IMPACTO CIENTÍFICO
EDITORA

ANALYSIS OF THE APPLICATION OF NETTLE EXTRACT IN THE GREEN MASS AND DRY MASS OF THE AERIAL PART OF THE CORN PLANT, IN THE MUNICIPALITY OF MARECHAL DEODORO, ALAGOAS

ANÁLISE DA APLICAÇÃO DE EXTRATO DE URTIGA NA MASSA VERDE E NA MASSA SECA DA PARTE AÉREA DA PLANTA DE MILHO, NO MUNICÍPIO DE MARECHAL DEODORO, ALAGOAS

ANÁLISIS DE LA APLICACIÓN DE EXTRACTO DE ORTIGA EN LA MASA VERDE Y SECA DE LA PARTE AÉREA DE PLANTAS DE MAÍZ EN EL MUNICIPIO DE MARECHAL DEODORO, ALAGOAS

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ABSTRACT

Nettle is a plant species that grows in different parts of the world, particularly in Brazil. Specifically, in the Sertão de Alagoas, it is found in large quantities throughout the year. Some companies, such as food companies, use it as a coloring agent for some foods. The pharmaceutical sector, on the other hand, uses its extract in the manufacture of medicines, due to its vast composition of distinct substances that can be used for a range of pathological treatments. This study focused mainly on the use of nettle extract as a potential nutrient, with the aim of promoting the development of corn. For this research to be developed, the following methodology was used, which was divided into two stages: the first stage involved the germination of Creole corn seeds, so that their viability could be evaluated (unpublished data). The second stage consisted of planting corn plots that received the application of the

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extract for 75 days, followed by the analysis of the weight of the green mass and dry mass of the aerial part of the plant. The results showed that both the green mass of the corn shoot and the dry mass began to decrease from the dose of 200g of nettle. Finally, it was concluded that the application of nettle extract from 200g had an inhibitory effect on maize nutrition.

Keywords: Greenhouse House. Creole Corn. Nettle.

RESUMO

A urtiga é uma espécie vegetal que cresce em diferentes partes do mundo, em especial no Brasil. Especificamente no Sertão de Alagoas, é encontrada em grandes quantidades durante todo o ano. Algumas empresas, como as alimentícias, a utilizam como corante para alguns alimentos. Já o setor farmacêutico utiliza seu extrato na fabricação de medicamentos, devido à sua vasta composição de substâncias distintas que podem ser utilizadas para uma gama de tratamentos patológicos. Este estudo teve como foco principal o uso do extrato de urtiga como nutriente potencial, com o objetivo de promover o desenvolvimento do milho. Para o desenvolvimento desta pesquisa, utilizou-se a seguinte metodologia, dividida em duas etapas: a primeira etapa envolveu a germinação de sementes de milho crioulo, para que sua viabilidade pudesse ser avaliada (dados não publicados). A segunda etapa consistiu no plantio de talhões de milho que receberam a aplicação do extrato durante 75 dias, seguido da análise do peso da massa verde e da massa seca da parte aérea da planta. Os resultados mostraram que tanto a massa verde da parte aérea do milho quanto a massa seca começaram a diminuir a partir da dose de 200 g de urtiga. Por fim, concluiu-se que a aplicação de extrato de urtiga a partir de 200 g teve efeito inibitório sobre a nutrição do milho.

Palavras-chave: Estufa. Milho Crioulo. Urtiga.

RESUMEN

La ortiga es una especie vegetal que crece en diversas partes del mundo, especialmente en Brasil. Específicamente en la región del Sertão de Alagoas, se encuentra en grandes cantidades durante todo el año. Algunas empresas, como las alimentarias, la utilizan como colorante para ciertos alimentos. El sector farmacéutico utiliza su extracto en la fabricación de medicamentos debido a su amplia composición de distintas sustancias que pueden utilizarse para diversos tratamientos patológicos. Este estudio se centró principalmente en el uso del extracto de ortiga como un nutriente potencial para promover el desarrollo del maíz. Esta investigación utilizó la siguiente metodología, dividida en dos etapas: la primera consistió en la germinación de semillas de maíz criollo para evaluar su viabilidad (datos no publicados). La segunda etapa consistió en la siembra de parcelas de maíz que recibieron el extracto durante 75 días, seguido del análisis del peso de la masa fresca y seca de la parte aérea de la planta. Los resultados mostraron que tanto la masa fresca como la masa seca de la parte aérea del maíz comenzaron a disminuir después de una dosis de 200 g de ortiga. Finalmente, se concluyó que la aplicación de extracto de ortiga a dosis de 200 g o superiores tuvo un efecto inhibitorio sobre la nutrición del maíz.

