European Journal of Academic Essays 3(6): 214-220, 2016
ISSN (online): 2183-1904
ISSN (print): 2183-3818
www.euroessays.org

Influence of the coriander oil and its nano against *Tuta absoluta* (Lepidoptera: Gelechiidae)

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Abstract: The autumn tomato variety F.N.8 were planted in two Egyptian governorate Aswan and Kafer El Skehk to control the tomato pin worm *Tuta absoluta*. under laboratory conditions, the effect of coriander and nano coriander on *T. absoluta* under laboratory conditions which revealed that larval mortality 56, 43, 33 and 21% after treated with coriander at 5. 2.5, 0.5 and 0.05% . the adult mortality for the corresponding concentration recorded, 54, 40, 30 and 18% , respectively. When the target insect pests treated with the nano coriander oil the percentage of larval mortality significantly increased to 81, 78, 66 and 56% after treated with the concentrations, 0.1, 0.5, 0.05 and 0.005% . the percentage of adult mortality recorded for the corresponding concentrations against adult, 77, 70 62 and 59 %Under semifield conditions the percentage of adult decreased to 18% after treated with0.05%The meanes number fof eggs laid/ female significantly decreased to 2.0±1.1, 4.0±3.1, 8.2±2.1 and 10.0±8.1eggs/ female after 20, 50, and 120 days respectivelythe weight of tomato significantly increase to 3671± 79.49 and 3850± 36.70 Kg/ Feddan in plots treated with nano coriander in both two governorates Aswan And Kafer El Shehk respectively as compared to 2444± 41.81 and 2444± 41.81 Kg/ Feddan in the control , respectively.

Key wards., **coriander oil nano** , nano. ***Tuta absoluta****.tomato.*

1. Introduction

The Egyptian tomato crop, *Lycopersicon esculentum* (Mill) is a considered among very important vegetable crop of the world. The tomato leafminer, *Tuta absoluta* Meyrick, (Lepidoptera : Gelechiidae) is one of a harmful serious pest of both the greenhouse, and field tomatoes. The harmful pest, *T. absoluta* considered among serious insect pests of the tomato crop. Tomatoes fruits lost by the tomato leaf minor in the field [1-3]. *Tuta absoluta* infect the leaves and soluneouses fruits which leads to drying the plant [4-7]. This insect pests migrate from tomato crop to any other solanouse crops which leads to damaging and loss of it [8-11]. The new pest of the tomato leaf minor have a serious threat to such efforts and needs to be kept in check as early as possible. During the past three years and while expanding eastward from Spain along the North African coast, *Tuta absoluta* have caused havoc in agricultural production , devastating crops in all countries on the way, elevating prices beyond the capability of average consumer. [1] controlled the tomato leaf miners by the microbial fungi and *Trichogramma evanesens.* Under laboratory condition the percentage eggs parasitoid of *T. evanesens* were significantly decreased after treatments with *M. anisopliae to 93.2% as* compare to 98.2 in the control. Under green house conditions the means number of infestation were significantly decreased [1] . Damage to fruit allows e.g. fungal diseases to enter, which leading to rotting fruit before or after harvest , [1,2] . In Egypt. tomato grown in green house and open field. *T. absoluta* are severely attack the tomato fruits which causing a lose of their commercial value. 50–100% losses have been reported on tomato [3,4] [5, 6, 7] , used the Biocontrol agent bacteria or fungi for controlling the Tomato Pinworm *T. absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. [7,8] control the tomato insect pests by using isolated *Bacillus thuringiensis* and the entomopathogenic fungi. Nano pesticides, nano fungicides and nanoherbicides are being used efficiently in agriculture [9,10, 11, 12, 13.]

The aim of this work to evaluate of chitosan and nno-chitosan against *T. absoluta* under laboratory, greenhouse effect and field.

