



# STUDY OF BAP, GA AND IAA CONC. ON THREE CULTIVARS OF *VICIA FABAL*. WHICH TREATED BY DIFFERENT PLANT EXTRACTION

F. H. Issa, H. H. Harby and M. T. Meften

Department of Plant Production, Agricultural Collage, Al-Muthanna University, Iraq.

## Abstract

This research was conducted at Experimental Researches Unit “ALL–Bender location”, Department of Plant Production during 2016-2017 growing season. The experiment included studying the effect the foliar application of Plant extraction (T1 control with distill water, T2 aqueous extraction of liquorice 5g L<sup>-1</sup> and T3 10g L<sup>-1</sup>, T4 Yeast 5g L<sup>-1</sup> and T5 10g L<sup>-1</sup>, aqueous extraction of liquorice with Yeast 5g L<sup>-1</sup>, T7 10g L<sup>-1</sup> and Cyter treatment on tree cultivars of bean (*Vicia faba* L. cv. Local (V1), *Filo samills* (V2) and *Grano violeto* (V3) on flower setting ratio and (BAP, GA and IAA conc.) characters. Randomized Completely Block Design (R.C.B.D) were used with three replicates. The means were compared according to L.S.D test at the level 0.05. The results were summarized as follows: *Filo semillas* variety significantly increased its Auxin contain, which reached 42.49µg Kg<sup>-1</sup>, while gibberellin and Cytokinin were increased significantly in *Grano violeto* variety and reached (4.98 and 4.12 µg Kg<sup>-1</sup>), respectively. The treatment (T7) affected significantly on Auxin, Gibberellin and Cytokinin in seeds of all three varieties which reached (81.8, 7.18, 7.60 49µg.Kg<sup>-1</sup>), respectively. The interaction between treatment VIT7 was affected significantly on Auxin contain (91.7649µg Kg<sup>-1</sup>) and V3T7 on Gibberellin and Cytokinin contain (7.77 and 8.9049µg Kg<sup>-1</sup>), respectively.

**Key words** : Bean, IAA, GA, BAP, Setting flower, Variety, Aqueous extraction, Yeast.

## Introduction

*Vicia faba* L. is one of the winter crops of the Fabaceae family, one of the most nutritious seed crops in the world. It is nutritionally important because its seeds contain a high protein that is estimated at 25-40% (Natalia *et al.*, 2008). As well as the seeds contained high percentage of carbohydrates reach in most varieties to 56% (Salem, 2009). Also bean contain the most important elements, metals, fiber, vitamins and a large number of amino acids such as Lucine, lysine and Arginine (Ofuya and Akhidue, 2005). There are a lot of problems that reduce productivity, including falling flowers and abortion seeds up to 70-80%. As many studies have shown by adding chemical pollinators in large quantities that cause increased environmental pollution and damage to human and animal health (Taiz and Zeiger, 2006). Therefore, the world began to refrain from using chemical fertilizers because of its many negative effects and resort to the

use of natural materials and extracts (Abd-El Moniem and Abd-Allah, 2008) and has an important positive role in improving vegetative and fruit growth and productivity through the improvement, development and increase of plant content of hormones (Auxin, cytokinin and gibberellin) and carbohydrate aggregation (Barnettel *et al.*, 1990). This research has been targeted studying: The possibility of manufacturing organic hormonal pollinators locally and used in increasing fertilization and comparing the efficiency of organic hormonal pollinators with imported chemical pollinators (Agritons) to the concentrations of plant hormones in three varieties of bean seeds.

## Materials and Methods

Field experiment was conducted at the Agricultural Research Station of the Faculty of Agriculture, Al-Muthanna University during the winter season 2016-2017. The study includes two factors:

First factor: three varieties :Local (V1), Grano violetto (V2) and Filo Semillas (V3).

