SPINNING STIMULATION OF SILKWORM , BOMBYX MORI L. BY PIMPINELLA ANISUM

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ABSTRACT

The present work has been carried out at Plant Protec. Dept. Fac. of Agric., El Fayoum Univ. during spring season of 2014 to study the effect of *Pimpinella anisum* as food additives on spinning of silkworm, *Bombyx mori* L. Dried seeds of *P. anisum* were crushed and dissolved in distilled water to prepare different concentrations (5, 10, 15, 20 and 25 mg/ml.). In the present study, results showed that, the concentration 10 mg/ml. of *P. anisum* occupied the first category to improve the most studied parameters of *B. mori* L. when comparing to control. Where 5th instar mortality percentage recorded 5% compared to 10% in control. 5th instar larval duration were 10.40 days compared to 10.44 days in control. Cocooning percentage were 96.82% compared to 92.22% in control and cocoon indices were 1.192 g, 0.253 g and 21.23% for cocoon, cocoon shell weights and cocoon shell ratio comparing to 1.088 g, 0.194 g and 17.90% for the control respectively. Total haemolymph protein registered 75.90 mg/ml compared to 67.52 mg/ml in control. Protease enzyme were 64.33 µg alanine/min/ml compared to 57.21 µg alanine/min/ml. in control and silk productivity were 2.434 cg/day compared to 1.866 cg/day in control.

INTRODUCTION

The silkworm, *Bombyx mori* L is monophagous feeding only on mulberry leaves, and the foliage quality of mulberry has a profound effect on the quality of silk **(Ravikumar, 1988)**. The nutritive value of mulberry leaves depends on various agro climatic factors and any deficiency of nutrients in leaves affects silk synthesis by the silkworm. Nutritional management directly influences the quality and quantity of silk production **(Murugan *et al.*,1998)**. *Pimpinella anisum* is aromatic and medicinal plant contains acetaldehyde, alpha-pinene, alpha-terpineol, alpha-zingiberene, anisaldehyde, anisic-acid, anisyl-alcohol, ar-curcumene, ascorbic-acid, bergapten, beta-bisabolene, beta-pinene, boron, caffeic-acid, calcium, camphene, chlorogenic-acid, choline, copper, d-carvone, dianethole , estragole, eugenol, fiber, furfural, hydroquinone, imperatorin, iron, isoorientin, isovitexin, limonene, linalool, magnesium, manganese, mannitol, methyl-chavicol, myristicin, p-cresol, phellandrene, phosphorus, potassium, rutin, scoparone, scopoletin, seselin, squalene, stigmasterol, trans-anethole,

umbelliferone and zinc. **(El Kady *et al.*, 1995; Andarwulan and Shetty, 1999; Kitajima *et al.*, 2003; Rodrigues *et al.*, 2003; Gebhardt *et al.*, 2005 and Tabanca *et al.*, 2006).** *P. anisum* use as anticoagulant **(Kartnig *et al.*,1975),** antidiuretic and enhance glucose absorption **(Kreydiyyeh *et al.*, 2003),** antifungal **(Soliman and Badeaa, 2002),** muscle relaxant **(Reiter and Brandt,1985)** and neurological **(Sahraei *et al.*, 2002).** Fortification of mulberry leaves with certain nutritive materials as carbohydrates, amino acids, proteins, lipids, antibiotics, vitamins, enzymes, minerals and other chemicals have proved to be useful for improving crop yield **(Rajegowda, 2002).** The present study has been planned to determine the effect of *P. anisum* as food additives on spinning of silkworm , *B. mori*, L.

MATERIALS AND METHODS

The effect of *Pimpinella anisum* on spinning of silkworm, *Bombyx mori* L. was studied during spring season of 2014 at Plant Protec. Dept. Fac. of Agric., El Fayoum Univ. Egg box of silkworm, *B. mori* L. (Egyptian hybrid) were obtained from the Seric. Res. Dept., Plant Protec. Res. Inst, Agric. Res. Center. Dokki, Giza. Dried seeds of *P. anisum* were crushed and dissolved in distilled water to prepare different concentrations. Larvae of *B. mori* L. were reared on fresh mulberry leaves (*Morus alba* var. *indicia*) under laboratory conditions (26±2°C, 76±5% RH). At the beginning of the 5th instar, larvae were divided into five groups (in addition to the control). Each group contained five replicates (each of twenty larvae). Each replicate was reared in carton tray (30×15×4^{cm}).