2. Materials and Methods

2.1. Rearing insect pests:

The tomato pinworm were reared on tomato leaves under laboratory conditions 22±2Co and RH 60-70% *T. absoluta* used in the trials were obtained from laboratory cultures. The experiments were repeated 4 times. The percentages of mortality were calculated and corrected according to [14], while LC50 was calculated through probit analysis, [15]. The experiments were carried out under laboratory conditions 22

± 2o C and 60-70% R.H. Twenty individuals of the third larvae of *T. absoluta* were put on them, covered with muslin. Control (untreated) was made by feeding the larvae on untreated leaves (sprayed by water only).

2.2.Green house trials:

The summer tomato variety F.N. was planted in the green house in 40 plots in each artificial infestation was made by spraying the plant with the bioinsecticides chitosan at the concentrations of and 30ppm. Control samples were sprayed by water only. The plants were examined every two days, the percentage of infestation was calculated until the end of the experiment. Each treatment was replicated 4 times. The percent mortality was counted and corrected according to [14]; while Lc50s were calculated through probit analysis after [15].

2.3.Field trials.

summer tomato variety F.N. Our field experiments were conducted at Aswan and Kafer El Shehk Governorate), Egypt during the seasons 2016 to study the effectiveness of the tested coriander and Nano-coriander oil on *T. absoluta*, (summer tomato variety F.N.8) was planted at the end of May during two successive seasons in an area of about half feddan. The tested, coriander were applied as single treatments in randomize plots. 5g for coriander. Regular agricultural practices were performed and no chemical control was used during our study period. The weeds were removed by hand. Five plots of corn were sprayed with water as control treatments. Samples from each treatment were collected weekly and transferred to the laboratory in order to investigate. The Percentages of infection were calculated.

2.8. Yield Assessment:

Yield data in treated and untreated plots in the corn harvest seasons in two different governorates Aswan and Kafer El Shek, represented by weight in Kg were determined. The Yield loss was estimated according to the following equation:

$$\text{Yield loss} = \frac{\text{Potential yield} - \text{Actual yield}}{\text{Potential yield}}$$

Potential yield was *Nano*- Coriander treatment (the best result among the tested pathogens) was considered the standard for comparison with the other ones.

2.4.Bioassays

The insecticidal efficacy of coriander and nano- coriander were tested at three dose rates 10, 25, 50 ppm against the 3rd instar larvae of *T. absoluta* . For each case, four glass jars as replicates were used. Each replicate was treated individually with the respective nano- chitosan quantity and then shaken manually for one minute to achieve equal distribution of the chitosan and nano chitosan Subsequently, ten 3rd instar larvae of the two tested species were introduced into each glass jar and covered with muslin for sufficient ventilation. Twelve replicates glass jars containing untreated wheat served as control. Mortality was assessed after 7 d of exposure in the treated and untreated jars. Mortality was corrected according to [13]. All tests were conducted at 27 ± 2 °C and 65 ± 5% relative humidity (RH). All the experiments were repeated three times.

2.5. Nanoencapsulation

The Nanoencapsulation is a process through which a chemical is slowly but efficiently released to the particular host for insect pests control. Release mechanisms include dissolution, biodegradation, diffusion and osmotic pressure with specific pH [26]. Encapsulated of the tested bioinsecticides nano- coriander, nano-emulsion is prepared by high-pressure homogenization of 2.5% surfactant and 100% glycerol, to create stable droplets which that that increase the retention of the oil and cause a slow release of the nano materials . The release rate depends upon the protection time; consequently a decrease in release rate can prolong insect pests protection time [27].

3. Results

Table 1 and 2 show that the effect of coriander and nano coriander on *T. absoluta* under laboratory conditions which revealed that larval mortality 56, 43, 33 and 21% after treated with coriander at 5. 2.5, 0.5 and 0.05% . the adult mortality for the corresponding concentration recorded, 54, 40, 30 and 18% , respectively (Table 1).

