

## Effect of Foliar Spray With Thyme Extract on Codling Moth (*Cydia pomonella*) Control and Some Fruit Quality of Pear (*Pyrus communis L*) Al-zafaraniyah selectee



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### Abstract:

The effect of water extract of thyme significantly reduced the infestation ratio of codling moth, (*Cydia pomonella*) on pear fruits. The control gave the highest infestation (18.60%), while 10% thyme recorded the lowest (8.02%),. Thyme extract treatments caused significant increases with regard to the following fruit parameters : length, diameters ,fresh weight ,and volumes . as well as Total acidity%, and total soluble solids%.

**Key words:** Pear, Cultivar, Al-zafaraniah, *Cydia pomonella*, Plant extracts;

### I. Introduction:

Pear is one of the most important commercial crops grown in the Kurdistan region. The codling moth, *Cydia pomonella*, is a common fruit pest of pome fruits throughout Kurdistan Region. During the last decades the increasing use of synthetic insecticides caused several negative effects such as environmental pollution, toxicity at different trophic levels and creation of resistant insect populations [1]. Many studies have demonstrated that medicinal plants contain varicose bioactive compounds with antioxidant activity, which are responsible for their beneficial health effects. Phenolic are compounds possessing one or more aromatic rings with one or more hydroxyl groups [2]. Botanical extracts are broad

spectrum materials used in pest control, they are safe to apply, unique in action and can easily be processed. Plant materials have been widely used in the pest to protect the plant from damage caused by insect [3], [4] investigated the effect of some aqueous plant extract on the biological activity of house fly *Musca domestica* L.and the results revealed that mortality rates of eggs and larvae increased with increasing concentration, the 5% conc. Gave the highest mortality followed by 10% conc. but 1% gave the lowest [5] showed that the codling moth *Cydia pomonella* is a major pest of apple, and if not controlled may eliminate up to 80% of the crop. Codling moth produced a complete first generation and some third generation individuals each summer. On an

average, females lay between 40 to 50 eggs in each generations, but fecundity varies much between individuals.[6]. Thymol (2-iso propyl -5- methylphenol) is the main monoterpene phenol, isomeric with carvacrol, found in thyme essential oil. These compounds have shown antibacterial and fungal properties.

The objective of this study was to investigate the effect of thyme plant extract as alternative synthetic pesticides in controlling codling moth of pear fruit.

## **II. Materials and methods:**

This experiment was carried out in Bazian 40Km south west of Sulaimani city on 10 years old orchard select Al-zafaraniah pear trees, planted at 5\*5m. Trees were of normal growth, uniform in vigor under furrow irrigation system. Fresh herbal thyme plant materials were collected in Qaradakh region located south east Sulaimani city. The collected plant material (leaves and branch) were air-dried in darkness at room temperature. The dried plant material was cut up and stored in tightly sealed dark containers until needed.

Thyme (*Thymus vulgaris*) piece materials were grounded. For the preparation of 10% aqueous solution of Thyme (40) grams were grounded and placed in 400 ml dried materials conical flask, then distilled water was added until arrived the marked limit 400 ml. such solution was stirred with magnetic stirrer for (30) minutes. The solution, then kept in the electric oven at (35)C° until the time of request. The solution was diluted to 5%. Foliar sprays with three concentration (0.5 and 10)% thyme were applied on the selected trees depending on the appearance of adult codling moth indicated by the light traps

placed at three location in the orchard. At the harvesting, 30 Fruits were randomly taken from each experimental unit to determine the physical and chemical parameters

The following parameters were estimated:

1- Infestation ratio%

Infested fruit were selected from each experimental unit (trees) calculated, using the following equation

Infestation ratio% =  $\frac{\text{No. infested fruit}}{\text{Total No. of yield fruit}} * 100$

2- Fruit fresh weight (g): Using electrical balance 0.000g.