Larvae of *B. mori* L. were fed on mulberry leaves sprayed with one concentration of (5, 10, 15, 20 and 25 mg/ml.) of *P. anisum* at the 7th day of the 5th instar, after drying on ambient air temperature for one minute while the control was fed on mulberry leaves sprayed with distilled water. Tested parameters were recorded for all the replications of treatments and control. 5th instar mortality percentages were calculated according to **Megalla, 1984.** 5th instar larval duration was recorded. Cocooning percentages were calculated according to **Goudar and Kaliwal, 2000.** Cocoon weights and cocoon shell weights were recorded. Cocoon shell ratio was calculated according to **Tanaka 1964** .Total haemolymph protein was analyzed according to **Bradford 1976.** Protease enzyme was analyzed according to **Lee & Takabashi 1966 and Tachell *et al.*, 1972.** Silk productivity was calculated according to **Chattopadhyay *et al.* 1995.** Data was analyzed by ANOVA through statistical package for social science (SPSS) according to **Berkowitz and Allaway, 1998** to find out the significance between treated and control. Means were separated by (L.S.D at 0.05% and 0.01%).

RESULTS AND DISCUSSION

- 5th instar mortality percentages:

Table (I) showed no significant change in the treated groups of *P. anisum* when compared to control for the 5th instar mortality percentages . Where the best result (5%) has been obtained when used with concentration of 10 mg/ml of *P. anisum.* This might be due to the effect of *P. anisum as* anti fungal **(Soliman and Badeaa, 2002).**

- 5th instar larval durations:

The means of the larval durations were varied but not showed any significant change in the treated groups of *P. anisum* when compared to control **(Table (I)).**

- Cocooning percentages:

Cocooning percentages were significantly increased in the treated groups of *P. anisum* when compared to control as presented in **Table (I).** These might be due to the effect of *P.anisum* as anti fungal on treated larvae which lead to decrease in mortality percentages and in turn increased the cocooning percentage.

Table (I): Effect of feeding *Bombyx mori* L. on mulberry leaves treated with concentrations of *Pimpinella anisum* on the biological parameters.

Concentrations of *P. anisum* by mg/ml of water.	Parameters		
	The means of 5th instar mortality percentages (%).	The means of 5th instar larval durations (days).	The means of cocooning percentages (%).
5	10±1.581	10.48±0.135	93.02±1.543 b
10	5±0.000	10.40±0.141	96.82±0.362 a
15	9±1.870	10.38±0.149	92.79±1.153 b
20	10±1.581	10.50±0.134	91.99±1.121 b
25	10±1.581	10.48±0.101	91.65±0.933 b
Control	10±1.581	10.44±0.160	92.22±1.182 b
F test	-	-	*
LSD at 0.05%	-	-	3.283

- Cocoon weights , cocoon shell weights and cocoon shell ratio:

The obtained results in **Table (II)** represents the means of cocoon and cocoon shell weights and cocoon shell ratio increased significantly especially when larvae treated with 10 mg/ml of *P. anisum.* Where the cocoon weights were 1.192g compared to 1.088g in control and cocoon shell weights take the same trend. Where cocoon shell weights were 0.253g compared to 0.194g in control. The increase may be due to the stimulatory effect of *P. anisum* which increased total haemolymph protein and stimulate the effect of protease enzyme **(Table (III)).** However, cocoon shell ratio did not show any

significant change in the treated groups of *P. anisum* when compared to control.

Table (II):Effect of feeding *Bombyx mori* L. on mulberry leaves treated with concentrations of *Pimpinella anisum* on cocoon indices.

Concentrations of *P. anisum* by mg/ml of water.	Parameters		
	The means of cocoon weights (g).	The means of cocoon shell weights (g).	The means of cocoon shell ratio (%).
5	1.065±0.025 b	0.194±0.009 b	18.19±1.027
10	1.192±0.022 a	0.253±0.029 a	21.23±2.306
15	1.042±0.013 c	0.185±0.007 b	17.79±0.320
20	1.028±0.005 bc	0.174±0.003 b	17.00±0.141
25	1.007±0.003 bc	0.179±0.005 b	17.32±0.183
Control	1.088±0.012 bd	0.194±0.005 b	17.90±0.368
F test	**	**	-
LSD at 0.05%	0.041	0.041	-

- Total haemolymph protein and protease enzyme :

