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# Effect of foliar fertilization levels of active yeast on growth characteristics and yield of the dill (*Anethum gravelolens* L).

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## Abstract

The field experiment was carried out during the winter season of 2019-2020 at Hawija College of Agriculture - University of Kirkuk with the aim of determining the response of Anethum graveolens L. to different levels of leaf fertilization of yeast and its effect on the growth and yield characteristics. The experiment included studying the effect of different levels of yeast fertilizer (0, 3, 6 g) The experiment was carried out within the system of global experiments according to the design of complete random design and with three replications, the data were analyzed statistically according to the design followed for the experiment. The number of days from planting to 50% flowering, the number of branches in the plant, the dry weight of the plant, the weight of 1000 seeds, and the total seed yield exceeded the level (3 g) in giving the highest values.

**Keyword: foliar fertilization, yeast, *Anethum gravelolens***

## Introduction

Dill (*Anethum gravolens* L.), an annual herbaceous plant belonging to the Umbelliferon family, native to the countries of the Mediterranean, Southwest Asia and Southeast Europe. The seeds and leaves of dill are used as flavoring in sauces, vinegar, pastries, and soups, as dill seeds contain an essential oil as an active ingredient, and that carvone and limonene are the most important components of dill, which are used in the manufacture of pharmaceuticals, stimulant and gas repellent (Bailer et Singh al., 2001; et al., 2005; Callan et al., 2007); Sokhangoy et al. Chillinet has an antimicrobial, anti-hyperlipidemic effect, lowers blood pressure, diuretic, antispasmodic, and antiemetic (Choi & Koppula, 2011; Hosseinnzadeh et al., 2002; Tucakov, 1997). Eating fresh green grass is useful in calming the nerves, repelling gas, preventing stomach rot, and antispasmodic (Shahat, 2000), as well as an anti-oxidant and anti-cancerous disease (Peerakam et al., 2014). The bioactive components of dill are essential oils, fatty oils, proteins, carbohydrates, fibers, mineral elements (potassium, calcium, magnesium, phosphorous, sodium), vitamin A and niacin (Kaur & Arora, 2010). The essential oil is found in all parts of the dill, but it is more concentrated in the seeds (2-5%) (Leung & Foster, 2003). The main ingredient in dill seed essential oil is carvone (20-60%) (Leung & Foster, 2003; Radulescu et al., 2010, Delaquis et al., 2002). The plant is of great importance as an aromatic herb that contains volatile oil components such as B-camphene, α-pinene, anethole, lonone, umbelliferone, and carvone (Sharma, 2004 and Dhalwal et al., 2008). There are many studies that indicate that adding yeast to the plant leads to the availability of safe plant nutrition that is free from any harm in addition to it being cheap and produced by factories in very large quantities. Yeast is generally used to fertilize very many crops, whether vegetables or fruits, it is used to stimulate root growth in the early stages in vegetable crops, and it also gives good results in leaf crops such as: (mallow - dill - parsley - watercress). Saccharomyces cerevisiae bread yeast. A source of important biological fertilization sources due to its ability to store phosphates, and it stores many amino acids, especially Arginine (Agamy et al., 2013), and that it has the ability to produce the basic materials for growth such as auxins, gibberellins, cytokines, amino acids, and sugars as well as being the natural source of some nutrients such as nitro-

gen and phosphorous. Potassium, magnesium, iron, chlorine, sodium, etc. (Hesham and Mohamed, 2011)

