the combined application of poultry dung and NPK fertilizer produced optimal growth, indicating

a complementary effect between organic and inorganic fertilizers. This aligns with integrated nutrient management (INM) approaches, which emphasize balancing quick-release nutrients with long-term soil health improvements (Giller *et al.*, 2017).

The chlorophyll content index (CCI) provided an indirect measure of photosynthetic efficiency under different fertilizer treatments. The highest chlorophyll content was observed in plants treated with a combination of poultry dung and NPK, followed by NPK-treated plants. This suggests that an adequate supply of nitrogen, a key component of chlorophyll molecules, enhances photosynthetic activity (Bello *et al.*, 2016). Poultry dung-treated plants also exhibited improved chlorophyll content over time, reflecting the gradual nutrient release from organic fertilizers, which supports sustained plant health (Palma *et al.*, 2019).

One key concern associated with inorganic fertilizers is the potential for nutrient leaching and soil degradation. Overapplication of chemical fertilizers can lead to soil acidification and groundwater contamination, which have long-term environmental implications (Badejo *et al.*, 2015). In contrast, organic fertilizers improve soil structure and promote microbial activity, reducing dependency on chemical inputs (Dinesh *et al.*, 2018).

This study suggests that a balanced approach incorporating both organic and inorganic fertilizers can optimize yield while minimizing environmental risks. The use of poultry dung alongside NPK fertilizer proved to be an effective strategy, providing immediate nutrient availability while enhancing long-term soil fertility.

#### **4.1 CONCLUSION**

The findings of this study reinforce the importance of selecting appropriate fertilization strategies for *Solanum macrocarpon* cultivation. While NPK fertilizer promotes rapid growth and high yield, poultry dung contributes to sustainable soil management. A combined application approach is recommended to maximize productivity while maintaining soil health.

Future research should focus on long-term field trials to assess the cumulative effects of organic and inorganic fertilizers on soil fertility and crop performance.

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## APPENDICES

### Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
						Lower Bound
Poultry Dung (PD) Treatment, Number of Leaf Day 3	0	3	2.00	.000	.000	2.00
	50	3	2.00	.000	.000	2.00
	100	3	2.00	.000	.000	2.00
	150	3	2.00	.000	.000	2.00
	200	3	2.00	.000	.000	2.00
	Total	15	2.00	.000	.000	2.00
NPK Treatment, Number of Leaf Day 3	0	3	2.00	.000	.000	2.00
	50	3	2.00	.000	.000	2.00
	100	3	2.00	.000	.000	2.00
	150	3	2.00	.000	.000	2.00
	200	3	2.00	.000	.000	2.00
	Total	15	2.00	.000	.000	2.00
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 3	0	3	2.00	.000	.000	2.00
	50	3	2.00	.000	.000	2.00
	100	3	2.00	.000	.000	2.00
	150	3	2.00	.000	.000	2.00
	200	3	2.00	.000	.000	2.00
	Total	15	2.00	.000	.000	2.00

### Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
						Lower Bound
Poultry Dung (PD) Treatment, Number of Leaf Day 6	0	3	2.33	.577	.333	.90
	50	3	4.00	.000	.000	4.00
	100	3	4.00	.000	.000	4.00
	150	3	4.00	.000	.000	4.00

	200	3	4.00	.000	.000	4.00
	Total	15	3.67	.724	.187	3.27
NPK Treatment, Number of Leaf Day 6	0	3	2.33	.577	.333	.90
	50	3	4.00	.000	.000	4.00
	100	3	4.00	.000	.000	4.00
	150	3	3.67	.577	.333	2.23
	200	3	3.00	1.000	.577	.52
	Total	15	3.40	.828	.214	2.94
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 6	0	3	2.33	.577	.333	.90
	50	3	3.67	.577	.333	2.23
	100	3	4.00	.000	.000	4.00
	150	3	3.67	.577	.333	2.23
	200	3	3.67	.577	.333	2.23
	Total	15	3.47	.743	.192	3.06

**Poultry Dung (PD) Treatment, Number of Leaf Day 6**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	2.33	
50	3		4.00
100	3		4.00
150	3		4.00
200	3		4.00
Sig.		1.000	1.000

**NPK Treatment, Number of Leaf Day 6**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	2.33	
200	3	3.00	3.00
150	3		3.67
50	3		4.00
100	3		4.00
Sig.		.188	.076

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	2.33	

50	3		3.67
150	3		3.67
200	3		3.67
100	3		4.00
Sig.		1.000	.477

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
					Lower Bound
0	3	4.33	.577	.333	2.90
50	3	4.00	.000	.000	4.00
100	3	4.00	.000	.000	4.00
150	3	4.67	1.155	.667	1.80
200	3	5.00	1.732	1.000	.70
Total	15	4.40	.910	.235	3.90
0	3	4.33	.577	.333	2.90
50	3	5.67	1.528	.882	1.87
100	3	4.33	.577	.333	2.90
150	3	4.00	.000	.000	4.00
200	3	4.67	1.155	.667	1.80
Total	15	4.60	.986	.254	4.05
0	3	4.33	.577	.333	2.90
50	3	4.67	.577	.333	3.23
100	3	5.00	.000	.000	5.00
150	3	5.67	2.082	1.202	.50
200	3	5.33	1.528	.882	1.54
Total	15	5.00	1.134	.293	4.37

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Number of Leaf Day 9	Between Groups	2.267	4	.567	.607
	Within Groups	9.333	10	.933	
	Total	11.600	14		
NPK Treatment, Number of Leaf Day 9	Between Groups	4.933	4	1.233	1.423
	Within Groups	8.667	10	.867	
	Total	13.600	14		
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 9	Between Groups	3.333	4	.833	.568
	Within Groups	14.667	10	1.467	
	Total	18.000	14		

**Poultry Dung (PD) Treatment, Number of Leaf Day 9**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
50	3	4.00
100	3	4.00
0	3	4.33
150	3	4.67
200	3	5.00
Sig.		.269

**NPK Treatment, Number of Leaf Day 9**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
150	3	4.00
0	3	4.33
100	3	4.33
200	3	4.67
50	3	5.67
Sig.		.072

**Poultry Dung + NPK (PD+NPK), Number of Leaf Day 9**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
0	3	4.33
50	3	4.67
100	3	5.00
200	3	5.33
150	3	5.67
Sig.		.242

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	
Poultry Dung (PD)	0	3	5.00	.000	.000	5.00

Treatment, Number of Leaf Day 12	50	3	5.67	.577	.333	4.23
	100	3	5.67	1.155	.667	2.80
	150	3	4.33	.577	.333	2.90
	200	3	6.67	1.528	.882	2.87
	Total	15	5.47	1.125	.291	4.84
NPK Treatment, Number of Leaf Day 12	0	3	5.00	.000	.000	5.00
	50	3	5.67	1.528	.882	1.87
	100	3	6.00	1.000	.577	3.52
	150	3	5.00	.000	.000	5.00
	200	3	5.00	1.000	.577	2.52
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 12	Total	15	5.33	.900	.232	4.84
	0	3	5.00	.000	.000	5.00
	50	3	4.67	.577	.333	3.23
	100	3	5.00	.000	.000	5.00
	150	3	6.67	2.082	1.202	1.50
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 12	200	3	5.67	2.082	1.202	.50
	Total	15	5.40	1.352	.349	4.65

#### ANOVA

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Number of Leaf Day 12	Between Groups	9.067	4	2.267	2.615
	Within Groups	8.667	10	.867	
	Total	17.733	14		
NPK Treatment, Number of Leaf Day 12	Between Groups	2.667	4	.667	.769
	Within Groups	8.667	10	.867	
	Total	11.333	14		
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 12	Between Groups	7.600	4	1.900	1.056
	Within Groups	18.000	10	1.800	
	Total	25.600	14		

#### Poultry Dung (PD) Treatment, Number of Leaf Day 12

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
150	3	4.33	
0	3	5.00	5.00
50	3	5.67	5.67
100	3	5.67	5.67
200	3		6.67
Sig.		.133	.068

#### NPK Treatment, Number of Leaf Day 12

Duncan

Treatment (g)	N	Subset for alpha = 0.05

		1
0	3	5.00
150	3	5.00
200	3	5.00
50	3	5.67
100	3	6.00
Sig.		.253

**Poultry Dung + NPK (PD+NPK), Number of Leaf Day 12**  
Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
50	3	4.67
0	3	5.00
100	3	5.00
200	3	5.67
150	3	6.67
Sig.		.124

**Descriptives**

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
		Lower Bound				
Poultry Dung (PD) Treatment, Number of Leaf Day 15	0	3	5.33	.577	.333	3.90
	50	3	5.67	.577	.333	4.23
	100	3	5.67	1.155	.667	2.80
	150	3	4.33	.577	.333	2.90
	200	3	6.67	1.528	.882	2.87
	Total	15	5.53	1.125	.291	4.91
NPK Treatment, Number of Leaf Day 15	0	3	5.33	.577	.333	3.90
	50	3	5.67	1.528	.882	1.87
	100	3	6.00	1.000	.577	3.52
	150	3	5.00	.000	.000	5.00
	200	3	5.00	1.000	.577	2.52
	Total	15	5.40	.910	.235	4.90
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 15	0	3	5.33	.577	.333	3.90
	50	3	7.33	1.528	.882	3.54
	100	3	8.33	5.774	3.333	-6.01
	150	3	8.00	1.000	.577	5.52
	200	3	6.00	1.732	1.000	1.70
	Total	15	7.00	2.673	.690	5.52

