

## Evaluation of Active Ingredients of *Petroselinum Hortense* L. and the Possibility to Use in the Applied Field

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### ABSTRACT

The experiments were conducted, to study the effect of 3 concentrations of each of indole butyric acid (25,50 or 100 ppm) and Mepiquat chloride (125,250 or 500 ppm) on the active ingredients content of *Petroselinum hortense* L.

The experiments were designed in RCBD, and each treatment was replicated 3 times. L.S.D. test at level of 0.05 was used to compare the differences between means.

Result showed that the percentage of active ingredients of the plant extracts (essential oil, coumarin, flavonoids), were significantly increased with the increase of indole butyric acid compare with control treatment. However, application of Mepiquat chloride decreased them compare with control treatment.

Indole butyric acid increased endogenous gibberellic acid (GA) and indole acetic acid (IAA) while Mepiquat decreased them. This study proved that growth regulators of the plant as a natural tool to increase active ingredients for their medical value.

### تقدير محتوى نبات البقدونس من المواد الفعالة وأمكانية استخدامه في المجال التطبيقي

#### الخلاصة

أجري البحث لدراسة تأثير ثلاثة تراكيز لكل من حمض الأنډول بيوترك (٢٥, ٥٠ و ١٠٠ جزء في المليون) والمبيكوت كلوريد (١٢٥, ٢٥٠ و ٥٠٠ جزء في المليون) في محتوى نبات البقدونس من المواد الفعالة.

صممت التجربة بطريقة القطاعات العشوائية الكاملة (RCBD) وبثلاث مكررات وتم تحليل النتائج على وفق التصميم المتبع, وتم مقارنة متوسطات المعاملات بأتباع طريقة أقل فرق معنوي L.S.D على مستوى 5%.

أوضحت النتائج أن محتوى المواد الفعالة في مستخلصات نبات البقدونس الزيتي الأساسي, الكومارينات, والفلافونيدات قد ازدادت معنوياً بزيادة تركيز حمض الأنډول بيوترك مقارنة بمعاملة المقارنة بينما كان للمبيكوت كلوريد تأثير عكسي.

ان حمض الأندول بيوترك له تأثير مشجع في زيادة محتوى النبات من هرموني أندول حمض الخليك والجبرلين, في حين أدى المبيكويث كلوريد الى خفضه مقارنة بمعاملة المقارنة. يستنتج من هذه الدراسة إمكانية استخدام منظمات النمو كوسيلة لزيادة إنتاج المواد الفعالة في النبات لأستخدامها في أغراض طبيه وعلاجه مختلفه.

## INTRODUCTION

**P**etroselinum hortense L. plant belongs to Umbellifera Family and regarded as one of the well-known medical plants which contain essential oils , Coumarina , Terpinene and rarely ,they are beneficial in digestive , nervous and urinary systems diseases [7].scientific studies as well as applied researches referred to the importance of this Plant in the industries of nutrition and medicine[12] , where the effective medical material of the plant is concentrated in leaves , seeds and roots as they are chemical materials of great vitality and use due to its physiological effect and healing activity for humans and animals[7]

For the purpose of achieving an increment in producing the active ingredient of this plant it is necessary to follow modern scientific techniques to do so. The using of plant growth regulators which encourage the growth of the plant became as one of more common methods , and represents one of the fundamental trends of scientific researches for academic and categorization purposes due to the capability of these materials via their effects on various Physiological operations inside plant tissues[1] . Astudies on Petroselinum hortense L. plant, revealed that essential oil extracted was used in medical fields as medicines for respiratory system congestion and anti-Bacterial [3] . Also cothren etal.[5]conducted an experiment on Prangos asperula fruit available in (Keshmir) he used Mepiquat Chloride with concentrations of 0 , 50 , 100 or 150 ppm where results exposed that Mepiquat Chloride did not affect on the rate of essential oil and Coumarin . craspy etal.[6] also studied the influence of Gibberellic acid on growth and chemical components of Apium graveolens plant ( from the same family ) , they discovered that Gibberellic acid leaded to a significant increment in some of the chemical components as the Flavonoids rate in plant's leaves was increased ,Ahmed etal. [2 ] also noticed the effect of some growth regulators such as GA , NAA on the plant of Lupinus Termis L. and discovered that those materials lead to increment in endogenous growth regulators. 30 compounds of Coumarina were isolated from the plant P.pabularia after treating with growth regulator [IAA ] , 16 of these compounds were chosen due to it's effect against Bacteria [4]Because of rare studies on the effect of growth regulators effect IBA (Indole butyric acid) & MC (Mepiquat Chloride) on Physiological relations and producing of active ingredients of Petroselinum hortense L.plant.The present study was conducted to know the role of plant growth regulators in increasing of active ingredients in Petroselinum hortense L.

