

3-Abstracts of

1-

Title: Evaluation of antibacterial properties and Biochemical effects of monoterpenes on plant pathogenic bacteria

Authors: Mona A. Abdel Rasoul, Gehan I. Kh. Marei and Samir A. M.

Abdelgaleil

Journal: African Journal of Microbiology Research Vol. 6(15), pp. 3667-3672, 23 April, 2012

Abstract

The antibacterial activity of twelve monoterpenes, namely camphene, (*R*)-camphor, (*R*)-carvone, 1,8-cineole, cuminaldehyde, (*S*)-fenchone, geraniol, (*S*)-limonene, (*R*)-linalool, (*1R,2S,5R*)-menthol, myrcene and thymol was tested against two plant pathogenic bacteria *Agrobacterium tumefaciens* and *Erwinia carotovora* var. *carotovora* using agar dilution method. For a better understanding of monoterpenes mechanisms of action, the inhibitory effect of three monoterpenes (*R*)-linalool, myrcene and thymol was assessed on dehydrogenases and polyglacturonase activities. Among the tested monoterpenes, thymol, (*S*)-limonene and myrcene were the most potent antibacterial compounds against *A. tumefaciens* with minimum inhibitory concentration (MIC) of 1000 mg/L. Thymol was also the most effective compounds against *E. carotovora* var. *carotovora*, while camphene, cuminaldehyde and 1,8-cineole were the less effective compounds against both bacteria. In biochemical studies, myrcene caused the highest inhibitory effect on dehydrogenases activity of the two tested bacteria, followed by thymol. However, thymol showed the highest inhibitory effect on polygalacturonase activity of both tested bacteria, followed by (*R*)-linalool. In general, there was a positive correlation between the antibacterial activity of monoterpenes and their inhibitory effects on both enzymes. This is the first report for the determination of MIC and enzymes inhibitory effects of tested monoterpenes on plant pathogenic bacteria.

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Title: Comparative antifungal activities and biochemical effects of monoterpenes on plant pathogenic fungi

Authors: Gehan I.Kh. Marei, Mona A. Abdel Rasoul, Samir A.M. Abdelgaleil

Journal: Pesticide Biochemistry and Physiology 103 (2012) 56–61

Abstract

The antifungal activity of twelve monoterpenes, camphene, (*R*)-camphor, (*R*)-carvone, 1,8-cineole, cuminaldehyde, (*S*)-fenchone, geraniol, (*S*)-limonene, (*R*)-linalool, (*1R,2S,5R*)-menthol, myrcene and thymol was evaluated against four plant pathogenic fungi *Rhizoctonia solani*, *Fusarium oxysporum*, *Penicillium digitatum* and *Aspergillus niger* by using mycelial growth inhibitory technique. (*S*)-limonene and thymol were examined for their inhibitory effects on pectin methyl esterase (PME), cellulase and polyphenol oxidase (PPO) of tested fungi. Thymol was the most potent antifungal compound against the

four test fungi with EC50 values of 33.50, 50.35, 20.14 and 23.80 mg/L on *R. solani*, *F. oxysporum*, *P. digitatum* and *A. niger*, respectively. The antifungal activity of thymol was comparable to a reference fungicide, carbendazim.

(S)-limonene and 1,8-cineole exhibited pronounced antifungal activity against the four tested fungi. The most effective antifungal compounds thymol and (S)-limonene showed strong inhibitory effect on the activity of PME and cellulase but revealed no inhibitory effect on PPO. The results showed that PME was more sensitive than cellulase to thymol and (S)-limonene. This is the first report on the inhibitory effects of monoterpenes thymol and (S)-limonene on PME, cellulase and PPO. The results indicated that monoterpenes may cause their antifungal activity by inhibiting PME and cellulase. The strong antifungal activity of thymol, (S)-limonene and 1,8-cineole reported in this study indicated that these compounds have a potential to be used as fungicides.