## Materials and Methods

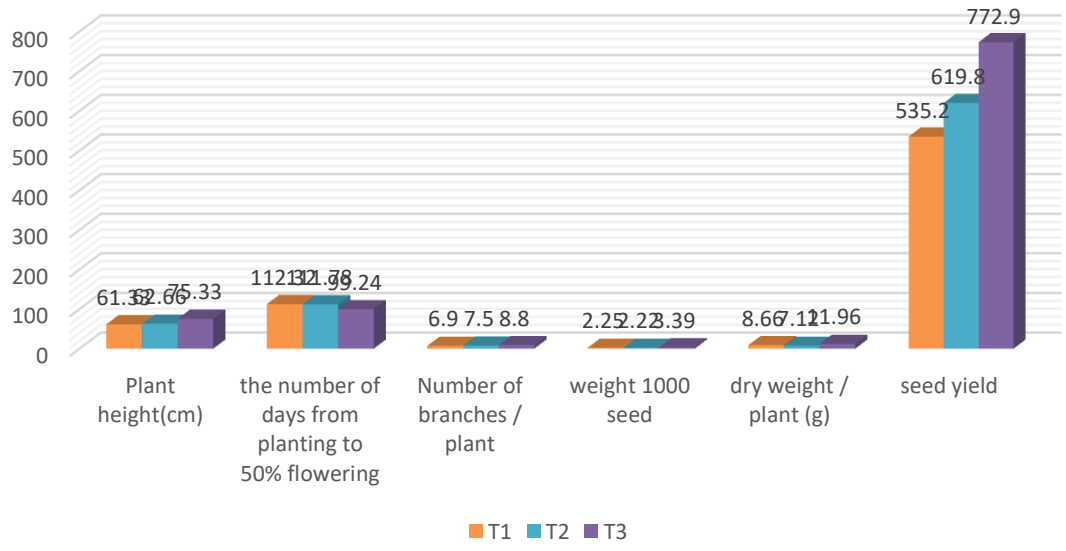
The experiment of his workers was carried out during the winter season of 2019-2020 at the College of Agriculture Hawija - University of Kirkuk to study the response of Anethum graveolens L. to different levels of leaf fertilization of active yeast and its effect on growth, yield and volatile properties. The study included four levels of leaf fertilizer (yeast), which are: (0 g, 3 g, 6 g) and its symbol ($T_1$, $T_2$, $T_3$) respectively, the dry yeast suspension was prepared by dissolving the studied levels of bread yeast prepared from the protected markets in a liter of distilled water. Warm at 32 ° C with adding 2 g of sucrose sugar (to activate the yeast) and then put in an incubator at 25 ° C for two hours (Chalutz et al., 1977). The experiment was fielded according to the design of the complete randomized CRD experimental system with three replications. The seeds were sown in lines on a day. 11/15/2019, and at a shallow depth due to the small size of the seeds, and leaf fertilizer was added after the completion of the vegetative growth. All crop service operations were conducted, including irrigation, hoeing, weeding and control whenever needed, and the plants were harvested on 5/27/2020.

## Results and Discussion

**Table No. (1) The effect of yeast fertilization levels on plant height, number of days from planting to 50%, number of branches, weight of 1000 seeds and seed yield of dill.**

| Treatments | Plant height(cm) | The number of days from planting to 50% flowering | Number of branches / plant | weight 1000 seed | dry weight / plant (g) | seed yield |
|---|---|---|---|---|---|---|
| 0 | 61.33 C | 112.32 C | 6.9 C | 2.25 C | 7.12 C | 535.2 C |
| 3 | 62.66 B | 111.78 B | 7.5 B | 2.22 B | 10.30 B | 619.8 B |
| 6 | 75.33 A | 99.24 A | 8.8 A | 3.39A | 11.96 A | 772.9 A |

Shape (1) Response of Anethum gravelolens L. for different levels of leaf fertilization of active yeast and its effect on growth and yield characteristics.




### Plant height (cm. Plant$^{-1}$):

Plant height is one of the indicators of the strength of vegetative growth, which depends on cell division and elongation, which is affected by the amount and type of nutrients absorbed by the

plant, and that the variation in environmental conditions can affect it. The results in Table (1) indicate that there were significant differences in the level of the third yeast fertilization (6g), which gave the highest rate (75.33 cm). This may be attributed to the role of the liquid yeast suspension through its absorption through the leaves in its effect on the characteristic of plant height because the leaves are an important center in which many physiological and biological processes take place (Hussein and Khalaf, 2008), as well as the yeast contains many nutrients, major and minor, including Nitrogen that is involved in the synthesis of amino acids (Al-Rawi. 2012).

**The number of days from planting to 50% flowering:**

It is evident from the results of Table (1) that the addition of leaf fertilization to the yeast had a significant effect in reducing the number of days from planting to flowering, as 50% of the plants early in flowering by increasing the levels of addition to the highest value at the level (6.g), as this treatment led to Achieving the lowest rate of 99.24 days may be attributed to the role that yeast plays in the production of gibberellins, cytokines, amino acids and sugars that drive plants to vegetative growth, which is followed by an increase in the number of plant branches and thus the duration of flowers is short. This is what (Gamelo-Lopez et al., 1995) found. They mentioned that the flowering period is short when the vegetative growth and the number of plant branches increase.