When the target insect pests treated with the nano coriander oil the percentage of larval mortality significantly increased to 81, 78, 66 and 56% after treated with the concentrations, 0.1, 0.5, 0.05 and 0.005% . the percentage of adult mortality recorded for the corresponding concentrations against adult, 77, 70 62 and 59 % (Table2). Under semifield conditions the percentage of adult decreased to 18% after treated with0.05%(Table 3)

The meanes number fof eggs laid/ female significantly decreased to 2.0±1.1, 4.0±3.1, 8.2±2.1 and 10.0±8.1eggs/ female after 20, 50, and 120 days respectively (Table4). Table 5 revealed that the weight of tomato significantly increase to 3671± 79.49 and 3850± 36.70 Kg/ Feddan in plots treated with nano coriander in both two governorates Aswan And Kafer El Shehk respectively as compared to 2444± 41.81 and 2444± 41.81 Kg/ Feddan in the control , respectively (Table 5).

Figures 1 and 2 showed that, the infestations of the target insect pests of *T. absoluta* not only significantly decreased when treated with chitosan solution but also highly significantly decreased when treated with nano-coriander

under semifield and field conditions treatments (figre, 1 & 2).

4. Discussion

Auther found that the bio insecticide control many vegetables pests [15 ,16, 17].The same results obtained [17, 18, 19,20, 21,22] who found that the nano microbial insecticide decrease the amount of insecticides used. . [23] found the insecticidal activity the nano-chitosan (CS-g-PAA) showed highest effect against the three insect of soybean. [24, 25, 26, 27] reported that the means number of eggs deposited /female were significantly decreased. Under laboratory and semifield condition, *Aphis gossypii* were significantly decreased to 20.9±9.1 and 28.9±9.2 eggs/female respectively as compared to 97.3±4.9 and 90.3±4.9 eggs/female in the control, respectively. The same trends were also observed against *Callosobruchus maculatus* .

[28,29,30,31] found that the nano insecticides of Imidacloprid and fungi strains cases a higher mortality for insect infestations. Our results agree with [32,33,34,35,36] who find that the nano pesticide decrease the infestation percentage of different pests.

[26-29] agree with our results and control a lot of pests with nano materials. [30-41] have the same results obtained and show that the nano pesticides is a perfect for controlling mny pests and diseases . [40-45] found the insecticidal activity the nano-chitosan (CS-g-PAA) showed highest effect against the three insect of soybean. as the means number of eggs deposited /female were significantly decreased. Under laboratory and semifield condition, *Aphis gossypii* were significantly decreased to 20.9±9.1 and 28.9±9.2 eggs/female respectively as compared to 97.3±4.9 and 90.3±4.9 eggs/female in the control, respectively. The same trends were also observed against *Callosobruchus maculatus* . [28, 29, 30, 331, 32, 33] found that the nano insecticides of Imidacloprid and fungi strains cases a higher mortality for insect infestations. Our results agree with [34,35, 36, 41,42] who find that the nano pesticide decrease the infestation percentage of different pests. Our results matched with those [43,44,45,46 47] .

5. Acknowledgment. This research was supported by PROJECT TITLED, BIOLOGICAL CONTROL OF SOME GREENHOUSE TOMATO INSECT PESTS. project supported by Ministry of Higher Education and Scientific Research

Table 1.Effect of coriander oil against the different stages of *T. absoluta* under laboratory conditions.

Concentrations	% of larval mortality	% of adult mortality
5	56	54
2.5	43	40
0.5	33	30
0.005	21	18

Table 2.Effect of nano coriander oil against the different stages of *T. absoluta* under laboratory conditions.

Concentrations	% of larval mortality	% of adult mortality
5	81	77
2.5	78	70
0.5	66	62
0.005	59	59

Table 3.Effect of coriander oil against the different stages of *T. absoluta* under semifield conditions.

Concentrations	% of larval mortality	% of adult mortality
5	**56**	**54**
2.5	**43**	**40**
0.5	**33**	**30**
0.005	**21**	**18**

Table (4): Effect of coriander oil against *T. absoluta* under semifield conditions

Treatments	Days after treatment	Means of infestations (Means ± S.E.)
Control	20 50 90 120	32.2±2.7 60±5.5 79±9.9 99±7.6
Coriander	20 50 90 120	2.0±1.1 4.0±3.1 8.2±2.1 10.0±8.1
Nano-**coriander**	20 50 90 120	2.0±1.1 4.0±3.1 8.2±2.1 10.0±8.1
Ftest	12.4	
Lsd5%	12.8	

Table (5): Weight of harvested tomato into two Egyptian regions after coriander and nano-coriander oil treatment against *T. absoluta* during seasons 2015.