3- Fruit volume (cm<sup>3</sup>): Was measured with water volume which was replaced as the fruit has been pushed in water container.

4- Fruit length (cm): Was measured with digital vernier

5- Fruit diameter (cm): Was measured with digital vernier

6- Total acidity (%): was determined in fruit juice (as malic acid) with titration with 0.1N sodium hydroxide with phenol – naphthalene as indicator.

7- Total soluble solids percentage (TSS %): was measured, using hand Refractometer. (A.O.A.C.(1995)

The experiment followed complete randomized block design on 15 Trees as 3 Treatments with 5 replicates.

Results of measured parameters were subjected to computerized statistical analysis using X-LSAT package for analysis of variance (ANOVA) and means

of treatments were compared using L.S.D. at 5% level .

### III. Results and Discussions:

Thyme extract treatment caused significant reduction of infestation ratio of codling moth in pear fruits (Figure1). The highest infestation ratio 18.60% observed from control treatment while the lowest value (8.02%) was recorded from 10% thyme extract treatment. These results are in agreement with the finding of Azad et al 2012(3). They noted that the extract of Khuksha leaves showed best performance against the pest attack of eggplant. 14809-53865 Jul 22 Azad M.A.K.,M.N.Yasmin and M.S. Islam. Effect of botanical extract on pest control in brinjal Field.J. Environ.Sci.and Natural Resources,5(2):173-176,2012. Reduction of infestation may be due to oviposition The reason of reducing of infestation ratio of codling moth in pear fruits could be related to the oviposition and sterility action against insects(7).

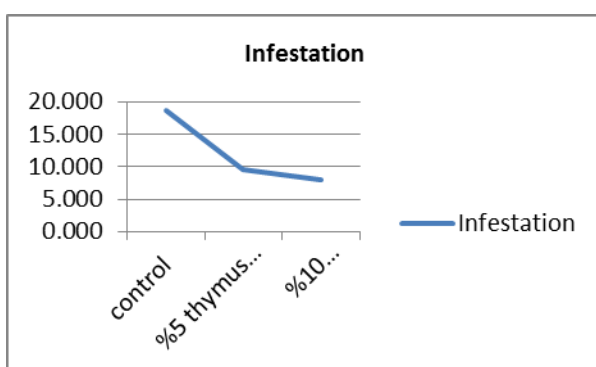


Fig. 1 Effect of thyme extraction on infestation rate%.

#### A. Fruit weight (g/fruit):

Highest significant fruit weights ranged between 53.86-61.50g and resulted from

spraying of 5 and 10% Thyme extracts respectably meanwhile the lowest average fruit weight was produced on control trees and reached 42.50g (Figure 2).

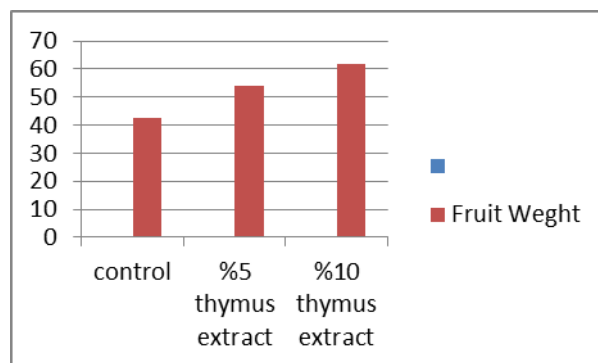


Fig. 2 Effect of Thyme extraction on Fruit weight (g).

#### B. Fruit volume (cm<sup>3</sup>)

Figure(3) shows that significant fruit volume reached (60.08cm<sup>3</sup>) was observed as a result of Thyme extract 10% whereas the lowest significant fruit volume resulted on The control trees and reached (41.42cm<sup>3</sup>)Fig3.