**Number of branches / plant $^{-1}$**

The results of Table (1) indicate that the third level of leaf fertilization with yeast (6g) had a significant effect on the number of branches, as it achieved the highest rate of the number of branches, which reached 5.59 branches / plant -1. The effect of yeast in increasing the number of branches of the plant may be the result of its effect on increasing the volume of vegetative growth by the action of gibberellins, auxins and amino acids and to the positive action of phosphorus and its direct role in most vital processes inside plant cells as it helps in the formation and division of cells as well as its participation in the formation of compounds Rich in energy, thus stimulating vegetative growth and increasing the number of branches (Kandil, 2002).

**The dry weight of the plant. gm. Plant$^{-1}$:**

The dry weight of the plant is one of the indicators that indicate the strength or weakness of plant growth, which in turn depends on increasing the ability of the plant to metabolism by increasing the photosynthesis products and their accumulation in the plant tissues with the nutrients to form dry material and by increasing it, the dry weight of the plant increases. The results of Table (1) show that the level of yeast fertilization (6g) was significantly higher in the dry weight gain, reaching 11.96g. Plant-1, the effect may be due to the absorption of nutrients and amino acids present in the liquid yeast depth, which is absorbed directly into the leaf cells to contribute to increasing the manufacture of food by increasing the efficiency of the processes of photosynthesis and carbon representation, which leads to an increase in the nutrients manufactured in the plant and their accumulation of carbohydrates and proteins (Hosseny and Ahmed, 2009, Ercan and Durum 2003), which was positively reflected in the increase in the dry weight of the plant.**Weight**

**Weight 1000 seeds (g. 1000) seeds:**

The results in Table (1) indicated that there were significant differences in the effect of organic fertilization levels on the weight of a thousand seeds, as the level of fertilizer (6 grams) gave the highest rate of 3.68 grams, and the reason for the increase in the weight of the thousand seeds by increasing the levels of leaf fertilizer for the yeast may be due to the effect of nitrogen In activating the biological processes, especially the photosynthesis process, which led to the formation of a good vegetative system and the activation of the photosynthesis process, thus increasing the accumulation of nutrients such as carbohydrates and proteins in the seeds that led to an increase in the weight of a thousand seeds per gram (Singh et al., 1994).

**Seed yield, kg. h$^{-1}$**

The results in Table (1) showed that the level of foliar fertilizer (3 g) had a significant effect on the seed yield, as this level gave an average of 762.1 kg. H-1, and the increase in yield when foliar fertilization treatments may be due to the increased growth of roots and their increased ability to

absorb the elements. Nutrient and the availability of nutrients in the foliar fertilizer of yeast, in addition to being a source of growth promoters (such as auxins), amino acids and vitamins, and this is reflected in an increase in the yield by the result (Abou El-maged et al., 2008).

**Conclusion**

The addition of leaf fertilization with yeast suspension solution to dill plant led to the improvement of vegetative growth characteristics and yield under experimental conditions.

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# تأثير مستويات التسميد الورقي بالخميرة النشطة في صفات النمو وحاصل نبات الشبت (*Anethum Gravelolens* L).

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**الخلاصة**

نفذت التجربة الحقلية خلال الموسم الشتوي ٢٠١٩-٢٠٢٠ في كلية زراعة الحويجة – جامعة كركوك بهدف تحديد استجابة نبات *Anethum Gravolens* L. لمستويات مختلفة من التسميد الورقي للخميرة وتأثيرها في خصائص النمو والإنتاج، تضمنت التجربة دراسة تأثير مستويات مختلفة من سماد الخميرة (٠، ٣، ٦ جم) نفذت التجربة ضمن نظام التجارب العالمية وفق تصميم العشوائية الكاملة وبثلاث مكررات، وتم تحليل البيانات إحصائياً وفقاً للتصميم العشوائي الكامل للتصميم المتبع للتجربة عدد الأيام من الزراعة حتى ٥٠% تزهير، عدد الأفرع في النبات، الوزن الجاف للنبات، وزن ١٠٠٠ بذرة، وحاصل البذور الكلي تجاوز مستوى (٣ غم) في إعطاء أعلى القيم.