The oil obtained from leaves of the lemon grass, *Cymbopogon flexuosus* (Steud.) Wats. has been found to be biologically active against a range of fungi related to rotting of fruits. The experiments conducted to control post harvest rotting in apples revealed that rotting could completely be prevented by spraying the oil (at a conc. of 20-30 µl per ml) on fruit before or after exposure to the fungus. The biological activity of the oil was stable up to a temperature of 100°C and lasted up to 48 months (*NewsIndia*, September 2003,11).

Akee, *Blighia sapida* Koenig. is a medium-sized tree occasionally cultivated in some parts of Maharashtra, West Bengal and Tamil Nadu. Fruits greenish white, sweet fragrant; seeds are enclosed by white to cream-coloured fleshy aril. The fruits are edible but without proper preparation consumption should be avoided as they are poisonous and cause vomiting. Experiments were conducted at the University of the West Indies, Trinidad to investigate the bioactivity of the dried seed powder and aril extract on three stored-product insect pests, viz. *Tribolium castaneum* (Herbst.), *Callosobruchus maculatus* (Fabr.) and *Sitophilus zeamais* Motsch. The seeds were collected from freshly fallen fruits, air-dried for 14 days and ground to a fine powder. The powder was passed through a 0.5 mm sieve, and then mixed with dried pigeon pea [*Cajanus cajan* (Linn.) Millsp.] and maize (*Zea mays* Linn.) in the concentration of 0.01, 0.05 and 0.1g/g dry weight for 24 hours and the number of insects on the treated seeds were counted. In another experiment extracts of the aril were prepared using ethanol, acetone, hexane, methanol, chloroform and water.

The results showed that powder-treated seeds affected the three insect pest species, but at varying repellency. There was at least a 50% reduction in the number of eggs oviposited for all three insects pests. The aril-water extracts induced significant (P< 0.05) mortality and antifeedant effects in all three insects pests, but affected the fecundity of only *C. maculatus*. The LC$_{50}$ indicated that water extract could be safely used by farmers for storing food grains [*Khan et al, Trop Agric* (Trinidad), 2002, 79(4), 217-223].

**Lemon grass oil to control rotting in apples**

**Darmar seed extract against hen louse**

**Zanthoxylum armatum** DC. syn *Z. alatum* Roxb. (Hindi — *Darmar, tumru*) is a prickly shrub found in Himalayan region. Locally it is used for mouthwash and tooth-care. The bark and leaves are rub on the body of cattle to control the infestation of ectoparasites. Keeping this traditional practice in view scientists at Department of Zoology, Government Raza P.G. College, Rampur evaluated the lousicidal potential (lice control) of its seed extract on a tropical hen louse, *Lipeurus lawrensii tropicalis*. The acetone extract of the seeds was prepared from dried and powdered seeds. The lousicidal properties varied with respect to dilution and exposure time. The diluted extract and its 1:1 dilution caused 100% mortality within 12 hours. Its further dilution 1:5, 1:10 and 1:100 could cause 93.3%, 83.3% and 56.7% mortality in 48 hours, respectively (*Kumar et al, Indian Vet J*, 2003, 80, 848-850).

**Pesticidal effect of Akee Apple against stored-product insect pests**

Insecticide/Fungicide
Sappan wood extract against fungal pathogen of silk-worm

*Caesalpinia sappan* Linn. (Hindi & Beng. — Bakam, Patang) wood is used in traditional medicine as an antihyper-cholesteremic, anticomplementary, immuno-modulation and anti-inflammatory agent. The crude extract of the plant has a supporting effect on the central nervous system and has antimicrobial activity. Researchers working at the Natural Products Laboratory, Indian Institute of Chemical Technology, Hyderabad isolated four homoisoflavonoids from heartwood of the plant and tested them for inhibitory activity against *Beauveria bassiana* a harmful fungal pathogen, which grows on silkworm, *Bombyx mori* Linn. Homoisoflavonoid, 4-O-methylsappanol showed good antifungal activity against *B. bassiana* at a concentration of 100 mg/ml comparable to that of standard drug Dithane M-45. Homoisoflavonoids, protosappanin A and caesalpin J also showed moderate activity against the fungal pathogen [Reddy et al, *Fitoterapia*, 2003, 74(6), 600-602].

**Antifungal and insecticidal activity of Zedoary volatile oil**

*Curcuma zedoaria* Rosc. commonly known as Zedoary is distributed in many parts of India and closely resembles to *Curcuma domestica* Valet. syn. *C. longa* Linn. in appearance. A highly valued commercial product “Shoti Starch” (82.6% starch) is extracted from rhizomes of the plant. The rhizomes are used for jaundice, as blood purifier, for promoting vital energy circulation, removing blood stasis, promoting digestion, in alleviating pain and in preparation of useful products such as ‘Abir’ (a red powder), perfumery and cosmetics. Rhizomes on steam distillation or solvent extraction give light yellow oil of good medicinal value. Researchers at Chemistry Department, DDU Gorakhpur University, Gorakhpur and Government P G College, Rajamundry, Andhra Pradesh carried out chemical, antifungal and insecticidal studies on the rhizome volatile oil obtained after hydrodistillation. The oil was found to be highly insecticidal against *Odontotermes obesus* Rhamb. (white termite) and the minimum dose for 100% mortality was recorded as 2 µL per petriplate for 24 hours exposure duration. It also showed complete mycelial inhibition of *Colletotrichum falcatum* at 4 µL per petriplate of the oil and was also effective in controlling the mycelial growth of *Aspergillus terreus*, *Fusarium graminearum*, *F. solani* and *Curvularia pallescens*. The rhizome volatile oil of Zedoary is rich in 1,8-cineol, p-cymene, α-phellandrene and has a potent antifungal as well as insecticidal activity [Singh et al, *Indian J Chem Technol*, 2003, 10(5), 462-465].

**Insecticidal activity of Phyllanthus amarus against stored food grain insect pests**

The insect pests damage food grains stored for domestic as well as commercial purposes hence protection by natural products has been found essential to avoid chemical preservatives.

*Phyllanthus amarus* Schum. & Th. is a medicinal plant and its leaves are used in jaundice and diabetes. Researchers at Dayalbagh Educational Institute, Agra evaluated insecticidal potential of ethanolic extract of aerial and root parts of this plant against stored grain pest *Tribolium castaneum*. LC*₉₀* values of ethanolic aerial parts were 895.57, 473.91, 279.89 and 260.85 µg/cm², while 512.62, 376.62, 376.96, 248.88 and 209.79 µg/cm² for ethanolic root part at the exposure of 3,5,7,9 and 11 days, respectively. Results revealed that root extract possesses significant insecticidal activity [Khanna et al, *J Environ Biol*, 2003, 24(4), 391-394].