Treatments	Aswan Weight tomatoes (Kg/feddan)	Kafer El Shehk Weight tomatoes (Kg/feddan
control	2444± 41.81	2330± 56.60
Coriander	2900± 16.60	3101± 66.40
Nano-**coriander**	3671± 79.49	3850± 36.70
F –test	**33.4**	**30.1**
LSD5%	**17.8**	**16.9**

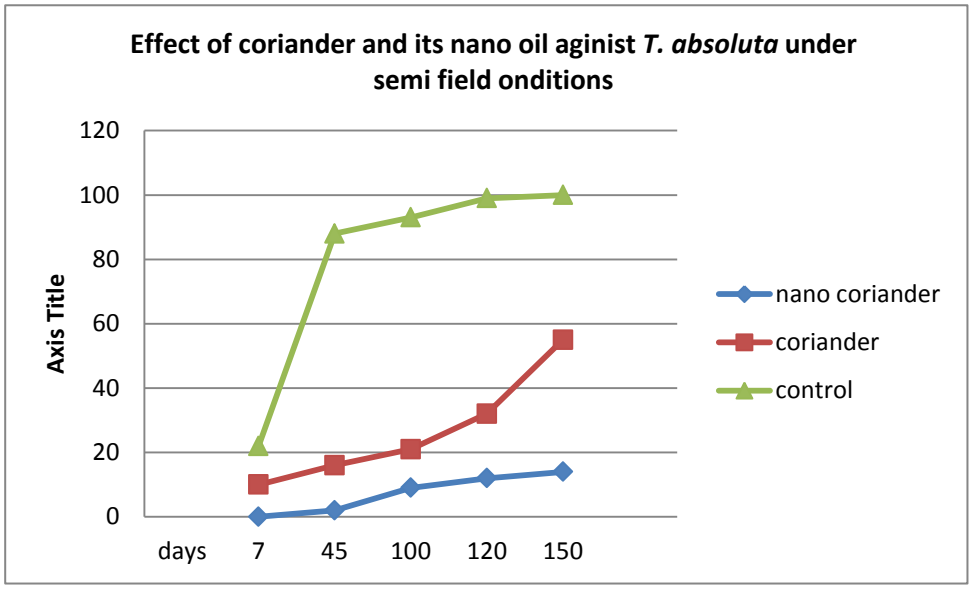

Fig1. infestation percentages of *T. absolua* under semi field conditions

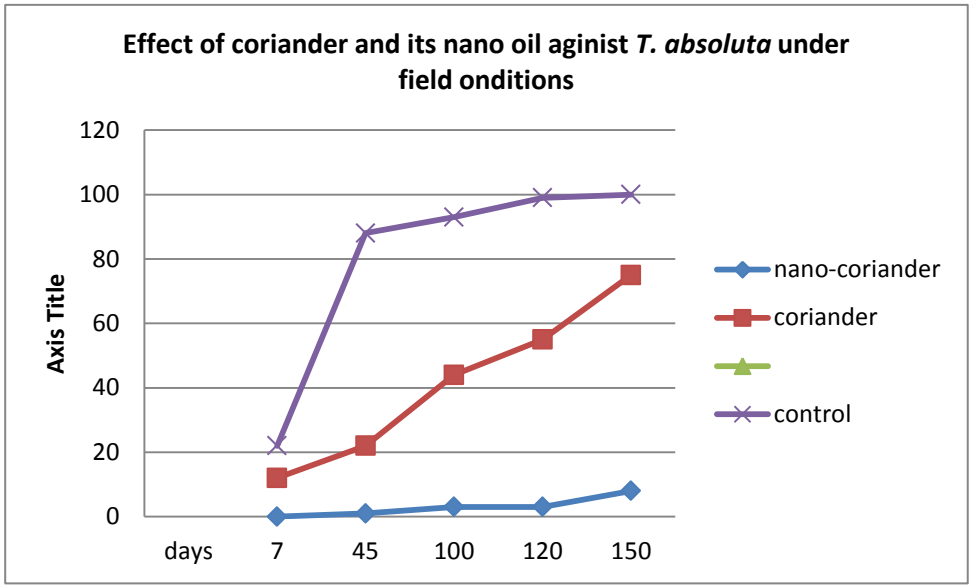

Fig2. Infestation percentages of *T. absolua* under field conditions

References

1. EPPO, 2008.First record of Tuta absoluta in Algeria.EPPO reporting service 2008/135.

2. EPPO, 2008.First record of Tuta absoluta in Morocco.EPPO reporting service 008/174.EPPO.

3. EPPO, 2009a.First report of Tuta absoluta in Tunisia.EPPO reporting service 2009/042.

4. EPPO, 2009b. Tuta absoluta reported for first time from Lazio region Italy. EPPO reporting

service2009/106EPPO.

5. Sabbour M.M.2014. Biocontrol of the Tomato Pinworm *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. Middle East Journal of Agriculture Research, 3(3): 499-503.

6. Sabbour M.M.2014. Biocontrol of the Tomato Pinworm *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. Middle East Journal of Agriculture Research, 3(3): 499-503.

7. Sabbour**, M.M.** 2009. Evaluation of two entomopathogenic fungi against some insect pests infesting tomato crops in Egypt , IOBC/wprs Bulletin, Vol. 49: 273-278

8. Sabbour, M.M and Nayera, Y. Soliman, 2014,. Evaluations of three *Bacillus thuringiensis* against *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. *Volume 3 Issue 8, August 2014*. 2319-7064

9. Sabbour M.M. and Singer, S.M. 2014. Evaluations of Two *Metarhizium* varieties against *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064.

