



# EFFECT OF FOLIAR SPRAYING WITH GROWMORE FERTILIZER AND GROUND NUTRITION WITH SHEEP MANURE ON GROWTH AND YIELD FOR GRAPE (FRANCE CULTIVAR)

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## Abstract

This study was conducted during the season 2017-2018 on grapes vines French cultivar in one of the private Special grape orchards in the Alsiyahu area of Babylon province. The vines were cultivated with wire cabin and 8-year-olds. The aim of this study to know the effect of fertilization with Growmore fertilizer (0, 10, 20 g.L<sup>-1</sup> vine) and sheep manure (0, 5, 10 kg.L<sup>-1</sup> vine). The aim of this study to know the effect of fertilization with Growmore fertilizer (0, 10, 20 g.L<sup>-1</sup> vine) and sheep manure (0, 5, 10 kg.L<sup>-1</sup> vine) on some yield traits and the leaves content of chlorophyll and some mineral elements. The factorial experiment was conducted according to the Randomized Complete Block Design (R.C.B.D) with three replicates. The results showed that fertilizer with sheep manure 10 kg. vine<sup>-1</sup> excelled on the rest of the treatments in the average of the number of clusters, cluster weight, grain weight, T.S.S, leaves content of chlorophyll and some mineral elements (nitrogen, phosphorus and potassium), compared to the control treatment which gave the lowest average for these traits. As for the treatment of spraying with Growmore fertilizer, the concentration (10 g.L<sup>-1</sup> vine) gave the highest average of these traits compared to the control treatment. As for the interaction treatment between sheep manure at an average of (10 kg.L<sup>-1</sup> vine) and Growmore fertilizer at a concentration (10 g.L<sup>-1</sup> vine). It had a significant effect on the rest of the treatments in the average number of clusters, cluster weight, grain weight, TSS, leaves content of chlorophyll and some mineral elements (nitrogen, phosphorus and potassium) compared to the control treatment. It led to obtaining the highest values in the quality and quantity of the yield and improving the other traits of the studied French cultivar.

**Key words :** Growmore fertilizer, sheep manure, *Vitis vinifera*, mineral elements.

## Introduction

The grapes (*Vitis vinifera* L.) are One of the most important and oldest types of fruit known to humans and the most widespread in various parts of the world. The fruit is desirable fruit for the majority of the inhabitants of the earth, where it is eaten fresh, dried or manufactured as it extracts juice and wine. Grapes are an ancient fruit introduced by Humanity himself and have been known since ancient times as mentioned by the Greeks and Romans. Most botanists agreed that the origin of European grapes. The area between latitudes 20-50° north of the equator and latitudes 20-40° south of the equator. Grape growing in Iraq is as old as a human settlement in the Mesopotamia Valley (Alsaidi, 2000). Grapes are high in potassium, calcium, phosphorus, magnesium, iron, manganese, etc. They also contain vitamins and organic acids (Winkler *et al.*, 1974). French cultivar is one of the cultivars spread in the central areas of Iraq, which is

characterized by early yield and long production period, many researchers are interested in studying the effects of organic fertilizers on the growth and yield of the plant as Organic matter is one of the important and effective factors affecting the availability of plant nutrients because of the properties that affect the soil content of nutrients and make it available to absorption by the plant AL-Rawi, (1998). It thus positively affects the growth and development of the plant. The use of organic manure is intended to direct the modern world to clean agriculture and away from chemicals and the importance of the organic matter in improving the physical and chemical traits of soil and reduce soil pH to release microelements (Marr *et al.*, 1998). To be ready for absorption as Iraqi soils are base in addition to their role in warming the soil (root Perimeter) in winter (Tisdale *et al.*, 1997). Foliar nutrition also contributes to the growth and development of plants as the plant's response to foliar nutrition is rapid.

**Table 1:** Some physical and chemical traits of field soils.

Unit	Value	Traits
-	7.75	PH
ds.m <sup>-1</sup>	4.55	EC
g.k <sup>-1</sup>	472.17	sand
g.k <sup>-1</sup>	140.20	Silt
g.k <sup>-1</sup>	387.63	Clay

As they are also widely used for micronutrient because they can be affected by soil factors, oxidation and reduction processes, which affect the availability of these elements (Jawad *et al.*, 1988; Mengel, 2002; Havlin *et al.*, 2005; Khalil *et al.*, 2008). Abdul, (1988) showed that 85% of the plant's nutrient requirements for horticultural crops can be met by leaves compared to the elements that can be taken by roots. Therefore, foliar fertilization has become common in the present time, especially for fruit trees in order to deepen its roots and that most of the fertilizers remain close to the soil surface as well as slow movement to the root zone, in the depths of the soil, there are some necessary micronutrient such as iron and zinc, but trees cannot benefit from them because of the residues of oxygen in these depths, So foliar fertilizers should be used to ensure improved quality and quantity yield, Hashem, (2016) showed that organic fertilization of grape vines with sheep manure resulted in a significant increase in grain weight, number of clusters and total yield. Aldujaily *et al.*, (1994) observed that the spraying of micronutrient on the grape vines of the Des Alanz cultivar increased the weight of the grain, the number of clusters and the total yield. Due to the nutritional and economic importance of grapes, this study came to know the role of fertilizer (Grow More) and sheep manure in the growth and yield of grapes.

