INSECTICIDES (incl. Fungicides, Herbicides, Nematicides, Larvicides, etc.)

NPARR 4(4), 2013-0376 Use of Chaetomium globosum for biocontrol of potato late blight disease

The efficacy of Chaetomium globosum as a biocontrol agent against the late blight pathogen Phytophthora infestans was evaluated in potato plants. Among eight Chaetomium isolates evaluated C. globosum isolate Cg-6 showed greater inhibition to mycelial growth of P. infestans in vitro. TLC studies showed that isolate Cg-6 produced an antibiotic called ‘Chaetomin’. Isolate Cg-6 showed greater exo- and endo-glucanase enzyme activity when compared to other isolates. PCR amplification of the ITS region and sequencing of the PCR product confirmed that isolate Cg-6 belongs to the C. globosum group. C. globosum Cg-6 was formulated as a liquid and applied as a tuber, soil and foliar treatment either individually or in combination against Phytophthora infection in potato plants. Among different treatments, combined application of C. globosum as a tuber treatment @ 1 ml/kg of tubers, as a soil application @ 1 ml/kg of Farm Yard Manure (FYM) and foliar spray @ 0.7% resulted in significantly less late blight infection (72%) compared to untreated control (100%) under field conditions. The application of C. globosum resulted in greater tuber yield by reducing late blight infection in two field trials when compared to untreated controls. The study clearly demonstrated the potential use of C. globosum as a biocontrol agent in the management of late blight disease in potato plants [V. Shanthiyaa*, D. Saravanakumar, L. Rajendran, G. Karthikeyan, K. Prabakar and T. Raguchander (Department of Plant Pathology, Centre for Plant Protection Studies, Tamil Nadu Agricultural University, Coimbatore 641 003, India), Crop Protection, 2013, 52, 33-38].

NPARR 4(4), 2013-0377 Saffron corm as a natural source of fungicides: The role of saponins in the underground

Fungi cause important deteriorations of corms from Crocus sativus L. In order to screen the antifungal properties of this organ to fight such infections, two independent experiments based on the lyophilized and sterilized external (peel) and internal parts of the corm were conducted against five fungi isolated from infected corms during August. The minimum inhibitory concentrations (MIC) after 30 days of the peel treatments were 5.4% against Aspergillus niger, 3.9% against Bipolaris spicifera, Fusarium oxysporum, Penicillium raistrickii and 2.3% against Rhizopus nigricans while the MIC of the internal part were not detected for A. niger and B. spicifera, 7.0% against F. oxysporum and P. raistrickii and 3.9% against R. nigricans. The higher toxicity of the peel against fungi led us to investigate the influence of the saponins exclusively detected on the external part of the corm, as partially responsible for the extra observed effect. The main influence of these compounds on the toxicity was against F. oxysporum, the most devastating pathogen in saffron corms, followed by B. spicifera and A. niger. The growth inhibition of P. raistrickii and R. nigricans was almost negligible. However, other compounds such as phenolics compounds could also be responsible for the fungicidal activity detected. These results illustrate that saffron corms could be further exploited in order to discover new phytochemical products with antifungal properties [Ángela Rubio-Moraga*, Lourdes Gómez-Gómez, Almudena Trapero, Natali Castro-Díaz and Oussama Ahrazem (Instituto Botánico, Departamento de Ciencia y Tecnología Agroforestal y Genética, Facultad de Farmacia, Universidad de Castilla-La Mancha, Campus Universitario s/n, 02071 Albacete, Spain.), Industrial Crops and Products, 2013, 49, 915-921].
Evaluation of mosquito larvicidal activities of seed coat extract of *Cassia sophera* L.

In the present study an attempt was made to analyze the larvicidal activity of crude and ethyl acetate extracts of matured seed coat of *Cassia sophera* against *Culex quinquefaciatus*. Crude and ethyl acetate extracts of matured seed coat of *Cassia sophera* was tested against *Culex quinquefaciatus*. The lethal concentration was determined and the appropriate lethal concentrations at 24 h for ethyl acetate extract was also studied on non target organisms such as *Daphnia* sp., *Diplonychus annulatum* (predatory water-bug) and *Chironomus circumdatus* larvae (insect). Phytochemical analysis of the crude extract of matured seed coat of *Cassia sophera* was also done. All the graded concentration (0.6%, 0.7%, 0.8%, 0.9%, 1%) showed significant (p<0.05) larval mortality and result of regression equation revealed that mortality rates were positively correlated with concentrations of extracts. LC$_{50}$ and LC$_{90}$ values were calculated at different time intervals, and the lowest values were obtained at 72 h for first instar larvae. In ethyl acetate solvent extract the mortality rate was higher at 520 ppm against *Culex quinquefaciatus* than the other doses. There was no mortality of non-target organism within 72 h of post exposure to LC$_{50}$ concentration at 24 h of both crude and solvent extracts under the laboratory condition. The result of preliminary qualitative phytochemical analysis of the seed coat revealed the presence of some secondary metabolite such as saponin, alkaloid and cardiac glycosides. The results support that the tested plant extract can be used for control of larval form of *Culex quinquefaciatus*.

Isolation and characterization of biofumigant from leaves of *Lantana camara* for control of stored grain insect pests

Due to environmental concerns, health hazards to man and the evolution of resistance in insect pests, there have been constant efforts to discover newer insecticides both from natural sources and by chemical synthesis. Natural sources for novel molecules hold promise in view of their eco-friendly nature, selectivity and mammalian safety. We have isolated one natural bioactive molecule from the leaves of *Lantana camara* named Coumaran, based on various physical–chemical and spectroscopic techniques (IR, $^1$H NMR, $^{13}$C NMR and MS). Coumaran is highly toxic and very low concentration is needed for control of stored product insects. This molecule has potent grain protectant potential and caused significant reduction in F1 progeny of all the three species in the treated grain and the progeny was completely suppressed at 30 $\mu$g/l. The differences in germination between the control and treated grains were not significant. The lack of any adverse effect of Coumaran on the seed germination is highly desirable for a grain protectant, becoming a potential source of biofumigant for economical and environmentally friendly pest control strategies against stored grain pests during storage of grains or pulses (Yallappa Rajashekar*, Honnaiah Vijay Kumar, Kothapalli V. Ravindra and Nandagopal Bakthavatsalam (Animal Bioresources Programme, Institute of Bioresources and Sustainable Development, Department of Biotechnology, Govt. of India, Takyelpat, Imphal 795001, Manipur, India), *Industrial Crops and Products*, 2013, 51, 224-228).