10. Sabbour Magda and Maysa E. Moharam. 2015. Comparing the Effect of Seven Isolated *Bacillus Thuringiensis* against *Tuta absoluta* Infesting in Laboratory and Field Condition. International Journal of Science and Research.458-462.

11. Owolade OF, Ogunleti DO and Adenekan MO. 2008. Titanium dioxide affects disease

development and yield of edible cowpea. Agri. Food. Chem., 7(50):2942-2947

12. Sabbour M.M and S.M. Singer. 2016. Observations of the effect of two isolated *nano Bacillus thuringiensis* on *Tuta absoluta* infestation under laboratory and field condition. In press.

13. Abbott, W.W. (1925). A method of computing the effectiveness of an insecticide. J. Econ. Entomol 18: 265-267.

14. Finney, D.J. (1971). Probit Analysis, Cambridge: Cambridge University Press.

15. Sabbour M.M. 2013. Evaluating toxicity of extracted destruxin from *Metarhizium anisopliae* against the desert locust *Schistocerca gregaria* in Egypt. J.Egypt. Acad. Environ. Develop. 14(1): 35-41.

16. Sabbour M.M. 2013. Evaluating toxicity of extracted destruxin from *Metarhizium anisopliae a*gainst the grasshopper *Hetiracris littoralis* in Egypt. J.Egypt. Acad. Environ. Develop. 14(1): 29-34.

17. Sabbour M.M. and Singer, S.M. 2014. Evaluations of Two *Metarhizium* varieties against *ta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Egypt. International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064.

18. Sabbour, M.M.2014a. Evaluating toxicity of extracted nano -Destruxin against the desert locust *Schistocerca gregaria* in Egypt . J. Egypt. Acad. Environ. Develop. 15(2): 9-17.

19. Sabbour, M.M. 2014b. Evaluating Toxicity of nano-Extracted Destruxin from *Metarhizium anisopliae* Against the grasshopper *Hetiracris littoralis* in Egypt. J.Egypt. Acad. Environ. Develop. 15(2): 1-7.