**ANOVA**

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD)	Between Groups	8.400	4	2.100	2.250

Treatment, Number of Leaf Day 15	Within Groups	9.333	10	.933	
	Total	17.733	14		
NPK Treatment, Number of Leaf Day 15	Between Groups	2.267	4	.567	.607
	Within Groups	9.333	10	.933	
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 15	Total	11.600	14		
	Between Groups	20.000	4	5.000	.625
	Within Groups	80.000	10	8.000	
	Total	100.000	14		

**Poultry Dung (PD) Treatment, Number of Leaf Day 15**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
150	3	4.33	
0	3	5.33	5.33
50	3	5.67	5.67
100	3	5.67	5.67
200	3		6.67
Sig.		.146	.146

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
150	3	5.00
200	3	5.00
0	3	5.33
50	3	5.67
100	3	6.00
Sig.		.269

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
0	3	5.33
200	3	6.00
50	3	7.33
150	3	8.00
100	3	8.33

Sig.		.259
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**Descriptives**

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
						Lower Bound
Poultry Dung (PD) Treatment, Number of Leaf Day 18	0	3	5.33	.577	.333	3.90
	50	3	5.67	.577	.333	4.23
	100	3	5.67	1.155	.667	2.80
	150	3	5.00	.000	.000	5.00
	200	3	6.67	1.528	.882	2.87
	Total	15	5.67	.976	.252	5.13
NPK Treatment, Number of Leaf Day 18	0	3	5.33	.577	.333	3.90
	50	3	5.67	1.528	.882	1.87
	100	3	6.00	1.000	.577	3.52
	150	3	5.00	.000	.000	5.00
	200	3	5.33	.577	.333	3.90
	Total	15	5.47	.834	.215	5.00
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 18	0	3	5.33	.577	.333	3.90
	50	3	7.33	1.528	.882	3.54
	100	3	8.33	5.774	3.333	-6.01
	150	3	8.00	1.000	.577	5.52
	200	3	6.00	1.732	1.000	1.70
	Total	15	7.00	2.673	.690	5.52

**ANOVA**

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Number of Leaf Day 18	Between Groups	4.667	4	1.167	1.346
	Within Groups	8.667	10	.867	
	Total	13.333	14		
NPK Treatment, Number of Leaf Day 18	Between Groups	1.733	4	.433	.542
	Within Groups	8.000	10	.800	
	Total	9.733	14		
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 18	Between Groups	20.000	4	5.000	.625
	Within Groups	80.000	10	8.000	
	Total	100.000	14		

**Poultry Dung (PD) Treatment, Number of  
Leaf Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1

150	3	5.00
0	3	5.33
50	3	5.67
100	3	5.67
200	3	6.67
Sig.		.072

**NPK Treatment, Number of Leaf Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
150	3	5.00
0	3	5.33
200	3	5.33
50	3	5.67
100	3	6.00
Sig.		.236

**Poultry Dung + NPK (PD+NPK), Number of Leaf Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
0	3	5.33
200	3	6.00
50	3	7.33
150	3	8.00
100	3	8.33
Sig.		.259

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
					Lower Bound
Poultry Dung (PD) Treatment, Number of Leaf Day 18	0	5.67	.577	.333	4.23
	50	6.00	.000	.000	6.00
	100	5.67	1.155	.667	2.80
	150	5.00	.000	.000	5.00
	200	7.00	1.732	1.000	2.70
	Total	15	5.87	1.060	.274
NPK Treatment, Number of Leaf Day 18	0	5.67	.577	.333	4.23
	50	5.67	1.528	.882	1.87
	100	6.00	1.000	.577	3.52
	150	5.00	.000	.000	5.00

	200	3	5.33	.577	.333	3.90
	Total	15	5.53	.834	.215	5.07
	0	3	5.67	.577	.333	4.23
	50	3	7.67	1.528	.882	3.87
Poultry Dung + NPK	100	3	8.67	5.508	3.180	-5.01
(PD+NPK), Number of Leaf	150	3	8.00	1.000	.577	5.52
Day 18	200	3	6.00	1.732	1.000	1.70
	Total	15	7.20	2.597	.670	5.76

#### ANOVA

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Number of Leaf Day 18	Between Groups	6.400	4	1.600	1.714
	Within Groups	9.333	10	.933	
	Total	15.733	14		
NPK Treatment, Number of Leaf Day 18	Between Groups	1.733	4	.433	.542
	Within Groups	8.000	10	.800	
	Total	9.733	14		
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 18	Between Groups	20.400	4	5.100	.689
	Within Groups	74.000	10	7.400	
	Total	94.400	14		

#### Poultry Dung (PD) Treatment, Number of Leaf Day 18

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
150	3	5.00	
0	3	5.67	5.67
100	3	5.67	5.67
50	3	6.00	6.00
200	3		7.00
Sig.		.264	.146

#### NPK Treatment, Number of Leaf Day 18

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
150	3	5.00
200	3	5.33
0	3	5.67
50	3	5.67
100	3	6.00
Sig.		.236

**Poultry Dung + NPK (PD+NPK), Number of  
Leaf Day 18**  
Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
0	3	5.67
200	3	6.00
50	3	7.67
150	3	8.00
100	3	8.67
Sig.		.241

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	
					Lower Bound	Upper Bound		
Poultry Dung (PD) Treatment, Number of Leaf Day 21	0	3	5.67	.577	.333	4.23	7.10	5
	50	3	6.00	.000	.000	6.00	6.00	6
	100	3	5.67	1.155	.667	2.80	8.54	5
	150	3	5.00	.000	.000	5.00	5.00	5
	200	3	7.00	1.732	1.000	2.70	11.30	5
	Total	15	5.87	1.060	.274	5.28	6.45	5
NPK Treatment, Number of Leaf Day 21	0	3	5.67	.577	.333	4.23	7.10	5
	50	3	5.67	1.528	.882	1.87	9.46	4
	100	3	6.00	1.000	.577	3.52	8.48	5
	150	3	5.00	.000	.000	5.00	5.00	5
	200	3	5.33	.577	.333	3.90	6.77	5
	Total	15	5.53	.834	.215	5.07	6.00	4
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 21	0	3	5.67	.577	.333	4.23	7.10	5
	50	3	7.67	1.528	.882	3.87	11.46	6
	100	3	8.67	5.508	3.180	-5.01	22.35	5
	150	3	8.00	1.000	.577	5.52	10.48	7
	200	3	6.00	1.732	1.000	1.70	10.30	5
	Total	15	7.20	2.597	.670	5.76	8.64	5

**ANOVA**

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Number of Leaf Day 21	Between Groups	6.400	4	1.600	1.714
	Within Groups	9.333	10	.933	
	Total	15.733	14		

NPK Treatment, Number of Leaf Day 21	Between Groups	1.733	4	.433	.542
	Within Groups	8.000	10	.800	
	Total	9.733	14		
Poultry Dung + NPK (PD+NPK), Number of Leaf Day 21	Between Groups	20.400	4	5.100	.689
	Within Groups	74.000	10	7.400	
	Total	94.400	14		

**Poultry Dung (PD) Treatment, Number of Leaf Day 21**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
150	3	5.00	
0	3	5.67	5.67
100	3	5.67	5.67
50	3	6.00	6.00
200	3		7.00
Sig.		.264	.146

displayed.

**NPK Treatment, Number of Leaf Day 21**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
150	3	5.00
200	3	5.33
0	3	5.67
50	3	5.67
100	3	6.00
Sig.		.236

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		1
0	3	5.67
200	3	6.00
50	3	7.67
150	3	8.00
100	3	8.67
Sig.		.241

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 9	0	3	2.77	.635	.367	1.19	4.34	2	4
	50	3	5.80	2.433	1.405	-.24	11.84	3	7
	100	3	1.63	.493	.285	.41	2.86	1	2
	150	3	4.77	.252	.145	4.14	5.39	5	5
	200	3	3.70	2.982	1.721	-3.71	11.11	1	7
	Total	15	3.73	2.123	.548	2.56	4.91	1	7
NPK Treatment, Chlorophyll Content Index of Day 9	0	3	2.77	.635	.367	1.19	4.34	2	4
	50	3	4.90	3.005	1.735	-2.56	12.36	2	7
	100	3	7.83	.839	.484	5.75	9.92	7	9
	150	3	6.93	.404	.233	5.93	7.94	7	7
	200	3	6.03	.153	.088	5.65	6.41	6	6
	Total	15	5.69	2.186	.565	4.48	6.90	2	9
Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 9	0	3	2.77	.635	.367	1.19	4.34	2	4
	50	3	2.33	.208	.120	1.82	2.85	2	3
	100	3	7.97	.723	.418	6.17	9.76	8	9
	150	3	6.73	.208	.120	6.22	7.25	7	7
	200	3	6.30	1.082	.624	3.61	8.99	5	8
	Total	15	5.22	2.397	.619	3.89	6.55	2	9

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 9	Between Groups	32.053	4	8.013	2.582	.102
	Within Groups	31.040	10	3.104		
	Total	63.093	14			
NPK Treatment, Chlorophyll Content Index of Day 9	Between Groups	46.283	4	11.571	5.604	.012
	Within Groups	20.647	10	2.065		
	Total	66.929	14			
Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 9	Between Groups	76.057	4	19.014	43.544	.000
	Within Groups	4.367	10	.437		
	Total	80.424	14			