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Title: THE AMELIORATING EFFECTS OF GREEN TEA EXTRACT AGAINST CYROMAZINE AND CHLORPYRIFOS INDUCED LIVER TOXICITY IN MALE RATS

Authors: TAREK M.HEIKAL; ABDEL- TAWAB H. MOSSA; **MONA A. ABDEL RASOUL**; GEHAN I. KH. MAREI

Journal: Asian J Pharm Clin Res, Vol 6, Issue 1, 2013 48-55,

Abstract

In the present study, the protective effect of an aqueous extract of green tea (GT) against hepatotoxicity and oxidative damage induced by cyromazine (Cyr), chlorpyrifos (CPF) and their combination in male rats was undertaken. Eight groups containing six rats each were selected. Group I served as control. Groups II, III and IV rats were given a single daily oral doses of Cyr (169.35 mg/kg, 1/20 LD50, in corn oil), CPF (6.75mg/kg, 1/20 LD50, in corn oil) and their combination for 28 consecutive days, respectively. Group V permitted free access to solubilised GT (1.5%) as the sole drinking fluid. Groups VI, VII and VIII rats were given the same doses as groups II, III and IV and simultaneously permitted free access to solubilised GT as the sole drinking fluid. Insecticides administration to rats resulted in significant reduction in body weight and elevation in liver weight compared to control. Insecticides administration to rats resulted in significant elevation of serum transaminases (AST & ALT), alkaline phosphatase (ALP), total protein, lipid peroxidation (LPO) expressed as malondialdehyde (MDA), lactate dehydrogenase (LDH) and decrease of serum albumin (Alb). Furthermore, significant elevation of hepatic superoxide dismutase (SOD), catalase (CAT), reduction of hepatic lactate dehydrogenase (LDH), glutathione peroxidase (GPx), depletion of hepatic glutathione reduced (GSH) and elevation of hepatic protein carbonyl (PC) content were noticed in insecticides-treated rats. Histopathological studies of liver revealed that supplementation of GT resulted in mild degeneration and necrosis of the hepatocytes. Furthermore, GT had normalized CAT, SOD, GPx, ALT, AST, ALP, serum LDH, total proteins and PC content, whereas attenuated Alb, hepatic LDH, GSH and LOP. In Conclusion, the use of green tea extract appeared to be beneficial to rats, to a great extent in attenuating and restoring the damage sustained by insecticide exposure.

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Title: Cyromazine and Chlorpyrifos Induced Renal Toxicity in Rats: The Ameliorating Effects of Green Tea Extract

Authors: Tarek M. Heikal, Abdel-Tawab H. Mossa, Gehan I. Kh. Marei, **Mona A. Abdel Rasoul**

Abstract

In the present study, the protective effect of an aqueous extract of green tea (GT) against renal oxidative damage and nephrotoxicity induced by cyromazine (Cyr), chlorpyrifos (CPF) and their combination in male rats was undertaken. Eight groups containing six rats each were selected. Group I served as control. Groups II, III and IV rats were given a single daily oral doses of Cyr (169.35 mg kg⁻¹, 1/20 LD50, in corn oil), CPF (6.75 mg kg⁻¹ kg⁻¹, 1/20 LD50, in corn oil) and their combination for 28 consecutive days, respectively. Group V permitted free access to solubilised GT (1.5% w/v in water) as the sole drinking fluid. Groups VI, VII and VIII rats were given the same doses as groups II, III and IV and simultaneously permitted free access to solubilised GT as the sole drinking fluid. Significant reduction in body weight and elevation in kidney weight were observed in insecticides exposed rats compared to control. Significant perturbations of renal function as evidenced via increase in blood urea nitrogen (BUN) and serum creatinine level were observed in treated rats. Also, renal oxidative damage was observed in insecticide-treated rats as evidenced via augmentation in kidney lipid peroxidation (LPO) as well as depletion in kidney antioxidant enzymes; catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx). Histopathological analysis of the kidney revealed that supplementation with GT resulted in nil to mild in vacuolization, swelling and degeneration in the endothelium of glomerular tuft and the epithelium of lining tubules. In conclusion, the use of green tea extract appeared to be beneficial to rats, to a great extent by attenuating and restoring the damage sustained by insecticide exposure.

