Comparative study on the effect of insecticides and plant extracts on the *Oligonychus sacchari* (McGrego) (Acari:Tetranychidaea)

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ABSTRACT

Three insecticides ,namely Polo500,Neoron500and Neotex super , and phenolic compounds of *Eucalyptus camaldulesis* and essential oil compounds of *Melia azedarach* plants , were tested ,to evaluatedeffects on the mortality rate of different instars of the mites *Oligonychussacchari*(McGregor). Results showed that Neoron 500 was the most effect with 58% mortality rate for eggs , 100% for larvae and adults followed by Polo500 with 51% mortality rate for eggs and 100% for larvae and nymph (1st and 2nd stages) ,but 90% for adults .on the other hand *Melia azadarah* essential oil compounds was recorded the highest mortality rate with an average (of three concentration) of 80,93.3 , 77.5 ,82.5 and 85% . and it reached 35,55,50,51 and 56 % in essential oil (100 conc.) in eggs ,larvae nymph and adults in respectively .

Keywords: *Oligonychus sacchari*, chemical control, plants extract control.

1. Introduction

This study deals with a single species *Oligonychussacchari*(McGregor) mite its belonging to family Tetranychidae a momophagus pest prefers the sugar cane leave causes economic gameges to this important crop in the world (Aljoboori,2002). Many studies showed that many kinds of insecticides controlled this mite by using Polo500, Neotex super and Neoron500

(Kiclkiewcz, 1982; Almansour&Akbar,2013), in other hand plant extracts(allelochemicals) were tested to control many species of insects and mites which may serve as a control agents for these pests , field observation revealed that *E.camaldlensis* and *M.azadarach* have repellent and poisoned compounds and prevent many insects and mites species feeding and oviposition response(Gotoh, 1997; Almansour et al. 1997; amansour &Akbar,2013).
The aims of this study were determined the effects of three kinds of insecticides activity compared with extract plants of *E.camaldensis* an *M .azadarach* on mortality rate for all stages of *O.sacchari* .

2. Materials and methods

2.1. Prepare the culture of sugar canes plant and *O.sacchari* mite. New adult plants of sugar cane (missan1) were planted in the laboratory and infected with mites to have pure culture of mites for all stages.

2.2. Three kinds of insecticides used namely Neoron500 ES (ml/l), polo500 ES (0.5 ml/l) and Newtex super (ml/l) .One ml used from each insecticide in each treatment.

2.3. Plant extracts

2.3.1. Phenolic compounds of *E. Camaldulensis* was extracted according to Harborne (1984) procedure, 1 gram of phenolic compounds dissolved in 100ml distilledwater with one ml liquid paraffin as adhesive material and two drops of tween 20 as surfactant material (100 % concentration) than 75%,50%,25% conc. were prepare (one ml for treatments)(zero concentration contained water only).

2.3.2. Essential oil of *M.azadarach* was extracted according to Almansour (1996) one ml of essential oil dissolved in 100 ml of distilled water with one ml liquid paraffin as surfactant material and two drops of tween20 as surfactant material (100% concentration) and 75, 50 and 25 % concentration were prepared (one ml for each treatment) (zero concentration prepare 100 ml distilled water contained 1 ml liquid paraffin and two drops of tween20).

2.4. Effect of insecticides on mortality rate of *O. sacchari*

2.4.1. According to Almansour &Akbar (2013), part of leaf of sugar cane was used in round plastic container (9 cm diameter , 1.5 cm high) with a watered cotton layer ,and 10male and 10 female of the mites transferred on the leaf and left for 24 hrs. for eggs oviposition than the adults removed, 20 eggs (three replicates) were sprayed with each insecticides (1 ml) using spray gun for each treatment. Eggs maintained in incubator condition of 30±1c , humidity 50-60 %and 12hr/day light (60 lux) and the mortality rate recorded after 72 hours .

2.4.2. Effect of insecticides on morality rate in immature stages of *O. sacchari*. according to Almansour & Akbar (2013) procedure, 20 larvae were introduced to the same containers containing part of leaf of sugar cane plant on watered cotton layer , sprayed with each concentration(1 ml) using spray gun three replicates of each concentration were prepared and maintained in incubator in the same conditions of eggs for 72 hr. The same procedure used for nymph and adult and mortality rates recorded after 72hr.