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
100	3	1.63	
0	3	2.77	2.77
200	3	3.70	3.70
150	3	4.77	4.77
50	3		5.80
Sig.		.070	.078

**NPK Treatment, Chlorophyll Content Index of Day 9**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		A	B	C
0	3	2.77		
50	3	4.90	4.90	
200	3		6.03	6.03
150	3		6.93	6.93
100	3			7.83
Sig.		.099	.129	.174

**Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 9**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		A	B	C
50	3	2.33		
0	3	2.77		
200	3		6.30	
150	3		6.73	
100	3			7.97
Sig.		.441	.441	1.000

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		

	0	3	2.90	.557	.321	1.52	4.28	2	4
Poultry Dung (PD)	50	3	4.97	.850	.491	2.85	7.08	4	6
Treatment, Chlorophyll	100	3	6.03	.929	.536	3.73	8.34	5	7
Content Index of Day 12	150	3	5.80	.400	.231	4.81	6.79	5	6
	200	3	6.07	1.206	.696	3.07	9.06	5	7
	Total	15	5.15	1.425	.368	4.36	5.94	2	7
	0	3	2.90	.557	.321	1.52	4.28	2	4
	50	3	5.30	2.476	1.429	-.85	11.45	3	7
NPK Treatment, Chlorophyll	100	3	7.90	.781	.451	5.96	9.84	7	9
Content Index of Day 12	150	3	6.37	.907	.524	4.11	8.62	5	7
	200	3	6.03	.153	.088	5.65	6.41	6	6
	Total	15	5.70	2.000	.516	4.59	6.81	2	9
	0	3	2.90	.557	.321	1.52	4.28	2	4
	50	3	2.90	.624	.361	1.35	4.45	2	4
Poultry Dung + NPK	100	3	8.00	.781	.451	6.06	9.94	8	9
(PD+NPK), Chlorophyll	150	3	6.37	.611	.353	4.85	7.88	6	7
Content Index of Day 12	200	3	7.37	1.305	.754	4.12	10.61	6	9
	Total	15	5.51	2.372	.613	4.19	6.82	2	9

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD)	Between Groups	21.417	4	5.354	7.627	.004
Treatment, Chlorophyll	Within Groups	7.020	10	.702		
Content Index of Day 12	Total	28.437	14			
NPK Treatment, Chlorophyll	Between Groups	40.187	4	10.047	6.361	.008
Content Index of Day 12	Within Groups	15.793	10	1.579		
	Total	55.980	14			
Poultry Dung + NPK	Between Groups	72.016	4	18.004	26.581	.000
(PD+NPK), Chlorophyll	Within Groups	6.773	10	.677		
Content Index of Day 12	Total	78.789	14			

### Homogeneous Subsets

#### Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 12

Duncan

Treatment (g)	N	Subset for alpha = 0.05

		A	B
0	3	2.90	
50	3		4.97
150	3		5.80
100	3		6.03
200	3		6.07
Sig.		1.000	.165

**NPK Treatment, Chlorophyll Content Index of Day 12**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		A	B	C
0	3	2.90		
50	3		5.30	
200	3		6.03	6.03
150	3		6.37	6.37
100	3			7.90
Sig.		1.000	.344	.113

**Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 12**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		A	B	C
0	3	2.90		
50	3	2.90		
150	3		6.37	
200	3		7.37	7.37
100	3			8.00
Sig.		1.000	.168	.368

**Descriptives**

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	Max..	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Chlorophyll	0	3	2.63	.404	.233	1.63	3.64	2	3
	50	3	5.60	.819	.473	3.57	7.63	5	6

Content Index of Day 15	100	3	6.67	1.563	.902	2.78	10.55	5	8
	150	3	6.13	.945	.546	3.79	8.48	5	7
	200	3	6.43	.907	.524	4.18	8.69	6	7
	Total	15	5.49	1.744	.450	4.53	6.46	2	8
NPK Treatment, Chlorophyll Content Index of Day 15	0	3	2.63	.404	.233	1.63	3.64	2	3
	50	3	5.27	2.386	1.378	-.66	11.19	3	7
	100	3	7.93	.839	.484	5.85	10.02	7	9
	150	3	7.27	.802	.463	5.27	9.26	7	8
Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 15	200	3	6.37	.723	.418	4.57	8.16	6	7
	Total	15	5.89	2.193	.566	4.68	7.11	2	9
	0	3	2.63	.404	.233	1.63	3.64	2	3
	50	3	2.90	.781	.451	.96	4.84	2	4
Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 15	100	3	7.63	.379	.219	6.69	8.57	7	8
	150	3	6.77	.252	.145	6.14	7.39	7	7
	200	3	6.37	1.457	.841	2.75	9.99	5	8
	Total	15	5.26	2.252	.581	4.01	6.51	2	8

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 15	Between Groups	32.583	4	8.146	8.157	.003
	Within Groups	9.987	10	.999		
	Total	42.569	14			
NPK Treatment, Chlorophyll Content Index of Day 15	Between Groups	51.876	4	12.969	8.392	.003
	Within Groups	15.453	10	1.545		
	Total	67.329	14			
Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 15	Between Groups	64.789	4	16.197	26.097	.000
	Within Groups	6.207	10	.621		
	Total	70.996	14			

#### Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 15

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	2.63	
50	3		5.60
150	3		6.13

200	3		6.43
100	3		6.67
Sig.		1.000	.251

**NPK Treatment, Chlorophyll Content Index of Day 15**  
Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		A	B	C
0	3	2.63		
50	3		5.27	
200	3		6.37	6.37
150	3		7.27	7.27
100	3			7.93
Sig.		1.000	.089	.171

**Poultry Dung + NPK (PD+NPK), Chlorophyll Content**  
**Index of Day 15**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	2.63	
50	3	2.90	
200	3		6.37
150	3		6.77
100	3		7.63
Sig.		.687	.089

**Descriptives**

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min	Max.	
					Lower Bound	Upper Bound			
					Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 18	0			3
	50	3	4.90	.520	.300	3.61	6.19	5	6
	100	3	6.40	1.418	.819	2.88	9.92	5	8
	150	3	6.53	1.021	.590	4.00	9.07	6	8
	200	3	6.33	.808	.467	4.33	8.34	6	7
Total	15	6.03	1.155	.298		5.39	6.67	4	8
NPK Treatment, Chlorophyll Content Index of Day 18	0	3	5.97	1.650	.953	1.87	10.07	4	8
	50	3	7.40	3.800	2.194	-2.04	16.84	4	11
	100	3	7.53	1.877	1.084	2.87	12.20	6	9

	150	3	6.90	.458	.265	5.76	8.04	7	7
	200	3	7.17	.635	.367	5.59	8.74	7	8
	Total	15	6.99	1.837	.474	5.98	8.01	4	11
	0	3	5.97	1.650	.953	1.87	10.07	4	8
	50	3	5.70	.361	.208	4.80	6.60	5	6
Poultry Dung + NPK (PD+NPK), Chlorophyll	100	3	9.10	.954	.551	6.73	11.47	8	10
	150	3	5.67	2.307	1.332	-.06	11.40	4	8
Content Index of Day 18	200	3	7.50	1.054	.608	4.88	10.12	7	9
	Total	15	6.79	1.838	.475	5.77	7.80	4	10

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD)	Between Groups	5.289	4	1.322	.987	.458
Treatment, Chlorophyll	Within Groups	13.400	10	1.340		
Content Index of Day 18	Total	18.689	14			
NPK Treatment, Chlorophyll	Between Groups	4.649	4	1.162	.273	.889
Content Index of Day 18	Within Groups	42.600	10	4.260		
	Total	47.249	14			
Poultry Dung + NPK (PD+NPK), Chlorophyll	Between Groups	26.904	4	6.726	3.298	.057
Content Index of Day 18	Within Groups	20.393	10	2.039		
	Total	47.297	14			

#### Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 18

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
50	3	4.90
0	3	5.97
200	3	6.33
100	3	6.40
150	3	6.53
Sig.		.143

#### NPK Treatment, Chlorophyll Content Index of Day 18

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
0	3	5.97
150	3	6.90
200	3	7.17
50	3	7.40
100	3	7.53
Sig.		.410

**Poultry Dung + NPK (PD+NPK), Chlorophyll Content  
Index of Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
150	3	5.67	
50	3	5.70	
0	3	5.97	
200	3	7.50	7.50
100	3		9.10
Sig.		.173	.200

**Descriptives**

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
					Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 21	0			3
	50	3	4.93	.351	.203	4.06	5.81	5	5
	100	3	5.97	1.069	.617	3.31	8.62	5	7
	150	3	7.13	1.595	.921	3.17	11.09	6	9
	200	3	6.17	1.106	.639	3.42	8.91	5	7
	Total	15	6.03	1.240	.320	5.35	6.72	5	9
NPK Treatment, Chlorophyll Content Index of Day 21	0	3	5.97	1.436	.829	2.40	9.53	5	8
	50	3	7.30	3.175	1.833	-.59	15.19	4	10
	100	3	6.20	.800	.462	4.21	8.19	5	7
	150	3	7.23	.802	.463	5.24	9.23	6	8
	200	3	9.23	1.930	1.114	4.44	14.03	8	11
	Total	15	7.19	1.969	.508	6.10	8.28	4	11
Poultry Dung + NPK	0	3	5.97	1.436	.829	2.40	9.53	5	8