## MATERIALS AND METHODS

This research was conducted in a private farm south of Baghdad in the year 2009 , Petroselinum hortense L. plants were sprayed By IBA and MC with the following concentrations:

- Indole Butyric acid (IBA) 25, 50 or 100 PPM
- Mepiquat Chloride (MC) 125, 250 or 500 PPM

In addition to control treatment

Growth regulators were used in the form of watery solution with the adding of Tween-100 material as an adhesive substance and were sprayed on Petroselinum hortense L. seedling in the phases of second and forth leaf until completely wet .The experiments were planned according to Randomized Complete Blocks Design(RCBD),with three replications .

For determination of endogenous Hormones activity , the plant material (leaves ) was frozen in liquid Nitrogen immediately after sampling and kept at - 20 degree till extraction . The extraction procedure of Indoles acetic acid(IAA) was similar to the described by [9] . However the extraction procedure of Gibberellin( GA) was similar to that described by [8]

The following chemical characteristics were assessed:

-Essential oil analysis, Essential oil extracted from leaves and seeds was Analyzed and components were determined using GC system and GC-MS System [3].

-Determining of total Phenolic:

Parts of plant ( leaves and seeds ) were weighed accurately then Methanol was extracted with the equipment of Soxhlet for a period of six hours [14 ] , then the extracted was vaporized using rotating evaporator (0.5 bar)for aperiod of 2.30 hours and volume was completed to 25 mL , 0.1 ML of the extraction was taken , Voline detector was added and absorbance was measured [765 nm] and total Phenolics were measured on the chain of Gallic acid [10] Determining of total Flavonoid :

Parts of the plant of leaves and seeds were weighed, Soxhlet was extracted , the extracted was vaporized by rotating evaporator [0.5 bar]for a period of 2.5 hours and volume completed to 25 m L , I mL was taken from the extract and expanded to 10 mL , then 1 mL was taken from it and Flavonoid rate was determined in the vegetarian extraction by the method of agitation and Soxhlet method [ 13]

-Extracting of Coumarin and determining the concentrations of Scopoletin and Psoralen compounds:-

Parts of plant (leaves & seeds) were weighed then hexan, ethyl acetate and methanol was extracted with equipment of soxhlet[11].

## RESULTS AND DISCUSSION

Table (1) shows the effect of growth regulators on content of oils in the extraction of Petroselinum hortense L. plant .It is clear that treatment IBA with concentrations of 25 , 50 or 100 PPM leaded to significant increment in percentage of oils in the extraction of Petroselinum hortense L. plant leaves and

seeds from ((R)- (+) limonene , 1,8- Cineole-2 , Linalyl Acetate-3 and  $\beta$ -Thujone-4 ). The best oil content obtained as a result of treatment with IBA was 100 ppm . these results agrees with those obtained by [7 ], in the same time the table showed that treatment with Mepiquat resulted diminishing of oils content compared with control treatment and this identical with the results obtained by [11].