20. Sabbour M.M. 2013a. Evaluating toxicity of extracted destruxin from *Metarhizium anisopliae* against the desert locust *Schistocerca gregaria* in Egypt. J.Egypt. Acad. Environ. Develop. 14(1): 35-41.

21. Sabbour M.M. 2013b. Evaluating toxicity of extracted destruxin from *Metarhizium anisopliae a*gainst the grasshopper *Hetiracris littoralis* in Egypt. J.Egypt. Acad. Environ. Develop. 14(1): 29-34.

22. Sabbour M.M and S.M. Singer. 2015b. Efficacy of Nano *Isaria fumosorosea* and *Metarhizium flavoviride* against Corn Pests under Laboratory and Field Conditions in Egypt. International Journal of Science and Research (IJSR). ISSN (Online): 2319-7064.

23. **Sahab, A. F.; Waly, A.I., Sabbour**, M. M. and Lubna S. Nawar. 2015. Synthesis, antifungal and insecticidal potential of Chitosan (CS)-g-poly (acrylic acid) (PAA) nanoparticles against some seed borne fungi and insects of soybean. Vol.8, No.2, pp 589-598.

24. Sahab Sabbour, M.M. and Sahab, A.F. (2005). Efficacy of some microbial control agents against cabbage pests in Egypt. Pak. J. Biol. Sci. 8: 1351-1356.

25. Sabbour, M.M. and Sahab, A.F. (2007). Efficacy of some microbial control agents against *Agrotis ipsilon* and *Heliothis armigera* in Egypt. Bull. N.R.C. Egypt. 13.

26. Sabbour, M.M. and Shadia, E. Abd-El-Aziz (2010). Efficacy of some bioinsecticides against *Bruchidius incarnatus* (BOH.) (Coleoptera: Bruchidae) Infestation during storage. J. Plant Prot. Res. 50 (1): 28-34.

27.Sahab, A.F. and Sabbour, M.M. (2011). Virulence of four entomo-pathogenic fungi on some cotton pests with especial reference to impact of some pesticides, nutritional and environmental factors on fungal growth. Egyp. J. Boil. Pest Cont., 21 (1): 61-67.

28. Sabbour M. M. 2015b. The Toxicity Effect of Nano Fungi *Isaria fumosorosea* and *Metarhizium flavoviride* against the Potato Tuber Moth, *Phthorimaea operculella* (Zeller). American Journal of Biology and Life Sciences. 3 (5):155-160.

29. Sabbour, M.M. 2015. Nano-Coriander Against Three Olive Pests Under Laboratory and Field Conditions Open Science Journal of Bioscience and Bioengineering 49-45 :(5)290.

30. Sabbour, M.M. 2015. Efficacy of some nano-Imidacloprid against red flour beetle *Tribolium castaneum* and confused flour beetle, *Tribolium confusum* (Coleoptera: Tenebrionidae) under laboratory and store conditions. Advances in Biochemistry & Biotechnology. 1-13.

31. Sabbour, M.M. and Shadia El-Sayed Abd-El-Aziz. 2015. Efficacy of some nano-diatomaceous earths against red flour beetle *Tribolium castaneum* and confused flour beetle, *Tribolium confusum* (Coleoptera: Tenebrionidae) under laboratory and store conditions. Bull. Env.Pharmacol. Life Sci., Vol 4 [7] June 2015: 54-59.

32 .Sabbour M. M. 2015. Laboratory and Store Efficacy of Nano-Extracted Destruxin from Metarhizium anisopliae Against Indian Meal Moth Plodia interpunctella (Lepidoptera-Pyralidae) . Journal of Nanoscience and Nanoengineering. Vol. 1, No. 3, 2015, pp. 142-147. (http://www.openscienceonline.com/journal/ajbls

33.Sabbour M.M and S.M. Singer. 2015. The entomotoxicity of Destruxin and Nano-Destruxin against three olive pests under laboratory and field conditions International Journal of Scientific & Engineering Research, Volume 6, Issue 8, August-2015.

34. Sabbour, Magda and MA Abdel-Raheem.2015. Toxicity of the fungus *Beauveria bassiana* and three oil extract against *Sitophilus granaries* under laboratory and store conditions . American J. of innovative research and applied sci. 251-256.