(PD+NPK), Chlorophyll	50	3	6.20	2.307	1.332	.47	11.93	4	9
Content Index of Day 21	100	3	12.33	3.062	1.768	4.73	19.94	9	14
	150	3	7.53	.451	.260	6.41	8.65	7	8
	200	3	8.00	1.212	.700	4.99	11.01	7	9
Total		15	8.01	2.878	.743	6.41	9.60	4	14

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Chlorophyll Content Index of Day 21	Between Groups	7.340	4	1.835	1.293	.336
	Within Groups	14.193	10	1.419		
	Total	21.533	14			
NPK Treatment, Chlorophyll Content Index of Day 21	Between Groups	19.997	4	4.999	1.458	.286
	Within Groups	34.300	10	3.430		
	Total	54.297	14			
Poultry Dung + NPK (PD+NPK), Chlorophyll Content Index of Day 21	Between Groups	79.109	4	19.777	5.366	.014
	Within Groups	36.860	10	3.686		
	Total	115.969	14			

**Poultry Dung (PD) Treatment, Chlorophyll**

**Content Index of Day 21**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
50	3	4.93
0	3	5.97
100	3	5.97
200	3	6.17
150	3	7.13
Sig.		.064

**NPK Treatment, Chlorophyll Content Index**

**of Day 21**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A

0	3	5.97
100	3	6.20
150	3	7.23
50	3	7.30
200	3	9.23
Sig.		.075

**Poultry Dung + NPK (PD+NPK), Chlorophyll Content  
Index of Day 21**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	5.97	
50	3	6.20	
150	3	7.53	
200	3	8.00	
100	3		12.33
Sig.		.254	1.000

**Descriptives**

	N	Mean	Std. Dev.	Std. Err.	95% Confidence Interval for Mean		Min	Max	
					Lower Bound	Upper Bound			
					Poultry Dung (PD) Treatment, Day 3	0			3
	50	3	2.00	1.000	.577	-.48	4.48	1	3
	100	3	2.33	.577	.333	.90	3.77	2	3
	150	3	2.67	.577	.333	1.23	4.10	2	3
	200	3	2.67	.577	.333	1.23	4.10	2	3
	Total	15	2.20	.775	.200	1.77	2.63	1	3
NPK Treatment, Day 3	0	3	.00	.000	.000	.00	.00	0	0
	50	3	3.00	.000	.000	3.00	3.00	3	3
	100	3	3.00	.000	.000	3.00	3.00	3	3
	150	3	2.33	.577	.333	.90	3.77	2	3
	200	3	2.67	.577	.333	1.23	4.10	2	3
	Total	15	2.20	1.207	.312	1.53	2.87	0	3
Poultry Dung + NPK (PD+NPK)	0	3	.00	.000	.000	.00	.00	0	0
	50	3	2.33	.577	.333	.90	3.77	2	3

100	3	2.67	.577	.333	1.23	4.10	2	3
150	3	3.00	.000	.000	3.00	3.00	3	3
200	3	2.33	.577	.333	.90	3.77	2	3
Total	15	2.07	1.163	.300	1.42	2.71	0	3

**Poultry Dung (PD) Treatment, Day 3**

Duncan

Treatment With SLO (ml)	N	Subset for alpha = 0.05
		a
0	3	1.33
50	3	2.00
100	3	2.33
150	3	2.67
200	3	2.67
Sig.		.053

**NPK Treatment, Day 3**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
150	3		2.33
200	3		2.67
50	3		3.00
100	3		3.00
Sig.		1.000	.064

**Poultry Dung + NPK (PD+NPK)**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		a	b
0	3	.00	
50	3		2.33
200	3		2.33
100	3		2.67
150	3		3.00

Sig.		1.000	.119
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### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 4	0	3	3.00	.000	.000	3.00	3.00	3	3
	50	3	3.67	.577	.333	2.23	5.10	3	4
	100	3	3.00	.000	.000	3.00	3.00	3	3
	150	3	3.00	.000	.000	3.00	3.00	3	3
	200	3	3.33	.577	.333	1.90	4.77	3	4
	Total	15	3.20	.414	.107	2.97	3.43	3	4
NPK Treatment, Day 4	0	3	.00	.000	.000	.00	.00	0	0
	50	3	3.33	.577	.333	1.90	4.77	3	4
	100	3	3.67	.577	.333	2.23	5.10	3	4
	150	3	3.33	.577	.333	1.90	4.77	3	4
	200	3	3.33	.577	.333	1.90	4.77	3	4
	Total	15	2.73	1.486	.384	1.91	3.56	0	4
Poultry Dung + NPK (PD+NPK), Day 4	0	3	.00	.000	.000	.00	.00	0	0
	50	3	3.67	.577	.333	2.23	5.10	3	4
	100	3	3.67	.577	.333	2.23	5.10	3	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	3.67	.577	.333	2.23	5.10	3	4
	Total	15	3.00	1.604	.414	2.11	3.89	0	4

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 4	Between Groups	1.067	4	.267	2.000	.171
	Within Groups	1.333	10	.133		
	Total	2.400	14			
NPK Treatment, Day 4	Between Groups	28.267	4	7.067	26.500	.000
	Within Groups	2.667	10	.267		
	Total	30.933	14			
Poultry Dung + NPK (PD+NPK), Day 4	Between Groups	34.000	4	8.500	42.500	.000
	Within Groups	2.000	10	.200		
	Total	36.000	14			

## Post Hoc Tests

### Homogeneous Subsets

#### Poultry Dung (PD) Treatment, Day 4

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
0	3	3.00
100	3	3.00
150	3	3.00
200	3	3.33
50	3	3.67
Sig.		.067

#### NPK Treatment, Day 4

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
50	3		3.33
150	3		3.33
200	3		3.33
100	3		3.67
Sig.		1.000	.477

#### Poultry Dung + NPK (PD+NPK), Day 4

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
50	3		3.67
100	3		3.67
200	3		3.67
150	3		4.00
Sig.		1.000	.414

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 5	0	3	3.00	.000	.000	3.00	3.00	3	3
	50	3	3.67	.577	.333	2.23	5.10	3	4
	100	3	3.00	.000	.000	3.00	3.00	3	3
	150	3	3.00	.000	.000	3.00	3.00	3	3
	200	3	3.33	.577	.333	1.90	4.77	3	4
	Total	15	3.20	.414	.107	2.97	3.43	3	4
NPK Treatment, Day 5	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4
Poultry Dung + NPK (PD+NPK), Day 5	0	3	.00	.000	.000	.00	.00	0	0
	50	3	3.67	.577	.333	2.23	5.10	3	4
	100	3	3.67	.577	.333	2.23	5.10	3	4
	150	3	3.67	.577	.333	2.23	5.10	3	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.00	1.604	.414	2.11	3.89	0	4

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 5	Between Groups	1.067	4	.267	2.000	.171
	Within Groups	1.333	10	.133		
	Total	2.400	14			
NPK Treatment, Day 5	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 5	Between Groups	34.000	4	8.500	42.500	.000
	Within Groups	2.000	10	.200		
	Total	36.000	14			

#### Post Hoc Tests

#### Homogeneous Subsets

**Poultry Dung (PD) Treatment, Day 5**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
0	3	3.00
100	3	3.00
150	3	3.00
200	3	3.33
50	3	3.67
Sig.		.067

**Poultry Dung + NPK (PD+NPK), Day 5**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
50	3		3.67
100	3		3.67
150	3		3.67
200	3		4.00
Sig.		1.000	.414

**E**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
					Poultry Dung (PD) Treatment, Day 6	0			3
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	4.00	.000	.000	4.00	4.00	4	4
NPK Treatment, Day 6	0	3	1.33	2.309	1.333	-4.40	7.07	0	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4

	Total	15	3.47	1.407	.363	2.69	4.25	0	4
	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
Poultry Dung + NPK	100	3	4.00	.000	.000	4.00	4.00	4	4
(PD+NPK), Day 6	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 6	Between Groups	.000	4	.000	.	.
	Within Groups	.000	10	.000		
	Total	.000	14			
NPK Treatment, Day 6	Between Groups	17.067	4	4.267	4.000	.034
	Within Groups	10.667	10	1.067		
	Total	27.733	14			
Poultry Dung + NPK (PD+NPK), Day 6	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			

### Post Hoc Tests

### Homogeneous Subsets

#### NPK Treatment, Day 6

#### Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	1.33	
50	3		4.00
100	3		4.00
150	3		4.00
200	3		4.00
Sig.		1.000	1.000

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		

Poultry Dung (PD) Treatment, Day 7	0	3	4.00	.000	.000	4.00	4.00	4	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	4.00	.000	.000	4.00	4.00	4	4
NPK Treatment, Day 7	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4
Poultry Dung + NPK (PD+NPK), Day 7	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	2.67	2.309	1.333	-3.07	8.40	0	4
	Total	15	2.93	1.831	.473	1.92	3.95	0	4

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 7	Between Groups	.000	4	.000	.	.
	Within Groups	.000	10	.000		
	Total	.000	14			
NPK Treatment, Day 7	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 7	Between Groups	36.267	4	9.067	8.500	.003
	Within Groups	10.667	10	1.067		
	Total	46.933	14			