Palabras clave: Invernadero. Maíz Criollo. Ortiga.

1 INTRODUCTION

Genus Urtica commonly known as Nettle, Urtica or Nettle, is a plant used by some peoples for medicinal purposes and for the purpose of both animal and human nutrition. There are records of more than 56 types of Nettle. Of these, the most common to be found in various regions of the world it is Urtica Dioica, which is perennial, a plant that can survive between 10 to 15 years, without the need for many inputs and with the ability to contribute richly to the soil. It remains green throughout the year, being a rustic plant, very resistant to the dry season and has a wild growth. It belongs to the Urticaceae family *(ORCIC et al.*, 2014; TAHERI *et al*., 2022; DREYER and MÜSSING, 2000).

Nettle has peculiar characteristics. Its stems and leaves are completely covered with stinging trichomes (thorns or hairs) with fluid composed of chemicals such as formic acid, histamine, acetylcholine and serotonin, which cause skin irritation. The substances that cause these episodes of urticaria are: formic acid, histamine, acetylcholine and serotonin (DI VIRGILLO, 2015).

According to Di Virgilio *et al*. (2015), this is a plant that can be found in significant quantities in Africa, America and Europe. Although some people consider it a weed, there are places where people consider it beneficial to health. They are also consumed in the form of soups, salads and even tea, and food for animals (TAYLOR, 2009).

In general, Nettle is composed of a range of substances, among these, we can mention iron, vitamin C, potassium, nitrogen, silicon, magnesium, iron and a range of micronutrients that stimulate plant growth and have the power to repel pests. In its leaves it has a large amount of carotenoid nutrients, Ascorbic acid, chlorophyll and essential amino acids that are used by the pharmaceutical and food industry (ORCIC *et al*., 2014). There are reports in the literature that nettle extract can contain some diseases that cause damage to plants (LEÓN *et al*., 2013; SILVA, 2024).

According to Ferreira et al. (1999), when using nettle extract dissolved in water, it has effects that stimulate the growth and control of diseases and specific pests that affect plants. Regarding the soil, when the nettle extract was applied, it was found that its action promoted the reestablishment of microbiological activity and caused protection in the roots against specific disease. Regarding its foliar application, the occurrence of nutrition and protection of the leaves against diseases was observed (HOMBERG & RIPKEN, 2001).

There is a study where nettle extract was used directly in the soil for the purpose of fertilization in the lettuce crop, where they obtained excellent results (LEÓN, 2013). According to Morales (2016), Urtica is rich in calcium, potassium and nitrogen, which, in turn, are

essential for plant nutrition and development. Khol (2021) also conducted his study with the application of different doses of Nettle extract to lettuce seed to evaluate what its effect would be on the germination and development of lettuce seedlings.

A very interesting work by Irigoin (2014), where nettle extract was applied in the twinning of radish seeds, and a significant growth of seedlings was found. In another experiment, the effect of nettle extract on the lemon seed was tested. In this case, the seeds were immersed at different times and doses of extract. In this experiment, the result was lower values in the amount of germination and in the length of the green mass of all seedlings (MORALES, 2016).

Currently, it is becoming very common to publish studies that show that nettle has been applied in research models focused on agriculture as a form of plant nutrition (COELHO, *et al.*, 2007; MORALES, 2016). A study recently published by Costa (2025) shows the use of nettle extract as a nutritive agent capable of promoting the growth of the corn crop.

Brazil is a country that depends on international partners for the development of its crops, as these, in turn, need a certain amount of nitrogen (N), potassium (K) and phosphorus (P), which are essential for cultivation and which come from imports (EMBRAPA, 2018).

In view of the above, this study aimed to evaluate the potential effect of various proportions of nettle extract on corn nutrition.

2 METHODOLOGY

This study was developed at the Federal Institute of Alagoas - Marechal Deodoro Campus, 19.00 km south of the capital of Alagoas, located at 9 meters of altitude and geographic coordinates: latitude 9° 47" 5' South and longitude 35° 54" 8' West, where all stages of the experiment were developed.

The research was quantitative, with an experimental character. For the development of this project, a variety of Creole seed was used, widely used in the planting of Family Farmers' crops. This type of seed is planted annually in the crops of the Sertão region of Alagoas.