35. Sabbour, Magda and MA Abdel-Raheem.2015. Determinations the efficacy of *Beauveria brongniartii* and *Nomuraea rileyi* against the potato tuber moth *Phthorimaea operculella* (Zeller*).* The American Journal of Innovative Research and Applied Sciences **.**

36. Sabbour, M.M. and Shadia E. Abed El-Aziz (2002). Efficacy of some botanical oils formulated with microbial agents against the cotton leafworm and greasy cutworm attaching cotton plants. Bull. Ent. Soc. Egypt. ser. 28, 2001-2002: 135-151.

37. 36.Sabbour, M.M. and Shadia El-Sayed Abd-El-Aziz. 2015. Efficacy of some nano-diatomaceous earths against red flour beetle *Tribolium castaneum* and confused flour beetle, *Tribolium confusum* (Coleoptera: Tenebrionidae) under laboratory and store conditions. Bull. Env.Pharmacol. Life Sci., Vol 4 [7] June 2015: 54-59.

37. Sabbour M.M and S.M. Singer. 2015. Efficacy of Nano *Isaria fumosorosea* and *Metarhizium flavoviride* against Corn Pests under Laboratory and Field Conditions in Egypt. International Journal of Science and Research (IJSR). ISSN (Online): 2319-7064.

38. Sabbour, Magda and MA Abdel-Raheem.2015. Determinations the efficacy of *Beauveria brongniartii* and *Nomuraea rileyi* against the potato tuber moth *Phthorimaea operculella* (Zeller*). **The** American Journal of Innovative Research and Applied Sciences* .197 -1202 .

39.Sabbour, M.M.2014. Evaluating toxicity of extracted nano - Destruxin against the desert locust *Schistocerca gregaria* in Egypt . J. Egypt. Acad. Environ. Develop. 15(2): 9-17.

40 . Sabbour, M.M. 2014. Evaluating Toxicity of nano-Extracted Destruxin from *Metarhizium anisopliae* Against the grasshopper *Hetiracris littoralis* in Egypt. J.Egypt. Acad. Environ. Develop. 15(2): 1-7.

41. Sabbour M.M. 2013. Evaluating toxicity of extracted destruxin from *Metarhizium anisopliae* against the desert locust *Schistocerca gregaria* in Egypt. J.Egypt. Acad. Environ. Develop. 14(1): 35-41.

42. Sabbour M.M. 2013. Evaluating toxicity of extracted destruxin from *Metarhizium anisopliae a*gainst the grasshopper *Hetiracris littoralis* in Egypt. J.Egypt. Acad. Environ. Develop. 14(1): 29-34.

43. Sabbour M.M. Nayera. Y. Solieman. 2016. The efficacy effect of using chitosan and nano-chitosan against *Tuta absoluta* (Lepidoptera: Gelechiidae) Journal of Chemical and Pharmaceutical Research, 2016, 8(3):548-554.

44. Sabbour, Magda and MA Abdel-Raheem.2015. Nano Imidacloprid efficacy against the desert locust, *Schistocerca gregaria* under laboratory and semi field conditions Der Pharma Chemica, 2016, 8(4):133-136.

45. Sabbour Magda and Hussein M. M.2016 . Determinations of the effect of using silica gel and nano-silica gel against Tuta absoluta (Lepidoptera: Gelechiidae) in tomato fields. Journal of Chemical and Pharmaceutical Research, 2016, 8(4):506-512.

46. Sabbour M.M. 2016. Observations of the effect of Chitosan and its nano compositions against the locust *Schistocerca gregaria* (Orthoptera: Acrididae). International Journal of ChemTech Research.Vol.9, No.06 pp 270-276.

47.Sabbour M.M. Nayera. Y. Solieman. 2016.Two Egyptian *Bacillus thuringiensis* isolates from soil and their potentialactivity against *Tuta absoluta* infestation under laboratory and field condition. Der Pharmacia Lettre, 2016, 8 (9):11-17.