#### Post Hoc Tests

#### Homogeneous Subsets

Poultry Dung + NPK (PD+NPK), Day 7

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
200	3		2.67
50	3		4.00
100	3		4.00
150	3		4.00
Sig.		1.000	.171

Descriptives

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	
					Lower Bound	Upper Bound		
Poultry Dung (PD) Treatment, Day 8	0	3	4.00	.000	.000	4.00	4.00	4
	50	3	4.00	.000	.000	4.00	4.00	4
	100	3	4.00	.000	.000	4.00	4.00	4
	150	3	4.00	.000	.000	4.00	4.00	4
	200	3	4.00	.000	.000	4.00	4.00	4
	Total	15	4.00	.000	.000	4.00	4.00	4
NPK Treatment, Day 8	0	3	.00	.000	.000	.00	.00	0
	50	3	4.00	.000	.000	4.00	4.00	4
	100	3	4.00	.000	.000	4.00	4.00	4
	150	3	4.00	.000	.000	4.00	4.00	4
	200	3	4.00	.000	.000	4.00	4.00	4
	Total	15	3.20	1.656	.428	2.28	4.12	0
Poultry Dung + NPK (PD+NPK), Day 8	0	3	.00	.000	.000	.00	.00	0
	50	3	4.00	.000	.000	4.00	4.00	4
	100	3	4.00	.000	.000	4.00	4.00	4
	150	3	4.00	.000	.000	4.00	4.00	4
	200	3	2.67	2.309	1.333	-3.07	8.40	0
	Total	15	2.93	1.831	.473	1.92	3.95	0

**ANOVA**

		Sum of Squares	df	F	Sig.	Mean Square
Poultry Dung (PD) Treatment, Day 8	Between Groups	.000	4	.	.	.000
	Within Groups	.000	10			.000
	Total	.000	14			
NPK Treatment, Day 8	Between Groups	38.400	4	.	.	9.600
	Within Groups	.000	10			.000
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 8	Between Groups	36.267	4	8.500	.003	9.067
	Within Groups	10.667	10			1.067
	Total	46.933	14			

**Post Hoc Tests**

**Homogeneous Subsets**

**Poultry Dung + NPK (PD+NPK), Day 8**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	
200	3		2.67
50	3		4.00
100	3		4.00
150	3		4.00
Sig.		1.000	.171

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 9	0	3	4.00	.000	.000	4.00	4.00	4	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	4.00	.000	.000	4.00	4.00	4	4
NPK Treatment, Day 9	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4
Poultry Dung + NPK (PD+NPK), Day 9	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 9	Between Groups	.000	4	.000	.	.
	Within Groups	.000	10	.000		
	Total	.000	14			
NPK Treatment, Day 9	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		

Poultry Dung + NPK (PD+NPK), Day 9	Total	38.400	14		
	Between Groups	38.400	4	9.600	
	Within Groups	.000	10	.000	
	Total	38.400	14		

### Notes

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Missing Value Handling	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
Cases Used	ONEWAY Poultry_Dung_PD_Treatment NPK_Treatment Poultry_Dung_NPK_PD_NPK BY Treatment_g /STATISTICS DESCRIPTIVES /MISSING ANALYSIS /POSTHOC=DUNCAN ALPHA(0.05).
Resources	
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Elapsed Time	00:00:00.06
Syntax	

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Stem Girth of Day 6	0	3	3.50	.361	.208	2.60	4.40	3	4
	50	3	4.70	.265	.153	4.04	5.36	5	5
	100	3	4.83	.153	.088	4.45	5.21	5	5
	150	3	4.73	.513	.296	3.46	6.01	4	5
	200	3	5.10	.300	.173	4.35	5.85	5	5
	Total	15	4.57	.642	.166	4.22	4.93	3	5
NPK Treatment, Stem Girth of Day 6	0	3	.00	.000	.000	.00	.00	0	0
	50	3	5.40	.721	.416	3.61	7.19	5	6
	100	3	4.50	.100	.058	4.25	4.75	4	5
	150	3	4.03	.058	.033	3.89	4.18	4	4
	200	3	4.40	.557	.321	3.02	5.78	4	5
	Total	15	3.67	1.984	.512	2.57	4.77	0	6
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 6	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.13	.351	.203	3.26	5.01	4	5
	100	3	4.47	.462	.267	3.32	5.61	4	5
	150	3	3.63	.473	.273	2.46	4.81	3	4
	200	3	4.13	.351	.203	3.26	5.01	4	5
	Total	15	3.27	1.745	.450	2.31	4.24	0	5

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Stem Girth of Day 6	Between Groups	4.616	4	1.154	10.006	.002
	Within Groups	1.153	10	.115		
	Total	5.769	14			
NPK Treatment, Stem Girth of Day 6	Between Groups	53.447	4	13.362	79.219	.000
	Within Groups	1.687	10	.169		
	Total	55.133	14			
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 6	Between Groups	41.243	4	10.311	75.444	.000
	Within Groups	1.367	10	.137		
	Total	42.609	14			

## Post Hoc Tests

### Poultry Dung (PD) Treatment, Stem Girth of Day 6

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	3.50	
50	3		4.70
150	3		4.73
100	3		4.83
200	3		5.10
Sig.		1.000	.208

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

### NPK Treatment, Stem Girth of Day 6

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		4.03	
200	3		4.40	
100	3		4.50	
50	3			5.40
Sig.		1.000	.213	1.000

### Poultry Dung + NPK (PD+NPK), Stem Girth of Day 6

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		3.63	
50	3		4.13	4.13
200	3		4.13	4.13
100	3			4.47
Sig.		1.000	.145	.317

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Notes

Output Created	09-FEB-2025 22:31:42
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Definition of Missing	User-defined missing values are treated as missing.
Missing Value Handling	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
Cases Used	ONEWAY Poultry_Dung_PD_Treatment NPK_Treatment Poultry_Dung_NPK_PD_NPK BY Treatment_g /STATISTICS
Syntax	

		DESCRIPTIVES /MISSING ANALYSIS /POSTHOC=DUNCAN ALPHA(0.05).
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.06

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.
					Lower Bound	Upper Bound	
0	3	3.53	.416	.240	2.50	4.57	3
Poultry Dung (PD)	3	4.73	.231	.133	4.16	5.31	5
Treatment, Stem Girth	3	4.83	.153	.088	4.45	5.21	5
of Day 9	3	4.73	.513	.296	3.46	6.01	4
200	3	5.20	.265	.153	4.54	5.86	5
Total	15	4.61	.651	.168	4.25	4.97	3
0	3	.00	.000	.000	.00	.00	0
50	3	5.40	.721	.416	3.61	7.19	5
NPK Treatment, Stem	3	4.50	.100	.058	4.25	4.75	4
Girth of Day 9	3	4.03	.058	.033	3.89	4.18	4
200	3	4.40	.557	.321	3.02	5.78	4
Total	15	3.67	1.984	.512	2.57	4.77	0
0	3	.00	.000	.000	.00	.00	0
50	3	4.23	.404	.233	3.23	5.24	4
Poultry Dung + NPK	3	4.57	.379	.219	3.63	5.51	4
(PD+NPK), Stem Girth	3	3.77	.252	.145	3.14	4.39	4
of Day 9	3	4.10	.200	.115	3.60	4.60	4
200	3	4.10	.200	.115	3.60	4.60	4
Total	15	3.33	1.762	.455	2.36	4.31	0

**Descriptives**

		Max.
	0	4
Poultry Dung (PD) Treatment, Stem Girth of Day 9	50	5

	100	5
	150	5
	200	6
	Total	6
	0	0
	50	6
NPK Treatment, Stem Girth of Day 9	100	5
	150	4
	200	5
	Total	6
	0	0
	50	5
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 9	100	5
	150	4
	200	4
	Total	5

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Stem Girth of Day 9	Between Groups	4.763	4	1.191	10.206	.001
	Within Groups	1.167	10	.117		
	Total	5.929	14			
NPK Treatment, Stem Girth of Day 9	Between Groups	53.447	4	13.362	79.219	.000
	Within Groups	1.687	10	.169		
	Total	55.133	14			
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 9	Between Groups	42.653	4	10.663	130.041	.000
	Within Groups	.820	10	.082		
	Total	43.473	14			

#### Poultry Dung (PD) Treatment, Stem Girth of Day 9

##### Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2

0	3	3.53	
50	3		4.73
150	3		4.73
100	3		4.83
200	3		5.20
Sig.		1.000	.150

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

#### NPK Treatment, Stem Girth of Day 9

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		4.03	
200	3		4.40	
100	3		4.50	
50	3			5.40
Sig.		1.000	.213	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

#### Poultry Dung + NPK (PD+NPK), Stem Girth of Day 9

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		3.77	
200	3		4.10	4.10
50	3		4.23	4.23
100	3			4.57
Sig.		1.000	.085	.085

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

**Notes**

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Missing Value Handling	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
	Syntax	<pre> ONEWAY Poultry_Dung_PD_Treatment NPK_Treatment Poultry_Dung_NPK_PD_NPK BY Treatment_g /STATISTICS DESCRIPTIVES /MISSING ANALYSIS /POSTHOC=DUNCAN ALPHA(0.05). </pre>
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.06