All Nettle used in the development of this project was harvested in the Sertão de Alagoas. Soon after the harvest, the weighing and centrifugation process were carried out so that all the extract was removed. The corn seeds were selected according to what is recommended in the Embrapa Manual. Soon after, these seeds went through the germination period, which lasted 10 days. This was done to test the viability of the seeds (MAGALHÃES, 2006). After confirmation of 100% germination of the Creole corn seed (unpublished

laboratory data), planting was carried out in pots that were in the greenhouse. A 6 x 4 design was carried out, with six doses and four replicates of each plot. The doses used were 00.00 g, 200.00 g, 400.00 g, 600.00 g, 800.00 g and 1,000.00 g of nettle extract, with a total of 24 plots, where the following variables were analyzed: weight of the green mass and dry mass of the aerial part of the Creole corn plant.

2.1 ANALYSIS OF GROWTH FACTORS, AS A FUNCTION OF NETTLE EXTRACT DOSES

Different plots of Creole corn from the Sertão de Alagoas were cultivated in a greenhouse. These were properly planted in 10.00 liter pots, which contained 7.00 kg of soil each. This soil was collected at a depth of 0-20 cm, at the Corisco Farm, which is located in the "Detrás da Serra" Farm, municipality of Pão de Açúcar, State of Alagoas. The soil was classified as Fluvic Neosol, having its Texture classified as medium to clay loam. All nettles that were used in the plots came from the Corisco Farm, located in the "Detrás da Serra" Farm, Municipality of Pão de Açúcar, State of Alagoas.

The 1st installment was named as a witness. This served as a parameter of comparison with the others. In this specific plot, only water was used, without any addition of any extract (BASTOS *et al.*, 2021). The amount of water applied was according to the field capacity. In the 2nd plot, the extract extracted from 200.00 g of the nettle plant was applied. In the 3rd plot, extract extracted from 400.00 g of nettle was used. In the 4th plot, extract extracted from 600.00 g of nettle was used. In the 5th plot, extract extracted from 800.00 g of nettle was used and, finally, in the 6th and last plot, extract extracted from 1,000.00 g of nettle was used. In the 6 (six) plots, volumes of nettle extract were used according to the soil field capacity of the respective plots.

All plants in the plots were irrigated according to field capacity for a period of 75 consecutive days so that the different variables evaluated could be analyzed later. According to the Commission (1998), field capacity is a measurement parameter of great importance for the correct management of irrigation, which is essential for plant development.

During the period of the experiment, cultural treatments were carried out weekly so that all invasive plants existing in that environment could be eliminated. Manual control of pests that may appear was also carried out. Two seeds of Creole corn were sown in each pot and, subsequently, one of the plants that was out of standard was eliminated, leaving only one plant in the pot. After the 75 days had passed, the plants of each plot were harvested, being properly cut close to the ground. Soon after, the green mass was weighed and placed in paper bags to be dried in an oven with forced air circulation (65° to 70º C), where they

remained for 24 hours so that they could undergo the dehydration process. After this process, the dried plants were weighed so that the statistical calculations could be carried out later.