The second factor: foliar application with extracts and commercial pollinators are as follows : T1 (Comparative treatment (spray with distilled water), T2 (Treatment of licorice spray at a concentration of 5 g.L<sup>-1</sup>), T3 (Treatment of licorice spray at a concentration of 10 g.L<sup>-1</sup>), T4 (Spray treatment with yeast suspension at a concentration of 5 g.L<sup>-1</sup>), T5 (Spray treatment with yeast suspension at a concentration of 10 g.L<sup>-1</sup>), T6 (Spray treatment with mixture :5 g.L<sup>-1</sup> each of yeast and licorice), T7(Spray treatment with mixture :10 g.L<sup>-1</sup> each of yeast and licorice) and T8 (Treatment of Cyter spray (imported Agriton). The plants were sprayed with the above treatments a month after the date of cultivation and repeated five times through the season. The research was carried out to the experimental factorial according to the design of the complete random blocks (R.C.B.D) with three replicates, each one included eight gour of seeds planted and used drip irrigation system. Randomized Completely Block Design (R.C.B.D) were used with three replicates. The means were compared according to L.S.D test at the level 0.05.

## Results and Discussion

### Flower set percentage

The results of table 1 showed that the spraying treatments T7 (licorice + yeast 10 g .L<sup>-1</sup>) and T6 (licorice + yeast 5 g/L<sup>-1</sup>) recorded the highest averages in the flower set percentage reached (67.71, 67.04%) respectively. The increase may be due to the inclusion of licorice root extract and yeast suspension on essential mineral elements, carbohydrates, vitamins, amino acids and other compounds such as substances that behave in the behavior of gibberellin effect (Ismaeil *et al.*, 2003 and Al-Delamy, 2012) and increase of flowers set by the hormonal balance (Abou Elyazid and Mady, 2011). On the other hand, Graovioletto was the highest in the flower set, although it did not differ significantly from the local variety, with the highest percentage (60.85.58.89%), which was significantly higher than Filo semillas. The following table shows that significant differences in the interactions between the spraying and the variety. Highest percentage in the combination V1T6 (licorice + yeast 5 g.L<sup>-1</sup>) for the local variety reached (81.96%) as compare to V2T1, which represent control treatment of Filo Semillas gave 33.89%.

### Auxin content in seeds (µg. Kg<sup>-1</sup>)

In table 2, the combination treatment T7 (Liquor + Yeast 10 g. L<sup>-1</sup>) was superior to give the highest mean

**Table 1 :** Effect of spray treatments in three varieties of bean on flower set percentage (%).

Treatment	Variety			Rat of treatment
	V1	V2	V3	
T1	39.39	33.86	49.84	41.03
T2	48.65	36.91	56.23	47.26
T3	59.67	57.32	56.03	57.67
T4	43.82	42.06	45.48	43.79
T5	58.34	39.35	70.63	56.11
T6	81.96	65.05	54.10	67.04
T7	79.49	48.06	75.57	67.71
T8	59.79	57.31	78.96	65.35
Rat of Variety	58.89	47.49	60.85	
LSD <sub>0.05</sub>	T=3.269 Interaction=5.662 V=2.002			

**Table 2 :** Effect of spray treatments in three varieties of bean on auxin content in seeds (µg. Kg<sup>-1</sup>).

Treatment	Variety			Rat of treatment
	V1	V2	V3	
T1	21.12	25.34	25.04	23.83
T2	30.50	31.41	33.90	31.94
T3	34.51	32.63	35.02	34.05
T4	41.64	41.22	39.86	40.91
T5	32.79	42.08	41.22	38.70
T6	44.51	67.32	42.58	51.47
T7	91.76	69.67	83.96	81.80
T8	29.78	30.22	28.92	26.64
Rat of Variety	40.82	42.49	41.31	
LSD <sub>0.05</sub>	V=0.146 Interaction=0.415 T=0.239			

of auxin content reached 81.80 µg. kg as compared to the other treatments treatments, possibly due to the combination between licorice root extract and yeast suspension act to increase the division and elongation of the cells, which increased the vegetative growth of the plant, especially plant height, which is the main location for the manufacture of auxin and gibberellin hormones (Khafaji, 2014). The results of the same table showed that Filo Semillas were significantly higher, giving the highest average content of auxin in seeds reached 42.49 µg.Kg<sup>-1</sup>, which is superior to Granovioletto and local varieties, due to differences among genotypes in their response to spraying treatments. The interaction between spray treatments and varieties had a significant effect on this character. The combination V1T7 (licorice + yeast

10 g.L<sup>-1</sup>) for the local variety gave the highest mean of the auxin content in the seeds was 91.76 µg. Kg<sup>-1</sup>. The control treatment of the local variety V1T1 The average Oxy content was 5.123 µg. Kg<sup>-1</sup>.