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for
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					Mean	
					Lower Bound	
	0	3	3.60	.346	.200	2.74
	50	3	4.80	.346	.200	3.94
Poultry Dung (PD)	100	3	4.87	.115	.067	4.58
Treatment, Stem Girth of	150	3	4.90	.557	.321	3.52
Day 12	200	3	5.23	.321	.186	4.43
	Total	15	4.68	.657	.170	4.32
	0	3	.00	.000	.000	.00
	50	3	5.40	.721	.416	3.61
NPK Treatment, Stem Girth	100	3	4.50	.100	.058	4.25
of Day 12	150	3	4.07	.115	.067	3.78
	200	3	4.40	.557	.321	3.02
	Total	15	3.67	1.986	.513	2.57
	0	3	.00	.000	.000	.00
	50	3	4.23	.404	.233	3.23
Poultry Dung + NPK	100	3	4.67	.306	.176	3.91
(PD+NPK), Stem Girth of	150	3	4.13	.416	.240	3.10
Day 12	200	3	4.63	.351	.203	3.76
	Total	15	3.53	1.863	.481	2.50

### Descriptives

		95% Confidence Interval for Mean	Minimum	Maximum
		Upper Bound		
	0	4.46	3	4
	50	5.66	5	5
Poultry Dung (PD) Treatment, Stem	100	5.15	5	5
Girth of Day 12	150	6.28	4	6
	200	6.03	5	6
	Total	5.04	3	6
	0	.00	0	0
	50	7.19	5	6
NPK Treatment, Stem Girth of Day 12	100	4.75	4	5
	150	4.35	4	4
	200	5.78	4	5
	Total	4.77	0	6
Poultry Dung + NPK (PD+NPK), Stem	0	.00	0	0
Girth of Day 12	50	5.24	4	5

100	5.43	4	5
150	5.17	4	5
200	5.51	4	5
Total	4.57	0	5

**ANOVA**

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Stem Girth of Day 12	Between Groups	4.711	4	1.178	8.832
	Within Groups	1.333	10	.133	
	Total	6.044	14		
NPK Treatment, Stem Girth of Day 12	Between Groups	53.523	4	13.381	78.402
	Within Groups	1.707	10	.171	
	Total	55.229	14		
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 12	Between Groups	47.487	4	11.872	107.274
	Within Groups	1.107	10	.111	
	Total	48.593	14		

**ANOVA**

		Sig.
Poultry Dung (PD) Treatment, Stem Girth of Day 12	Between Groups	.003
	Within Groups	
	Total	
NPK Treatment, Stem Girth of Day 12	Between Groups	.000
	Within Groups	
	Total	
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 12	Between Groups	.000
	Within Groups	
	Total	

**Poultry Dung (PD) Treatment, Stem Girth of Day 12**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	3.60	

50	3		4.80
100	3		4.87
150	3		4.90
200	3		5.23
Sig.		1.000	.205

**NPK Treatment, Stem Girth of Day 12**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		4.07	
200	3		4.40	
100	3		4.50	
50	3			5.40
Sig.		1.000	.248	1.000

**Poultry Dung + NPK (PD+NPK), Stem Girth of Day 12**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	
150	3		4.13
50	3		4.23
200	3		4.63
100	3		4.67
Sig.		1.000	.097

Output Created	09-FEB-2025 22:34:14
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
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Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.04

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
0	3	4.30	.624	.361	2.75	5.85
50	3	4.83	.404	.233	3.83	5.83
100	3	4.87	.115	.067	4.58	5.16
150	3	4.90	.557	.321	3.52	6.28
200	3	5.23	.321	.186	4.43	5.93
Total	15	4.83	.486	.126	4.56	5.10
NPK Treatment, Stem Girth	0	.00	.000	.000	.00	.00

of Day 15	50	3	5.43	.681	.393	3.74
	100	3	4.50	.100	.058	4.25
	150	3	4.07	.115	.067	3.78
	200	3	4.40	.557	.321	3.02
	Total	15	3.68	1.990	.514	2.58
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 15	0	3	.00	.000	.000	.00
	50	3	4.47	.611	.353	2.95
	100	3	5.10	.624	.361	3.55
	150	3	4.23	.351	.203	3.36
	200	3	4.70	.361	.208	3.80
Total	15	3.70	1.975	.510	2.61	

### Descriptives

		95% Confidence Interval for Mean		Minimum	Maximum
		Upper Bound			
Poultry Dung (PD) Treatment, Stem Girth of Day 15	0	5.85	4	5	
	50	5.84	5	5	
	100	5.15	5	5	
	150	6.28	4	6	
	200	6.03	5	6	
Total	5.10	4	6		
NPK Treatment, Stem Girth of Day 15	0	.00	0	0	
	50	7.12	5	6	
	100	4.75	4	5	
	150	4.35	4	4	
	200	5.78	4	5	
Total	4.78	0	6		
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 15	0	.00	0	0	
	50	5.98	4	5	
	100	6.65	4	6	
	150	5.11	4	5	
	200	5.60	4	5	
Total	4.79	0	6		

### ANOVA

	Sum of Squares	df	Mean Square	F
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Poultry Dung (PD)	Between Groups	1.349	4	.337	1.721
Treatment, Stem Girth of	Within Groups	1.960	10	.196	
Day 15	Total	3.309	14		
NPK Treatment, Stem Girth	Between Groups	53.871	4	13.468	84.525
of Day 15	Within Groups	1.593	10	.159	
	Total	55.464	14		
Poultry Dung + NPK	Between Groups	52.567	4	13.142	64.631
(PD+NPK), Stem Girth of	Within Groups	2.033	10	.203	
Day 15	Total	54.600	14		

### ANOVA

		Sig.
Poultry Dung (PD) Treatment, Stem Girth of Day 15	Between Groups	.221
	Within Groups	
	Total	
NPK Treatment, Stem Girth of Day 15	Between Groups	.000
	Within Groups	
	Total	
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 15	Between Groups	.000
	Within Groups	
	Total	

### Post Hoc Tests

### Homogeneous Subsets

#### Poultry Dung (PD) Treatment, Stem Girth of Day 15

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	4.30	

50	3	4.83	4.83
100	3	4.87	4.87
150	3	4.90	4.90
200	3		5.23
Sig.		.153	.326

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

**e**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		4.07	
200	3		4.40	
100	3		4.50	
50	3			5.43
Sig.		1.000	.233	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

**Poultry Dung + NPK (PD+NPK), Stem Girth of Day 15**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	
150	3		4.23
50	3		4.47
200	3		4.70
100	3		5.10
Sig.		1.000	.053

Means for groups in homogeneous subsets are displayed.

**Notes**

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Missing Value Handling	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
	Syntax	ONEWAY Poultry_Dung_PD_Treatment NPK_Treatment Poultry_Dung_NPK_PD_NPK BY Treatment_g /STATISTICS DESCRIPTIVES /MISSING ANALYSIS /POSTHOC=DUNCAN ALPHA(0.05).
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.06

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean
					Lower Bound

	0	3	4.40	.529	.306	3.09
	50	3	4.87	.379	.219	3.93
Poultry Dung (PD)	100	3	5.37	.764	.441	3.47
Treatment, Stem Girth of	150	3	6.53	.874	.504	4.36
Day 18	200	3	6.17	1.106	.639	3.42
	Total	15	5.47	1.049	.271	4.89
	0	3	.00	.000	.000	.00
	50	3	5.50	.656	.379	3.87
NPK Treatment, Stem Girth	100	3	4.67	.153	.088	4.29
of Day 18	150	3	4.13	.231	.133	3.56
	200	3	4.47	.473	.273	3.29
	Total	15	3.75	2.024	.523	2.63
	0	3	.00	.000	.000	.00
	50	3	4.60	.693	.400	2.88
Poultry Dung + NPK	100	3	5.10	.624	.361	3.55
(PD+NPK), Stem Girth of	150	3	4.27	.306	.176	3.51
Day 18	200	3	4.93	.115	.067	4.65
	Total	15	3.78	2.014	.520	2.66

#### Descriptives

		95% Confidence Interval for Mean		Minimum	Maximum
		Upper Bound			
	0	5.71	4	5	
	50	5.81	5	5	
Poultry Dung (PD) Treatment, Stem	100	7.26	5	6	
Girth of Day 18	150	8.70	6	8	
	200	8.91	5	7	
	Total	6.05	4	8	
	0	.00	0	0	
	50	7.13	5	6	
NPK Treatment, Stem Girth of Day 18	100	5.05	5	5	
	150	4.71	4	4	
	200	5.64	4	5	
	Total	4.87	0	6	
	0	.00	0	0	
Poultry Dung + NPK (PD+NPK), Stem	50	6.32	4	5	
Girth of Day 18	100	6.65	4	6	
	150	5.03	4	5	

200	5.22	5	5
Total	4.90	0	6

**ANOVA**

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Stem Girth of Day 18	Between Groups	9.407	4	2.352	3.928
	Within Groups	5.987	10	.599	
	Total	15.393	14		
NPK Treatment, Stem Girth of Day 18	Between Groups	55.877	4	13.969	95.680
	Within Groups	1.460	10	.146	
	Total	57.337	14		
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 18	Between Groups	54.811	4	13.703	70.150
	Within Groups	1.953	10	.195	
	Total	56.764	14		