### Materials and methods

This study was conducted during the season 2017-2018 in one of the private Special grape orchards in the Alsiyahiu area of Babylon province. The grape growing of all cultivars is spread in this region. The vines were cultivated with wire cabin and 8-year-olds and it is irrigated by surface irrigation. They were well serviced by weeding. The experiment was conducted according to the Randomized Complete Block Design (R.C.B.D) with three replicates, as where the lines of vines were chosen and the vines of the experiment were marked. The experiment included three levels of organic fertilizer (sheep manure) are (0, 5, 10 kg.L<sup>-1</sup> vine) and three levels of Grow More fertilizer (0, 10, 20 g.L<sup>-1</sup> vine). The organic

**Table 2:** Growmore fertilizer components.

N	P	K	Fe	Ca	Mg	Cu	Mn	S	B	Zn	Mo	Element
20	20	20	0.01	0.05	0.10	0.05	0.05	0.20	0.20	0.05	0.005	Percentage(%)

fertilizer (sheep manure) was added at the beginning of December 2018 by trenching around the trees 30-40 cm deep (Kessel, 2003) and then covered with soil. The fertilizer Grow More sprayed on the leaves with three dates, where sprayed vines before flowering, after flowering and when holding fruits. The spray was done in the early morning with the addition of drops of Dishwashing solution to increase the surface tension and adhesion of the solution drops to the leaves. The orchard soil was analyzed after taking a sample depth of 30 cm in table 1 and the results were analyzed statistically, the factorial experiment was conducted according to the Complete Randomized Blocks Design with three replications. The averages were compared according to Duncan polynomial test at a probability level of 0.05%. (Al-Rawi and Khalaf Allah, 1988).

### The studied traits

- 1. The number of clusters:** Calculated for all treatment.
- 2. The average cluster weight (g):** It was measured by electric balance. It weighed for all treatments and for each replicate and then take their average
- 3. The grain weight (g):** was measured after separated it from clusters and weighed by a sensitive balance and calculated at the harvest.
- 4. The leaves content of Chlorophyll (SPAD):** It was estimated for adult and full-length leaves in the grains maturation stage by a chlorophyll meter Chlorophyllmeter type Spade-502 equipped from Minolta Co. JAPANESE LTD.
- 5. Total Soluble Solids Percentage (T.S.S):** It was estimated at the Picking by squeezing a number of grains that were randomly taken from the treatments and were read by Hand Refractometer (AOAC, 1970). An average of five readings was taken to represent the percentage of total T.S.S.
- 6. The leaves content of (nitrogen, phosphorus, potassium) (%):** Mineral elements were estimated by collecting adult leaves and opposite clusters from the main fruit branches that amounted there completing explanation with their necks in mid-July. It was washed with water and then distilled water and then placed in perforated paper bags and placed in the electric oven (Oven) at 65°C. After the leaves samples and their necks were milled by using an electric miller and then taken 0.5 g. The total nitrogen was estimated using Microkjeldahl and according to the recommendations (A.O.A.C, 1970) while the phosphorus was estimated

**Table 3:** Effect of foliar spraying with Growmore fertilizer and ground nutrition with sheep manure on some yield and the leaves content of chlorophyll for grape vines (France cultivar).

Fertilization	Spraying	The number of clusters	The cluster Weight (g)	The grain Weight(g)	The leaves content of chlorophyll (SPAD)
Without fertilization	Without Spraying	13.30	173.10	4.10	25.10
	10 g.L <sup>-1</sup> vine	16.10	198.37	4.72	33.00
	20 g.L <sup>-1</sup> vine	17.00	200.19	4.83	33.73
Sheep manure (5) kg.L <sup>-1</sup> vine	Without Spraying	14.73	182.00	4.33	28.17
	10 g.L <sup>-1</sup> vine	22.11	264.12	6.00	38.00
	20 g.L <sup>-1</sup> vine	24.07	283.74	7.92	40.02
Sheep manure (10) k g.L <sup>-1</sup> vine	Without Spraying	15.20	187.11	4.40	30.30
	10 g.L <sup>-1</sup> vine	18.30	245.33	5.02	34.22
	20 g.L <sup>-1</sup> vine	20.20	232.10	5.40	36.19
L.S.D 5%		6.36	54.39	2.26	8.29
<b>Fertilization averages</b>					
		<b>The number of clusters</b>	<b>The cluster Weight (g)</b>	<b>The grain Weight (g)</b>	<b>The leaves content of chlorophyll (SPAD)</b>
Without fertilization		15.47	190.60	4.55	30.61
Sheep manure (5) kg.L <sup>-1</sup> vine		20.30	243.30	6.08	35.40
Sheep manure (10) kg.L <sup>-1</sup> vine		17.83	221.50	4.94	33.57
L.S.D 5%		3.67	31.40	1.30	2.25
<b>Spraying averages</b>					
		<b>The number of clusters</b>	<b>The cluster Weight (g)</b>	<b>The grain Weight(g)</b>	<b>The leaves content of chlorophyll (SPAD)</b>
Without Spraying		14.41	180.70	4.28	27.86
10 g.L <sup>-1</sup> vine		18.84	235.90	5.25	35.07
20 g.L <sup>-1</sup> vine		20.36	232.10	5.40	36.65
L.S.D 5%		3.67	31.40	1.30	2.25

by the method of ammonium molybdate in Spectrophotometer along a wavelength of 620 nm and potassium was estimated using Flame photometer.