Table (2) shows the effect of growth regulators on content of Phenolic & Flavonoids In the extraction of Petroselinum hortense L. plant .The use of growth regulators IBA led to significant increment in percentage of Phenolic & Flavonoids Specially those resulted from the adding of IBA 100 ppm compared with control treatment. venskutonis etal.[13]reported that IBA enhances plant growth in terms of leaves number and area causing efficiency enhancement in photosynthesis process and it's products with the increase of active ingredients fabrication causing an increment of it's concentration in leaves and seeds of the plant, while treatment with Mepiquat led to diminishing the content of Phenolic & Flavonoids in a significant manner , these results agrees with those of [5].From the above data it can be concluded that IBA had a favorable effect on growth characters of Petroselinum hortense L. compared with MC which caused a reduction effect.

The effect of growth regulators on content of Coumarins, Scopoletin and Psoralen in the extraction of Petroselinum hortense L. leaves and seeds were presented in Table( 3). It is obvious from this table that the adding of IBA with the three concentrations resulted an increment in content of Scopoletin and Psoralen compared with control treatment, and decreased significantly than control treatment by using Mepiquat Chloride (MC ) specially the concentration of 500ppm.

Table (4) shows the effect of growth regulators on endogenous Indole acetic acid (IAA) and Gibbereline (GA) inside Petroselinum hortense L. plant. From this table it is noticed that the use of IBA led to significant increment in plant Hormone contents of IAA and GA compared with control treatment , and decreased significantly than control treatment by using Mepiquat and this agrees with [2].The inhibition action of Mc may be due to reduce GA biosynthesis. Because it inhibit the formation of kaurene which is an intermediate in Gibbereline formation from mevalonate[2].

**Table (1) Effect of plant growth regulators on the essential  
oil content of seeds and leaves extracts of  
Petroselinum hortense L. plant**

Treat. ppm	(R)– (T) limonene		1,8 – cineole – 2		Linalyl acetate-3		B-Thujone-4	
	Seeds Extracts mg /gr	Leaves Extracts mg /gr	Seeds Extracts mg /gr	Leaves Extracts mg /gr	Seeds Extracts mg /gr	Leaves Extracts mg /gr	Seeds Extracts mg /gr	Leaves Extracts mg /gr
Control	19	18	16	20	9.5	9.3	4.5	5
IBA 25	20	19	17	21	10.5	10	5	5.5
50	21	20	18	22	11.5	11	6	6
100	22	21	19	23	12.5	12	7	7
MC 125	18	17	15	19	9	9	4	4.5
250	17	16	14	18	8	8.5	3.3	3.5
500	16	15	13	17	7	8	3	3
L.S.D at %5								

**Table (2) Effect of plant growth regulators on phenolic & flavonoid content of seeds and leaves extracts of Petroselinum hortense L. plant**

Treat .ppm	Total phenolic		Total flavonoid	
	Seeds Extracts mg /gr	Leaves Extracts mg /gr	Seeds Extracts mg /gr	Leaves Extracts mg /gr
Control	10	12	1.0	1.9
IBA 25	12	13	1.1	2.0
50	14	15.91	1.3	2.0
100	16.1	17.9	1.5	2.2
MC 125	9.5	11.02	1.0	1.7
250	9.0	10.75	0.80	1.5
500	8.5	9.6	0.50	1
L.S.D at %5				

**Table (3) Effect of plant growth regulators on Coumarin ( Scopoletin & Psoralen ) content of seeds and leaves Extracts of Petroselinum hortense L. plant.**

Treat.ppm	Scopoletin		Psoralen	
	Seeds extracts mg/gr	leaves extracts mg/gr	Seeds extracts mg/gr	leaves extracts mg/gr
Control	3	7.0	2000.	124
IBA 25	3.4	7.4	2000.8	124.7
50	4	8	3000	125
100	5	9	3000.5	126

MC 125	3	6.5	1900	123
250	2.5	6	1800	122
500	2	5	1700	121
L.S.D at %5				

**Table (4) Effect of plant growth regulators on endogenous GA and IAA of leaves of Petroselinum hortense L. plant.**

Endogenous Hormones	control	IBA			MC		
		25	50	100	125	250	500
GA	31	46	47	48	20	17	13
IAA	44	45	47	50	43	42	40

GA and IAA ng per gram fresh weight.

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