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Title: Cytogenetic effects of Malathion insecticide on Japanese quail (*Coturnix japonica*).

Authors: Manal M. Abdel- Rahman¹, Abdel- Hamid E. Abdel- Hamid
and **Mona A. Abdel- Rasoul**

Journal: Minufiya J. Agric. Res. Vol.36 No. 3:565-573, 2011.

Abstract

The Japanese quail (*Coturnix japonica*) belongs to the order Galliformes family Phasianidae and improved for egg and meat production. The cytogenetic effect of Malathion residues in grains stored for different periods were evaluated in quail using three doses low, medium and high. The study included chromosomal aberrations analysis in bone-marrow and spermatocyte cells. The study aimed to evaluate the genotoxic effects of the fungicides (Malathion), which is used to protect crops from fungi. We fed Japanese quail on seeds treated with Malathion to show the effect on Mitotic and Meiotic aberrations. For these reasons, bone marrow, spermatocytes and chromosome aberration tests were carried out in quail. Chromosomal aberrations may due to lesions in DNA which lead to discontinuities of the double helix. The results demonstrated that the cytogenetic effect induced in different quail tissues by Malathion residues were dose-dependent.

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Title: Acute Toxicity of Some Biopesticides and Their Effects on Acetylcholinesterase (AChE) to Honey Bee (*Apis mellifera*) Workers

Authors: Khalid. S. A. EID, Gehan. I.Kh. Marei, **Mona. A. Abdel-Rasoul**

Journal: J. Plant Prot and Path., Mansoura Univ., Vol.2 (10):805-827, 2011.

Abstract

Biopesticides are increasingly applied throughout Egypt. However, negative effects of these compounds on the honey bee (*Apis mellifera* L.), the most important pollinator for cultivated ecosystem, remained poorly investigated. The objective of our study was to evaluate the potential side effects of five biopesticides; bioarch (*Bacillus megaterium*), biofly (*Beauveria bassiana*), biozed (*Trichoderma album*), protikto BTK (*Bacillus thuringiensis kurstaki*), and spintor (spinosad) on mortality and acetylcholinesterase activity of honey bee (*Apis mellifera* L.) workers. Caged groups of worker bees were left for 24 h without feeding, and then fed on sugar syrup 1:1 (w/v) containing different concentrations of the tested biopesticides. The mortality of treated workers was determined after 24 h of application, and the lethal concentrations that caused 50% mortality (LC₅₀) were estimated. The impacts on acetylcholinesterase (AChE) activity were determined in vivo after 24 and 48 h in head, thorax, and abdomen of surviving bees. Our results indicated that spinosad showed the most toxic action to adult honey bee workers with LC₅₀ of 11.60 mg L⁻¹ followed by biozed with LC₅₀ of 114.12 mg L⁻¹. However, lower degrees of toxicity were obtained with protikto (LC₅₀ = 87,412 mg L⁻¹), biofly (LC₅₀ = 49,766 mg L⁻¹) and bioarch (LC₅₀ = 15,785 mg L⁻¹). In addition, all tested biopesticides caused various degrees of inhibition in AChE activity of adult honey bee workers (after 24 h of application) differed with body region and with concentration. On the contrary, there were different degrees of activation in AChE activity of head, thorax and abdomen obtained after 48 h of application with tested biopesticides, except in the cases of bioarch, biofly and protikto where inhibition in AChE activities of abdomen were obtained.

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Title: IMPACTS OF MULTIPLE APPLICATIONS WITH BIOFLY (*Beauveria bassiana*) AND SPINTOR® (SPINOSAD) ON HONEY BEE (*Apis mellifera*) LARVAE

Authors: Mona A. Abdel Rasoul, Khalid S. A. Eid and Gehan I. Kh. Marei

Journal: J. Plant Prot and Path., Mansoura Univ., 2013.