### Gibberellin content in seeds (µg. Kg<sup>-1</sup>)

Table 3 shows that the mixing treatment T7 (licorice + yeast 10 g.L<sup>-1</sup>) gave the highest mean in seeds content of the gibberellin reached 7.18 µg.kg<sup>-1</sup> significantly superior to the rest treatments, This is due to the containment of the spray extracts (NADPH), which involved the process of converting Acetyl-CoA into gibberellin (AbuZayd, 2000). In addition, it contains mevalonic acid in a large amount, which is the primary compound in the bio praline's dynamic construction of

**Table 3 :** Effect of Spray treatments in three varieties of bean on gibberellin content in seeds (µg.kg<sup>-1</sup>).

Treatment	Variety			Rat of treatment
	V1	V2	V3	
T1	2.39	2.82	3.06	2.77
T2	3.78	4.36	4.60	4.24
T3	3.90	4.79	5.36	4.68
T4	4.81	4.52	4.50	4.61
T5	4.52	4.33	5.45	4.77
T6	5.65	5.46	5.51	5.54
T7	7.61	6.16	7.77	7.18
T8	3.66	3.76	3.59	3.67
Rat of Variety	4.54	4.53	4.98	
LSD <sub>0.05</sub>	Interaction = 0.026 T = 0.015 V = 0.009			

**Table 4 :** Effect of Spray treatments in three varieties of bean on Cytokinin content in seeds (µg.kg<sup>-1</sup>).

Treatment	Variety			Rat of treatment
	V1	V2	V3	
T1	2.14	2.18	2.91	2.41
T2	2.98	3.39	3.03	3.13
T3	3.02	3.07	3.16	3.08
T4	3.63	3.52	3.64	3.60
T5	3.57	3.58	3.95	3.70
T6	4.11	3.95	4.13	4.06
T7	6.70	7.19	8.90	7.60
T8	3.22	2.71	3.22	3.05
Rat of Variety	3.67	3.70	4.12	
LSD <sub>0.05</sub>	T=0.024 Interaction=0.042 V=0.015			

gibberellin hormone (Ismaeil *et al.*, 2003 and Al-Delamy, 2012). The Granovioletto recorded the highest rate of giberellin content in the seeds reached 4.98 µg.kg<sup>-1</sup>, compared to the local varieties and Filo Semillas, possibly because of the nature of the genotypes. The combination V3T7 (licorice + yeast 10 g.L<sup>-1</sup>) for the Granovioletto variety gave the highest mean reached 7.77 µg.kg<sup>-1</sup>, while the comparison treatment of the local variety V1T1 reached 2.39 µg.kg<sup>-1</sup>.

### Cytokinin content in seeds (µg.kg<sup>-1</sup>)

The results in table 4 showed that the spray treatment T7 (licorice + yeast 10 g.L<sup>-1</sup>) gave the highest average of cytokinen content in the seeds reached 7.60 µg.kg<sup>-1</sup> significantly superior to the rest of the treatments. The reason is that licorice extract and dry yeast suspension for their containment on amino acids that help to increase the concentration of this hormone (Ismaeil *et al.*, 2003 and Al-Delamy, 2012). The Granovioletto significantly exceeded the content of cytokinin content in seeds and recorded the highest rate reached 4.54 µg.kg<sup>-1</sup> compare with Filo Semillas and local varieties. This may be due to the genetic differences between the Cytokinin content and the ability of each variety to absorb and produce this hormone in the plant tissue, which is made in the roots. The combination V3T7 gave highest mean reached 8.90 µg.kg<sup>-1</sup>. But V1T1 was less than Cytokinin content reached 2.14 µg.kg<sup>-1</sup>.

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