**ANOVA**

		Sig.
Poultry Dung (PD) Treatment, Stem Girth of Day 18	Between Groups	.036
	Within Groups	
	Total	
NPK Treatment, Stem Girth of Day 18	Between Groups	.000
	Within Groups	
	Total	
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 18	Between Groups	.000
	Within Groups	
	Total	

**Poultry Dung (PD) Treatment, Stem Girth of Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	4.40		
50	3	4.87	4.87	

100	3	5.37	5.37	5.37
200	3		6.17	6.17
150	3			6.53
Sig.		.175	.077	.108

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

**NPK Treatment, Stem Girth of Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05		
		1	2	3
0	3	.00		
150	3		4.13	
200	3		4.47	
100	3		4.67	
50	3			5.50
Sig.		1.000	.133	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

**Poultry Dung + NPK (PD+NPK), Stem Girth of Day 18**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	
150	3		4.27
50	3		4.60
200	3		4.93
100	3		5.10
Sig.		1.000	.057

**Notes**

Output Created	09-FEB-2025 22:37:03
Comments	
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
	Syntax	ONEWAY Poultry_Dung_PD_Treatment NPK_Treatment Poultry_Dung_NPK_PD_NPK BY Treatment_g /STATISTICS DESCRIPTIVES /MISSING ANALYSIS /POSTHOC=DUNCAN ALPHA(0.05).
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.
					Lower Bound	Upper Bound	
0	3	5.73	1.365	.788	2.34	9.12	5
Poultry Dung (PD)	3	5.57	.981	.567	3.13	8.00	5
Treatment, Stem Girth of Day 21	3	6.57	.569	.328	5.15	7.98	6
150	3	6.90	.794	.458	4.93	8.87	6
200	3	6.53	.586	.338	5.08	7.99	6
Total	15	6.26	.936	.242	5.74	6.78	5
0	3	.00	.000	.000	.00	.00	0
50	3	7.23	1.115	.644	4.46	10.00	6
NPK Treatment, Stem Girth of Day 21	3	6.40	2.272	1.311	.76	12.04	5
100	3	5.03	1.002	.578	2.55	7.52	4
150	3	4.87	.231	.133	4.29	5.44	5
200	3	4.87	.231	.133	4.29	5.44	5
Total	15	4.71	2.797	.722	3.16	6.26	0
0	3	.00	.000	.000	.00	.00	0
50	3	8.13	1.150	.664	5.28	10.99	7
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 21	3	7.30	2.707	1.563	.57	14.03	5
100	3	8.63	2.285	1.320	2.96	14.31	6
150	3	8.47	3.134	1.810	.68	16.25	5
200	3	8.47	3.134	1.810	.68	16.25	5
Total	15	6.51	3.867	.998	4.37	8.65	0

### ANOVA

		Sum of Squares	df	Mean Square	F
Poultry Dung (PD) Treatment, Stem Girth of Day 21	Between Groups	4.009	4	1.002	1.215
	Within Groups	8.247	10	.825	
	Total	12.256	14		
NPK Treatment, Stem Girth of Day 21	Between Groups	94.609	4	23.652	15.853
	Within Groups	14.920	10	1.492	
	Total	109.529	14		
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 21	Between Groups	161.929	4	40.482	8.541
	Within Groups	47.400	10	4.740	
	Total	209.329	14		

**ANOVA**

		Sig.
Poultry Dung (PD) Treatment, Stem Girth of Day 21	Between Groups	.364
	Within Groups	
	Total	
NPK Treatment, Stem Girth of Day 21	Between Groups	.000
	Within Groups	
	Total	
Poultry Dung + NPK (PD+NPK), Stem Girth of Day 21	Between Groups	.003
	Within Groups	
	Total	

**Poultry Dung (PD) Treatment, Stem Girth of  
Day 21  
Duncan**

Treatment (g)	N	Subset for alpha = 0.05
		1
50	3	5.57
0	3	5.73
200	3	6.53
100	3	6.57
150	3	6.90
Sig.		.129

**NPK Treatment, Stem Girth of Day 21  
Duncan**

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	

200	3		4.87
150	3		5.03
100	3		6.40
50	3		7.23
Sig.		1.000	.051

**Poultry Dung + NPK (PD+NPK), Stem Girth of Day 21**  
Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	
100	3		7.30
50	3		8.13
200	3		8.47
150	3		8.63
Sig.		1.000	.499

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

b.

**ANOVA FOR LEAF AREA**

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Leaf Area cm <sup>3</sup>	0	3	11.30	4.979	2.875	-1.07	23.67	6	16
	50	3	13.43	1.858	1.073	8.82	18.05	11	15
	100	3	19.88	3.736	2.157	10.60	29.16	16	23
	150	3	51.70	2.476	1.429	45.55	57.85	49	54
	200	3	51.97	22.489	12.984	-3.90	107.83	26	65
	Total	15	29.66	20.953	5.410	18.05	41.26	6	65
NPK Treatment, Leaf Area cm <sup>3</sup>	0	3	11.30	4.979	2.875	-1.07	23.67	6	16
	50	3	6.36	.325	.188	5.56	7.17	6	7
	100	3	10.32	1.475	.852	6.65	13.98	9	12
	150	3	10.95	4.086	2.359	.80	21.10	7	15
	200	3	34.43	9.457	5.460	10.94	57.93	25	44
	Total	15	14.67	11.268	2.909	8.43	20.91	6	44
Poultry Dung + NPK	0	3	11.30	4.979	2.875	-1.07	23.67	6	16

(PD+NPK), Leaf Area cm <sup>3</sup>	50	3	46.57	64.993	37.524	-114.88	208.02	8	122
	100	3	30.44	15.415	8.900	-7.86	68.73	13	41
	150	3	17.01	2.052	1.185	11.92	22.11	15	19
	200	3	14.85	3.393	1.959	6.42	23.28	11	18
	Total	15	24.03	28.708	7.412	8.14	39.93	6	122

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Leaf Area cm <sup>3</sup>	Between Groups	5038.370	4	1259.593	11.366	.001
	Within Groups	1108.186	10	110.819		
	Total	6146.556	14			
NPK Treatment, Leaf Area cm <sup>3</sup>	Between Groups	1511.210	4	377.803	14.180	.000
	Within Groups	266.425	10	26.643		
	Total	1777.636	14			
Poultry Dung + NPK (PD+NPK), Leaf Area cm <sup>3</sup>	Between Groups	2533.333	4	633.333	.703	.607
	Within Groups	9004.400	10	900.440		
	Total	11537.733	14			

#### Poultry Dung (PD) Treatment, Leaf Area cm<sup>3</sup>

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	11.30	
50	3	13.43	
100	3	19.88	
150	3		51.70
200	3		51.97
Sig.		.363	.976

#### NPK Treatment, Leaf Area cm<sup>3</sup>

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		a	B
50	3	6.36	
100	3	10.32	
150	3	10.95	
0	3	11.30	
200	3		34.43
Sig.		.300	1.000

#### Poultry Dung + NPK (PD+NPK), Leaf Area cm<sup>3</sup>

Duncan

Treatment (g)	N	Subset for alpha
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		= 0.05
		a
0	3	11.30
200	3	14.85
150	3	17.01
100	3	30.44
50	3	46.57
Sig.		.214

### Descriptives

	N	Mean	Std. Dev.	Std. Err.	95% Confidence Interval for Mean		Min	Max	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 3	0	3	1.33	.577	.333	-.10	2.77	1	2
	50	3	2.00	1.000	.577	-.48	4.48	1	3
	100	3	2.33	.577	.333	.90	3.77	2	3
	150	3	2.67	.577	.333	1.23	4.10	2	3
	200	3	2.67	.577	.333	1.23	4.10	2	3
	Total	15	2.20	.775	.200	1.77	2.63	1	3
NPK Treatment, Day 3	0	3	.00	.000	.000	.00	.00	0	0
	50	3	3.00	.000	.000	3.00	3.00	3	3
	100	3	3.00	.000	.000	3.00	3.00	3	3
	150	3	2.33	.577	.333	.90	3.77	2	3
	200	3	2.67	.577	.333	1.23	4.10	2	3
	Total	15	2.20	1.207	.312	1.53	2.87	0	3
Poultry Dung + NPK (PD+NPK)	0	3	.00	.000	.000	.00	.00	0	0
	50	3	2.33	.577	.333	.90	3.77	2	3
	100	3	2.67	.577	.333	1.23	4.10	2	3
	150	3	3.00	.000	.000	3.00	3.00	3	3
	200	3	2.33	.577	.333	.90	3.77	2	3
	Total	15	2.07	1.163	.300	1.42	2.71	0	3

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 3	Between Groups	3.733	4	.933	2.000	.171
	Within Groups	4.667	10	.467		
	Total	8.400	14			
NPK Treatment, Day 3	Between Groups	19.067	4	4.767	35.750	.000
	Within Groups	1.333	10	.133		
	Total	20.400	14			
Poultry Dung + NPK (PD+NPK)	Between Groups	16.933	4	4.233	21.167	.000
	Within Groups	2.000	10	.200		
	Total	18.933	14			

Poultry Dung (PD) Treatment, Day 3

Duncan

Treatment With SLO (ml)	N	Subset for alpha = 0.05
		a
0	3	1.33
50	3	2.00
100	3	2.33
150	3	2.67
200	3	2.67
Sig.		.053

**Poultry Dung + NPK (PD+NPK)**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		a	b
0	3	.00	
50	3		2.33
200	3		2.33
100	3		2.67
150	3		3.00
Sig.		1.000	.119