## Results and Discussion

### Effect of foliar spraying with Growmore fertilizer and ground nutrition with sheep manure on some yield and the leaves content of chlorophyll for grape vines (France cultivar)

The results in table 3, showed significant differences in the interaction treatment between levels of organic fertilization with sheep manure at an average of (5 kg.L<sup>-1</sup> vine) and Growmore fertilizer at a concentration of (20 g.L<sup>-1</sup> vine) in its effect on the number of clusters, cluster weight (g), grain weight (g) and the leaves content of chlorophyll (SPAD) gave the highest average of the above traits which amounted to (24.07, 283.74 g, 792 g, 40.02 (SPAD), respectively. This reason may be due to that the organic matter works to improve the physical and fertility traits by increasing the availability of nutrients as a result of the adding of organic fertilizers, including sheep manure and thus increased absorption by the plant as well as contain these fertilizers on the macro and micro nutrients necessary to conducted to biological processes within the plant, including magnesium, Iron and the

importance of these elements in the formation of chlorophyll (Rosen and Bierman, 2007). As well as the role of organic matter in the availability of nutrients in the soil, including nitrogen and magnesium by increasing the acidity of the soil all these causes lead to an increase of chlorophyll, which leads to increased photosynthesis process and thus increase the processed food, which leads to increased vegetative growth and increased leaves area and Increasing the effectiveness of food processing, which contributes to the accumulation of larger amounts of carbohydrates. Growmore fertilizer may be due to the increase in the above traits of this nutrient content of the macro and micronutrients that have a significant role in cell division and increased food manufacturing processes (El-Ghamry *et al.*, 2009). These elements contribute to the activation of bioactivities and their role in stimulating the physiological and biochemical processes. These elements are involved in the construction of proteins and the manufacture of carbohydrates by building chlorophyll and stimulate the process of photosynthesis, which led to improve the growth and yield of grapes and also participate in the construction and promotion of the work of many enzymes and enzymatic attachments and the rules of Purine and pyrimidine which leads to increase Vegetative growth thus increases the photosynthesis and

**Table 4:** Effect of foliar spraying with Growmore fertilizer and ground nutrition with sheep manure on the leaves content of nitrogen, phosphorus, potassium and TSS for grape vines.(France cultivar).

Fertilization	Spraying	The number of clusters	The cluster Weight (g)	The grain Weight(g)	The leaves content of chlorophyll (SPAD)
Without fertilization	Without Spraying	13.30	173.10	4.10	25.10
	10 g.L <sup>-1</sup> vine	16.10	198.37	4.72	33.00
	20 g.L <sup>-1</sup> vine	17.00	200.19	4.83	33.73
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L.S.D 5%		3.67	31.40	1.30	2.25

transport of the resulting material (Taiz and Zeiger, 2006).

#### **Effect of foliar spraying with Growmore fertilizer and ground nutrition with sheep manure on the leaves content of nitrogen, phosphorus, potassium and TSS for grape vines. (France cultivar).**

The results of the statistical analysis in table 4, showed significant differences (below the probability level of 5%) to the interaction treatments between the levels of organic fertilization with sheep manure at an average of (5 kg.L<sup>-1</sup> vine) and Growmore fertilizer at an average of (20 g.L<sup>-1</sup> vine), where observed from the table gave the highest average in TSS, nitrogen, phosphorus, potassium which amounted to 1.830%, 0.320%, 2.170%, 18.04 respectively, compared to the control treatment which gave the lowest average which amounted to 1.080%, 0.100%, 1.430%, 12.14, respectively. This may be due to sheep manure containing macronutrients necessary for growth, such as nitrogen, which has a role in increasing the number of cells in the leaves and size, also stimulate the plant to produce Auxin, which encourages cell division and elongation of cells. Phosphorus may also play an important role in plant growth, where this component contributes to the formation of energy-rich compounds needed by the plant in the formation of other compounds such as

carbohydrates, phospholipids and co-enzymatic that contribute to the activation of bioactivities, which leads to increase vegetative growth, thus increase the photosynthesis process and the transfer of materials resulted from this process, which came together with Growmore fertilizer that contains macro-nutrients and micro-nutrients, which has many roles in many important physiological processes for the plant (Taiz and Zeiger, 2006; Cheng *et al.*, 2003).

### **Conclusions**

Through the study it can be concluded that the sheep manure with Growmore fertilizer or use them individually contributed significantly to the improvement of grape vines of the French cultivar by improving the qualitative and quantitative treats.

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