According to data in **Table (III)** the means of total haemolymph protein and protease enzyme were significantly increased in the treated groups of *P. anisum* when compared to control. Where the high values were 75.90 mg/ml and 64.33 µg alanine/min/ml for total haemolymph protein and protease enzyme respectively, when larvae treated with 10 mg/ml of *P. anisum* comparing to 67.52 mg/ml and 57.21 µg alanine/min/ml for total haemolymph protein and protease enzyme, respectively in control. It might be refer to the good effect of *P. anisum* on metabolism as suggested by **Reichling *et al.* (1995).**

- Silk productivity:

The means of silk productivity were significantly increased in the treated groups of *P. anisum* when compared to control **(Table (III)).** Where the best treatment was 2.434 cg/day when larvae treated with 10 mg/ml of *P. anisum* compared to 1.866 cg/day in control . It might be due to the effect of *P. anisum* on total protein which increased in haemolymph.

Table (III): Effect of feeding *Bombyx mori* L. on mulberry leaves treated with concentrations of *Pimpinella anisum* on total haemolymph protein, protease enzyme and silk productivity.

Concentrations of *P. anisum* by mg/ml of water.	Parameters		
	The means of total haemolymph protein (mg/ml.).	The means of protease enzyme (µg alanine/min/ml.).	The means of silk productivity (cg/day).
5	70.54±2.478 a	61.10±1.670 a	1.856±0.147 b
10	75.90±1.147 a	64.33±2.503 a	2.434±0.271 a
15	67.81±1.851 b	54.12±1.298 b	1.790±0.091 b
20	67.38±2.488 b	55.10±1.945 b	1.662±0.039 b
25	68.69±1.408 b	51.07±1.942 b	1.662±0.028 b
Control	67.52±2.335 b	57.21±1.703 b	1.866±0.049 b
F test	*	**	**
LSD at 0.05%	5.898	5.486	0.390

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تحفيز التشرنق فى دودة الحرير التوتية باستخدام الينسون

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الملخص

تمت هذه الدراسة فى قسم وقاية النبات بكلية الزراعة جامعة الفيوم خلال فصل الربيع لعام ٢٠١٤ لدراسة تأثير الينسون كإضافة غذائية على التشرنق فى دودة الحرير التوتية. حيث تم الحصول على هجين محلى من قسم بحوث الحرير بمركز البحوث الزراعية بالجيزة. تم تربية اليرقات على ورق توت هندى خلال الخمس أعمار اليرقية. بعد الإنسلاخ الرابع تم تقسيم اليرقات إلى خمس مجموعات بالإضافة للكنترول. كل مجموعة قسمت إلى خمس مكررات وكذلك الكنترول. تم طحن بذور الينسون وإذابتها فى الماء المقطر لتحضير التركيزات المختلفة (٥ ، ١٠ ، ١٥ ، ٢٠ ، ٢٥ مجم/مللتر). حيث تم تغذية هذه اليرقات على ورق التوت المعامل بهذه التركيزات خلال اليوم السابع من العمر اليرقى الخامس.

وكانت النتائج كالتالى: أفضل تركيز هو ١٠مجم/مللتر. حيث كان متوسط نسبة موت يرقات العمر الخامس ٥% مقارنة بـــ ١٠% فى الكنترول ومتوسط طول العمر اليرقى الخامس ١٠,٤٠ يوم مقارنة بـــ ١٠,٤٤ يوم فى الكنترول و متوسط نسبة التشرنق ٩٦,٨٢% مقارنة بـــ ٩٢,٢٢% فى الكنترول.

كذلك كان متوسط وزن الشرنقة ١,١٩٢ جم و متوسط وزن قشرة الشرنقة ٠,٢٥٣ جم و متوسط نسبة الحرير ٢١,٢٣% مقارنة بـــ ١,٠٨٨جم و ٠,١٩٤ جم و ١٧,٩٠% فى الكنترول بالنسبة للصفات السابقة على التوالى. متوسط البروتين الكلى فى الدم ٧٥,٩٠ ملجم/مللتر مقارنة بـــ ٦٧,٥٢ مجم/مللتر فى الكنترول ومتوسط إنزيم البروتيز ٦٤,٣٣ ميكروجرام/مل فى الدقيقة مقارنة بـــ ٥٧,٢١ ميكروجرام/مل فى الدقيقة فى الكنترول وكذلك متوسط انتاج الحرير ٢,٤٣٤ سنتجرام/يوم مقارنة ب ١,٨٦٦ سنتجرام/يوم فى الكنترول.