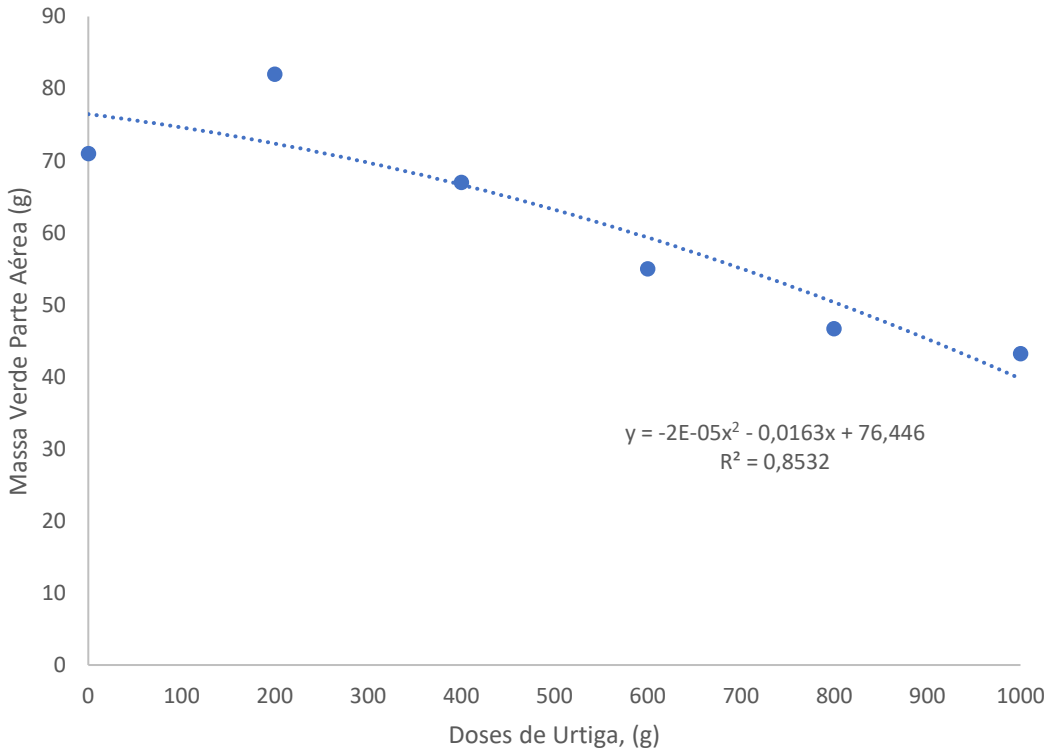
3 RESULTS AND DISCUSSION

3.1 GREEN MASS AND DRY MASS OF THE AERIAL PART OF THE PLANT

In graph 1, it was observed that the green mass of the corn shoot began to decrease from the dose of 200g of nettle, following the model of Y=-2E-05x2-0.0163x+76.446, with 85.32% of this variable explained by this model. In a study, León (2013) used nettle extract to evaluate the yield in kilograms of lettuce plants. Unlike the results of this research, he obtained a significant result, where he observed yield in lettuce weight when compared to the lot that did not use the extract.

Table 1

Green mass values of the aerial part of Creole corn, as a function of plant exposure to different doses of nettle extract.



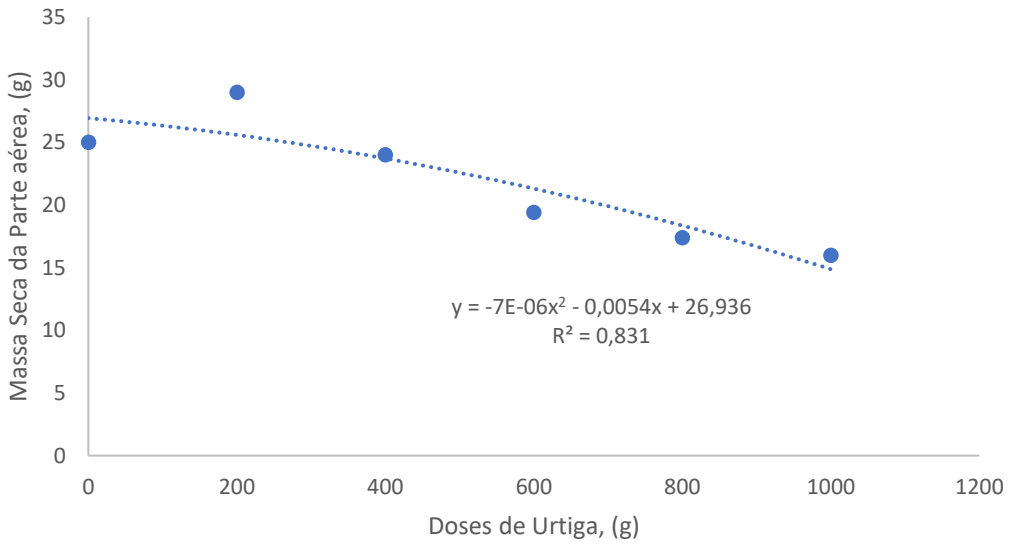
Source: Author, 2024

In relation to graph 2, it followed the same trend as in the previous graph, where the dry mass of the corn shoot decreased from the dose of 200g of nettle extract, according to the regression model Y=-7E-06x2-0.0054x+26.936, with 85.32% of these data being

explained by this model. Coelho (2007) showed in his work divergent results from what was shown in this research. Here, Creole corn seed was used and she applied nettle extract in the plantation of lettuce, cabbage, cabbage and melon and obtained improvements in the growth variable and weight of green mass of the aerial part. Regarding dry weight, there was a variation in its result (COELHO, 2007).

Table 2

Values of dry mass of the aerial part of Creole corn, as a function of the exposure of the plants to different doses of nettle extract.



Source: Author, 2024.

4 CONCLUSION

According to the results obtained, it can be concluded that, when using nettle extract from the dose of 200.00 g, a decrease in the green and dry mass of the aerial part of the plant was caused. Thus, it is suggested that it will be necessary to deepen studies to be able to better understand the results obtained in this research.

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