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
0	3	3.00	.000	.000	3.00	3.00	3	3
50	3	3.67	.577	.333	2.23	5.10	3	4
Poultry Dung (PD) Treatment, Day 4	3	3.00	.000	.000	3.00	3.00	3	3
150	3	3.00	.000	.000	3.00	3.00	3	3
200	3	3.33	.577	.333	1.90	4.77	3	4
Total	15	3.20	.414	.107	2.97	3.43	3	4
0	3	.00	.000	.000	.00	.00	0	0
50	3	3.33	.577	.333	1.90	4.77	3	4
NPK Treatment, Day 4	3	3.67	.577	.333	2.23	5.10	3	4
150	3	3.33	.577	.333	1.90	4.77	3	4
200	3	3.33	.577	.333	1.90	4.77	3	4
Total	15	2.73	1.486	.384	1.91	3.56	0	4
0	3	.00	.000	.000	.00	.00	0	0
50	3	3.67	.577	.333	2.23	5.10	3	4
Poultry Dung + NPK (PD+NPK), Day 4	3	3.67	.577	.333	2.23	5.10	3	4
150	3	4.00	.000	.000	4.00	4.00	4	4
200	3	3.67	.577	.333	2.23	5.10	3	4
Total	15	3.00	1.604	.414	2.11	3.89	0	4

**ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
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Poultry Dung (PD) Treatment, Day 4	Between Groups	1.067	4	.267	2.000	.171
	Within Groups	1.333	10	.133		
	Total	2.400	14			
NPK Treatment, Day 4	Between Groups	28.267	4	7.067	26.500	.000
	Within Groups	2.667	10	.267		
	Total	30.933	14			
Poultry Dung + NPK (PD+NPK), Day 4	Between Groups	34.000	4	8.500	42.500	.000
	Within Groups	2.000	10	.200		
	Total	36.000	14			

**Poultry Dung (PD) Treatment, Day 4**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
0	3	3.00
100	3	3.00
150	3	3.00
200	3	3.33
50	3	3.67
Sig.		.067

**NPK Treatment, Day 4**

Duncan

	N	Subset for alpha = 0.05	
		A	B
		0	3
50	3		3.33
150	3		3.33
200	3		3.33
100	3		3.67
Sig.		1.000	.477

**Poultry Dung + NPK (PD+NPK), Day 4**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
50	3		3.67
100	3		3.67
200	3		3.67
150	3		4.00
Sig.		1.000	.414

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 5	0	3	3.00	.000	.000	3.00	3.00	3	3
	50	3	3.67	.577	.333	2.23	5.10	3	4
	100	3	3.00	.000	.000	3.00	3.00	3	3
	150	3	3.00	.000	.000	3.00	3.00	3	3
	200	3	3.33	.577	.333	1.90	4.77	3	4
	Total	15	3.20	.414	.107	2.97	3.43	3	4
NPK Treatment, Day 5	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4
Poultry Dung + NPK (PD+NPK), Day 5	0	3	.00	.000	.000	.00	.00	0	0
	50	3	3.67	.577	.333	2.23	5.10	3	4
	100	3	3.67	.577	.333	2.23	5.10	3	4
	150	3	3.67	.577	.333	2.23	5.10	3	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.00	1.604	.414	2.11	3.89	0	4

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 5	Between Groups	1.067	4	.267	2.000	.171
	Within Groups	1.333	10	.133		
	Total	2.400	14			
NPK Treatment, Day 5	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 5	Between Groups	34.000	4	8.500	42.500	.000
	Within Groups	2.000	10	.200		
	Total	36.000	14			

**Poultry Dung (PD) Treatment, Day 5**

Duncan

Treatment (g)	N	Subset for alpha = 0.05
		A
0	3	3.00
100	3	3.00
150	3	3.00
200	3	3.33
50	3	3.67
Sig.		.067

**Poultry Dung + NPK (PD+NPK), Day 5**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
50	3		3.67
100	3		3.67
150	3		3.67
200	3		4.00
Sig.		1.000	.414

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 6	0	3	4.00	.000	.000	4.00	4.00	4	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	4.00	.000	.000	4.00	4.00	4	4
NPK Treatment, Day 6	0	3	1.33	2.309	1.333	-4.40	7.07	0	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.47	1.407	.363	2.69	4.25	0	4
Poultry Dung + NPK (PD+NPK), Day 6	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 6	Between Groups	.000	4	.000	.	.
	Within Groups	.000	10	.000		
	Total	.000	14			
NPK Treatment, Day 6	Between Groups	17.067	4	4.267	4.000	.034
	Within Groups	10.667	10	1.067		
	Total	27.733	14			

Poultry Dung + NPK (PD+NPK), Day 6	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			

### Post Hoc Tests

### Homogeneous Subsets

NPK Treatment, Day 6

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	1.33	
50	3		4.00
100	3		4.00
150	3		4.00
200	3		4.00
Sig.		1.000	1.000

### Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 7	0	3	4.00	.000	.000	4.00	4.00	4	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	4.00	.000	.000	4.00	4.00	4	4
NPK Treatment, Day 7	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4
Poultry Dung + NPK (PD+NPK), Day 7	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	2.67	2.309	1.333	-3.07	8.40	0	4
	Total	15	2.93	1.831	.473	1.92	3.95	0	4

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD)	Between Groups	.000	4	.000	.	.

Treatment, Day 7	Within Groups	.000	10	.000		
	Total	.000	14			
NPK Treatment, Day 7	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 7	Between Groups	36.267	4	9.067	8.500	.003
	Within Groups	10.667	10	1.067		
	Total	46.933	14			

**Poultry Dung + NPK (PD+NPK), Day 7**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		A	B
0	3	.00	
200	3		2.67
50	3		4.00
100	3		4.00
150	3		4.00
Sig.		1.000	.171

**Descriptives**

	N	Mean	Std. Dev.	Std. Error	95% Confidence Interval for Mean		Min.	
					Lower Bound	Upper Bound		
Poultry Dung (PD) Treatment, Day 8	0	3	4.00	.000	.000	4.00	4.00	4
	50	3	4.00	.000	.000	4.00	4.00	4
	100	3	4.00	.000	.000	4.00	4.00	4
	150	3	4.00	.000	.000	4.00	4.00	4
	200	3	4.00	.000	.000	4.00	4.00	4
	Total	15	4.00	.000	.000	4.00	4.00	4
NPK Treatment, Day 8	0	3	.00	.000	.000	.00	.00	0
	50	3	4.00	.000	.000	4.00	4.00	4
	100	3	4.00	.000	.000	4.00	4.00	4
	150	3	4.00	.000	.000	4.00	4.00	4
	200	3	4.00	.000	.000	4.00	4.00	4
	Total	15	3.20	1.656	.428	2.28	4.12	0
Poultry Dung + NPK (PD+NPK), Day 8	0	3	.00	.000	.000	.00	.00	0
	50	3	4.00	.000	.000	4.00	4.00	4
	100	3	4.00	.000	.000	4.00	4.00	4
	150	3	4.00	.000	.000	4.00	4.00	4
	200	3	2.67	2.309	1.333	-3.07	8.40	0
	Total	15	2.93	1.831	.473	1.92	3.95	0

**ANOVA**

		Sum of Squares	df	F	Sig.	Mean Square
Poultry Dung (PD) Treatment, Day 8	Between Groups	.000	4	.	.	.000
	Within Groups	.000	10			.000
	Total	.000	14			
NPK Treatment, Day 8	Between Groups	38.400	4	.	.	9.600
	Within Groups	.000	10			.000
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 8	Between Groups	36.267	4	8.500	.003	9.067
	Within Groups	10.667	10			1.067
	Total	46.933	14			

**Poultry Dung + NPK (PD+NPK), Day 8**

Duncan

Treatment (g)	N	Subset for alpha = 0.05	
		1	2
0	3	.00	
200	3		2.67
50	3		4.00
100	3		4.00
150	3		4.00
Sig.		1.000	.171

**Descriptives**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.	
					Lower Bound	Upper Bound			
Poultry Dung (PD) Treatment, Day 9	0	3	4.00	.000	.000	4.00	4.00	4	4
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	4.00	.000	.000	4.00	4.00	4	4
NPK Treatment, Day 9	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
	100	3	4.00	.000	.000	4.00	4.00	4	4
	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
	Total	15	3.20	1.656	.428	2.28	4.12	0	4

	0	3	.00	.000	.000	.00	.00	0	0
	50	3	4.00	.000	.000	4.00	4.00	4	4
Poultry Dung + NPK	100	3	4.00	.000	.000	4.00	4.00	4	4
(PD+NPK), Day 9	150	3	4.00	.000	.000	4.00	4.00	4	4
	200	3	4.00	.000	.000	4.00	4.00	4	4
Total		15	3.20	1.656	.428	2.28	4.12	0	4

**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
Poultry Dung (PD) Treatment, Day 9	Between Groups	.000	4	.000	.	.
	Within Groups	.000	10	.000		
	Total	.000	14			
NPK Treatment, Day 9	Between Groups	38.400	4	9.600	.	.
	Within Groups	.000	10	.000		
	Total	38.400	14			
Poultry Dung + NPK (PD+NPK), Day 9	Between Groups	38.400	4	9.600		.
	Within Groups	.000	10	.000		
	Total	38.400	14			