2.5. Effect phenolic compounds and essential oil compounds in mortality rates of *O.sacchari* stages.The same procedure (Almansour & Akbar, 2013) was used and the conditions, for all stages of mite for each concentration, and the mortality rates recorded after 72 hr.

2.6. Statistical analysis of data was based on complete randomized design by using variance with confidence limited of 95% (little and Hills, 1972). All mortality rates were corrected according to Abott formula (1925).

3. Results and Discussion

In this study three insecticides were used compared with phenolic compounds *E. camaldulensis* and essential oil of *M. azadarach* to evaluate their effects in different stages of *O. sacchari*. The results showed (table 1) all the stages of this mite were affected by the insecticides , eggs hatchability affected in lower degree as compare with other stages with a direct correlation between insecticides and mortality rates in all stages it reached 50,51, 58% in Neotex super ,polo ,and Neoron respectively ,the larval stage showed high mortality rate it reached 100% in polo and Neoron but 95% in Newtex super , there was no correlation between the first and second nymph stages ,the mortality rate reached 100 and 90% in polo and Neoron respectively and the lowest rate in neotex super reached 90%. In the 1st and 2nd nymphal stages the mortality rates reached 100% in Neoron and 95% in polo, the lowest rate find in neotex super it reach 90%. Many researchers used these insecticides to controlled many species of mites specially neotex super and it give a good result to control all stages of these mites and these insecticides worked by contact.but poloworked as a repellent and anti-feeding agents (Chaudharyetal.,1982; Almansour et al.,1997; Aldossari,2002; Aljoboor1999).

According to table 2 the phenolic compounds of *E. camaldulensis*, affected all stages of mitebut its less than insecticides and the mortality rates were high degree in high concentration with a direct correlation, especially in 100%, itreaches 35% in eggsstages and it reached 55% in 100% concentration. Also the high concentration showed a high mortality rates in nymphal stages it reached 50% and 51% in 1st and 2nd nymphal stages in 100% concentration respectively. In adult mortality rate it reached 50% in 100% concentration. Table 3 showed that essential oil of *M.azadarach* had many active compounds that effected the different stages of this mite , the mortality rate in eggs reached 80% in 100%concentration and it reached 93 ,82, 23.3 % in larval, 1st,2nd, and adult stages respectively . many researches showed the activity of plant compounds in biology of mites and insects, and the most important compounds are phenolic which attached with proteins and made a complex compounds effected in feeding of animals and produced high mortality rates, also essential oil contain active compounds affected insects and mites works as poisons and repellent (Almansour1997; Alsaadi 2001; Almansour&Akbar2013). In conclusion the results showed that insecticides and plant extracts active to control this mite.

Table 1. Effect of three insecticides on *O.sacchari* stages mortality rates(%) after 72 hrs.

Treatment	Egg	Larvae	Nymph 1st stage	Nymph 2nd stage	Ldult
Polo500	51	100	100	100	95
Neoron500	58	100	100	100	100
Neotex	50	95	85	86	90
L.S.D	3.5	3.6	4.33	4.05	3.56

Table 2. Effect of *E.camaldulensis* phenolic compounds in mortality rates of *O. sacchari* (%) stages after 72 hrs.

Concentration	Egg	Larvae	Nymph 1st stage	Nymph 2nd stage	Ldult
25	5	15	20	19	18
50	18	22	39	38	22
75	22	37	42	43	41
100	35	55	50	51	56
L.S. D	1.5	1.2	1.5	1.5	1.6

Table 3. Effect of *M.azadarach* essential oil compounds on mortality rate of *O.sacchari* (%) stages after 72 hrs of treatments.

Concentration %	Egg	Larvae	Nymph 1st stage	Nymph 2nd stage	Adult
25	25	26.3	28.3	33.3	23.3
50	30.3	29.3	40.3	45.1	30.3
75	56.6	58.3	53.3	55	58.3
100	80	93.3	77.5	82.5	85
L.S.D	1.2	6.00	3.66	3.66	6.00

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