Natural insecticides to control maize weevil in storage

In indigenous practice farmer use ***Lantana camara* Linn.** and ***Tephrosia vogelii* Hook. f.** as grain protectants. Scientists at Kenya and UK evaluated the effect of these insecticidal plant materials on the quality parameters of stored maize grains for five months to generate natural product treatments suitable for post-harvest grain protection and as sustainable alternatives to synthetic insecticides in the control of the maize weevil, *Sitophilus zeamais* Motsch.

During experiment three rates (1.0, 2.5 and 5.0% w/w) of each plant powder, a synthetic insecticide, Actellic Super 2% dust at 0.05% w/w and an untreated control were used as treatments. Results revealed that the plant powders significantly minimised the magnitude of depression in per cent grain moisture content albeit at a lesser rate with high concentration and had no effect on the per cent germination of maize grains when compared to the controls. The botanical treatments and synthetic insecticide were equally effective in reducing insect damage by 25%, but the level of damage was independent of the concentration applied. Grain colour and odour were unaffected by the botanicals. Results are discussed with regard to the use of botanicals by small-scale farmers as cost-effective and sustainable alternatives to synthetic insecticides in maize grain storage [Ogendo *et al*, *J Food Technol Africa*, 2004, **9**(1), 29-36].

Mosquitocidal effect of Bitter Gourd leaf extracts

The vector-borne diseases (VBDs), malaria, filariasis, Japanese encephalitis, dengue, etc., are increasing and have been spreading to newer areas recently due to the increased risk of transmission fuelled by developmental activities, demographic changes and introduction of new products. All over the world, more than 50% of persons with filariasis receive their infections from the bites of mosquitoes, particularly *Culex quinquefasciatus* (Say). This species of mosquito and the incidence of filariasis are quite abundant in India, particularly in Chidambaram town of Tamil Nadu. Natural products are generally preferred because of their less harmful nature to non-target organisms and due to their innate biodegradability. Prabakar and Jebanesan of Vector Biology Division, Department of Zoology, Annamalai University, Annamalai Nagar carried over studies to assess the larvicidal properties of leaf extracts of five Cucurbitacious plants against *C. quinquefasciatus*.

Larvicidal efficacies of extracts of five species, viz. ***Momordica charantia* Linn.** (Bitter Gourd, Hindi — *Karela*), ***Trichosanthes anguina* Linn.** (Snakegourd, Hindi — *Chachinda*), ***Luffa acutangula* (Linn.) Roxb.** (Ridged or Ribbed Gourd, Hindi — *Kali tori*), ***Benincasa hispida* (Thunb.) Cogn.** syn. *B.cerifera* Savi (Ash Gourd, Hindi — *Petha*) and ***Citrullus lanatus* (Thunb.) Matsumura & Nakai** syn. *C.vulgaris* Schrad. (Watermelon, Hindi — *Tarbuz*) were tested against the late third larval age group of *C. quinquefasciatus*. The plants of ***M. charantia, T. anguina, L. acutangula, B. hispida*** and ***C. lanatus*** were collected from in and around Annamalai University campus, Annamalai Nagar, Tamil Nadu. The leaves were washed with tap water, shade-dried, and powdered. One gram of the plant residue was dissolved in 100 ml of methanol (stock solution). The solution was used for assaying mosquito larvicidal activity. The larval mortality was observed after 24 hr exposure. The LC_{50} values of ***M. charantia***, ***T. anguina***, ***L. acutangula***, ***B. hispida*** and ***C. lanatus*** were 465.85, 567.81, 839.81, 1189.30 and 1636.04 ppm, respectively. The present study reveals that there is a scope to use ***M. charantia*** to control the mosquito larvae of *C. quinquefasciatus* and the extract in mosquito coil formulation and isolation of the insecticide component is underway in the laboratory [Prabakar & Jebanesan, *Bioresour Technol*, 2004, **95** (1), 113-114].

Insecticide/Fungicide

Antifungal effect of *Adiantum* sp.

Scientists at Microbiology Laboratory, Botany Department, Jawahar Lal University, Jodhpur studied the effect of aqueous and alcoholic extracts of all parts of the fern, ***Adiantum*** sp. against toxigenic fungus, *Aspergillus flavus*, which produces aflatoxins. Higher degrees of inhibitions were recorded in aqueous extract of stem of ***Adiantum capillus-veneris*** **Linn.** and ***A. lunulatum*** **Burm.** (10 ml/plate dilution) and in aqueous extract of leaves of ***A. incisum*** **Forsk.** (10 ml/plate dilutions) [Parihar & Bohra, *Curr Agric*, 2002, **26** (1-2), 77-79].

Oil/Fats

Sesame cake extract for vegetable oil protection

Sesame, ***Sesamum indicum*** **Linn.** (Hindi — *Til*) is an important source of edible oil. The oil shows remarkable stability despite being highly unsaturated. Even though the antioxidant properties of sesame seed and oil have been studied, the antioxidant potential of sesame cake extracts has not been explored. Preliminary studies showed that an appreciable amount of antioxidants was still present in sesame cake, which is used as a cattle feed.

The scientists at Agro Processing Division, Regional Research Laboratory, CSIR, Thiruvananthapuram, Kerala, evaluated the antioxidant efficacy of extracts from sesame cake for protecting vegetable oils from oxidation, thus resulting in better byproduct utilization. During experiment commercial sample of sesame cake was dried and well powdered; 100 g of sample were initially defatted with hexane (500 ml×3 times), at room temperature. The defatted residue was water-washed using distilled water (500 ml×3 times) and dried below 70°C; 10 g of the above residue were extracted with 150 ml methanol for 16 hr in a Soxhlet extractor. Extract was filtered, solvent removed under vacuum/N_2 flow to dryness, weighed and the residue (0.5 g) redissolved in 100 ml of methanol to give an antioxidant solution of known concentration and stored in refrigerator until further experiments.

Antioxidant activity of methanolic extract of sesame cake was evaluated in soybean, sunflower, and safflower oils, using the Schaal oven method and differential scanning calorimetry (DSC) analysis. Results showed that sesame cake extract (SCE), at concentrations of 5, 10, 50 and 100 ppm in vegetable oils, could significantly ($P<0.05$) lower the peroxide value, diene value and *p*-anisidine value of oils during storage at 60°C. The study also indicated a better antioxidant effect for sesame cake extract than butylated hydroxy toluene (BHT) at 200 ppm. The DSC analysis produced results comparable to the Schaal oven method. Lower concentrations of sesame cake extract were effective in protecting vegetable oils, irrespective of their unsaturation and vitamin E content [Suja *et al*, *Food Chem*, 2004, **84**(3), 393-400].