Abstract

Biofly (*Beauveria bassiana*) and SpinTor® (Spinosad) are increasingly applied as biopesticides throughout Egypt to control various agricultural pests. We investigated, in a previous study, the acute toxicities of the two biopesticides among others and their effect on acetylcholinesterase (AChE) activity of honey bee (*Apis mellifera* L.) workers. In this study, we are focusing on the acute toxicities and the potential side effects of multiple applications with biofly (*Beauveria bassiana*) and SpinTor® (Spinosad) biopesticides on AChE activity of larvae of honey bee workers. Chosen groups of young worker larvae, in a

brood comb of honey bee colony, were fed once, twice or three times at 1-day intervals on sugar syrup 1:1 (w/v) containing different concentrations of the two biopesticides. The mortality percentages of treated worker larvae were determined after 24 h of one application, or two or three daily applications, and the lethal concentrations that caused 50% mortality (LC₅₀) were estimated to determine the acute toxicity of Biofly and Spinosad to worker larvae. Also, the impacts on AChE activity of larvae were determined *in vivo* after 24 and 96 h of single application or two daily applications. According to the LC₅₀ values, Spinosad showed higher toxic actions to worker larvae comparable to Biofly. Also, the acute toxicity (after 24 h) of three daily applications of Biofly (1905 mg L⁻¹) or Spinosad (12.04 mg L⁻¹) was higher than the corresponding value of two daily applications (3847 and 21.45 mg L⁻¹, respectively). The same trend, the acute toxicity of two daily applications was higher than that of single application (5113 and 51.29 mg L⁻¹, respectively). Therefore, there were lethal cumulative effects of Biofly and Spinosad on worker larvae. Furthermore, our findings indicated that the average of AChE activities in larvae fed twice on sugar syrup with Biofly or Spinosad was significantly ($p > 0.05$) higher than that in larvae fed once after 24 and 96 h. Also, Biofly when found in sugar syrup at tested concentrations has activator effects after 24 h of application, and inhibitory effects after 96 h of application on AChE activity in worker larvae fed once or twice. In addition, Spinosad showed activator effect only after 24 h of single application, and inhibitory effects after 24 h of two daily applications and after 96 h of one or two daily applications on AChE activity in worker larvae.

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Title: Potential of essential oils to control *Sitophilus oryzae* (L.) and *Tribolium castaneum* (Herbst) on stored wheat

Authors: Mohamed, M. I.; Abdelgaleil, S. M.; **Mona A. Abdel Rasoul**

Journal: Alexandria Science Exchange Journal 30, 419-429, 2009..

Abstract:

The uses of some essential oils isolated from Egyptian plants viz, *Mentha microphylla* C. Koch., of *Artemisia judaica* L., *Eucalyptus camaldulensis* Dehnh. and *Majorana hortensis* Moench, were evaluated against the rice weevil, *Sitophilus oryzae* (L.) and the rust red flour beetle, *Tribolium castaneum* (Herbst) in stored wheat grain under laboratory conditions. The essential oils were applied on the wheat seeds at application rates of 0.5, 1 and 5 mg/g except for *M. microphylla* oil which was applied at lower application rates of 0.01, 0.05 and 0.1 mg/g, due to a high toxicity of this oil, for controlling the two insect species. All the essential oils tested had a significant toxic effect on the two insects in sorted wheat. At all of the application rates, the treatments showed significantly higher mortality of adults of both insects after one and two weeks compared with untreated wheat grains except for the treatments of the oil of *E. camaldulensis* at 0.5 mg/g and the oil *M. hortensis* at 0.5 and 1 mg/g with *S. oryzae*. The oil of *M. microphylla* was the most toxic one among the tested oils against both insects. The oil treatments also significantly reduced progeny production of *S. oryzae* compared with the untreated control. No progeny emerged after 6 and 12 weeks on treated wheat with *M. microphylla* oil at 0.5 mg/g and with *A. judaica* and *E. camaldulensis* oils at 5 mg/g. The treatments with tested essential oils significantly reduced grain weight loss, particularly at the higher application rates and all treatments with *M. microphylla* oil. These promising oils, *M. microphylla* and *A. judaica*, could be recommended for use as part of integrated pest management program of *S. oryzae* and *T. castaneum* in stored wheat.