Table.I: Effect of thyme extraction on Fruit length (cm)

Fruit length(cm)	Treatment
4.865 b	Control
5.776 a	5% thymus
6.112 a	10% thymus
0.63	L.S.D

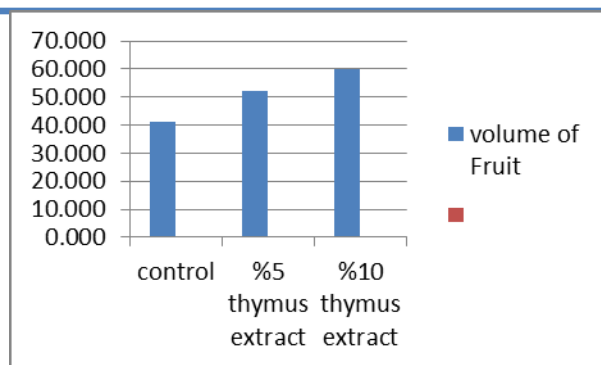


Fig. 3 Effect of thyme extraction on Fruit volume (cm<sup>3</sup>).

C. Fruit length (cm)

Table (1) reveals that spraying pear trees with thyme extract concentration resulted in a significant increase in Fruit length was with the control. The highest fruit length was 6.11cm recorded for 10% thyme extract concentration.

Table.II: Effect of thyme extraction on total acidity % of pear fruit.

T.A	Treatment
0.190 a	Control
0.218 a	5% thymus
0.170 a	10% thymus
0.062	L.S.D

D. Fruit diameters (cm):

Figure 4 shows significant effect of thyme extract concentration on pear fruit diameter. Figure 4 indicates that both 5 and 10% thyme extracts resulted in significant increases in fruit diameters compared with the control.

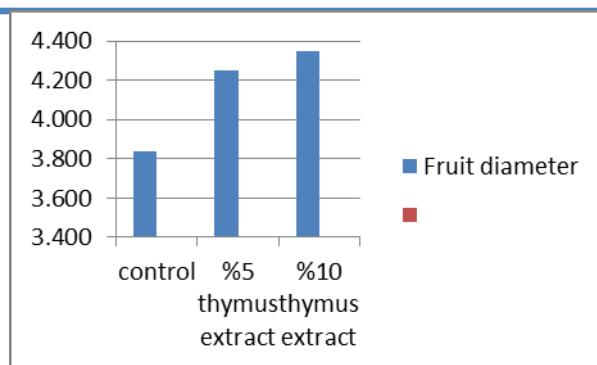


Fig. 4 Effect of thyme extraction on pear fruit diameter.

6- Total acidity%

It is clear from table (2) that thyme extract treatment had no significant effects on the percentage of total acidity.

7- Total soluble solids of fruit Juice (TSS%)

(Figure 5) show that 5% thyme extraction recorded the highest TSS value (18%) compared to 10% and the control.

The positive effect of thyme extraction on the studied parameters may be due to the keeping of the sprayed leaves with healthy leaves and attractive appearance which may result higher increase of photosynthesis and subsequently better qualities of the studied fruit parameters.

On the other hand thyme extracts may behave as plant growth inhibitors causing vegetative growth which reflects as stimulant factors for better fruit qualities.

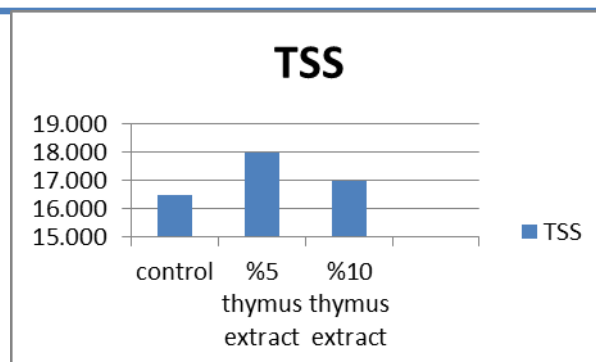


Fig. 5 Effect of thyme extraction on Total soluble solid of pear fruits.

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