The scientists at Department of Nutrition, Institute of Hygiene and Environmental Medicine, Tianjin, P. R. China studied the antioxidant activities of peel, pulp and seed fractions of 28 commonly consumed fruits in China using the ferric reducing/antioxidant power assay (FRAP assay).

The contribution of vitamin C to the antioxidant activity of fruit pulps was also calculated. The results showed that hawthorn pulp had the highest FRAP value among all fruit pulps and followed by date, guava, kiwifruit, purple mulberry, strawberry, white pomegranate, lukan and honey tangerine pulps etc. Most of fruit peel and seed fractions were stronger than the pulp fractions in antioxidant activity based on their FRAP values. The contribution of vitamin C to the FRAP value of fruit pulps varied greatly from fruit to fruit as calculated. Thus it can be concluded that peel and seed fractions of some fruits, such as pomegranate peel, grape seed, hawthorn peel, longan and lychee seeds possessed relatively high antioxidant activity and might be rich sources of natural antioxidants [Guo et al, Nutr Res, 2003, 23(12), 1719-1726].

The demand for conventional energy supplies such as electricity, coal, gas and petroleum products is increasing with the development of industrial sector and population explosion. To meet the requirement biomass and agricultural waste represent a large potential renewable energy source, which could benefit society with a clean fuel in the form of methane. Materials like potato, with a high content of soluble carbohydrate, are usually regarded as more suitable feedstocks for the production of ethanol rather than conversion to biogas. The yield of ethanol that can be obtained from potato is approximately 0.4 l/kg TS potato and has a methane content of 50%.

The scientists at Center for Chemistry and Chemical Engineering, Lund University, Sweden and Department of Biochemistry, University of Zimbabwe, Harare, Zimbabwe evaluated anaerobic batch biodegradation of potato waste alone and when co-digested with sugar beet leaves. During experiment the potato waste and beet leaves were homogenised using a kitchen blender (Moulinex Masterchef 350, France). Anaerobically digested sewage sludge from a wastewater treatment plant in Eslöv, Sweden was used as inoculum in the batches. Effects of increasing concentration of potato waste expressed as percentage of total solids (TS) and the initial inoculum-to-substrate ratio (ISR) on methane yield and productivity were investigated. The ISRs studied were in the range 9.0-0.25 and increasing proportions of potato waste from 10% to 80% of TS. A maximum methane yield of $0.32 \text{l CH}_4/\text{g VS}_{\text{degraded}}$ was obtained at 40% of TS and an ISR of 1.5. Methane content of up to 84% was obtained at this proportion of potato waste and ISR. Higher ISRs led to faster onset of biogas production and higher methane productivity. Furthermore, co-digestion of potato waste and sugar beet leaves in varying proportions was investigated at constant TS. Co-digestion improved the accumulated methane production and improved the methane yield by 31-62% compared with digestion of potato waste alone. Thus the solid potato waste like peeling wastes and potato chunks culled from food processing lines can be utilized for this purpose and the beet leaves to provide additional nitrogen to the system [Parawira et al, Renewable Energy, 2004, 29(11), 1811-1823].
Biodiesel from *Karanja* Oil

Biodiesel is an alternative diesel fuel made from vegetable oil and animal fats. It is completely biodegradable and non-toxic. It can act both as substitute and an additive to diesel fuel. Importance of biodiesel increases due to: increasing petroleum prices, limited fossil fuel reserves, and environmental friendly fuel.

*Pongamia pinnata* Pierre (*Karanja*) tree is grown in various parts of India and Australia. The kernels contain 27-39% of oil. The potential availability of the oil is estimated to be 55,000 tonnes/yr. The seed oil is extracted and sold for non-edible commercial purposes. Currently it is used in soap making and in leather industry. Researchers at Department of Chemical Engineering, Indian Institute of Technology, New Delhi, carried out studies to investigate the potential of Karanja oil as a source of biodiesel. Main objectives of their study were feasibility of this oil for the production of biodiesel, optimization of different parameters for high yield/conversion of Karanja oil to biodiesel. The study confirms that Karanja oil can be used as a raw material to obtain biodiesel, which can be used as fuel in diesel engine. The engine performance with biodiesel is similar to that of diesel, while emissions are less in the case of biodiesel. Optimum conditions were found to be: Pressure 1 atmos, Temperature 68-70°C, Reactant ratio 8-10 (Moles of MeOH: Moles of oil), Reaction time 30-40 min, Catalyst (KOH) 1.5 per cent w/w. The cost of raw material (vegetable oil) accounts to 60-70 per cent of the cost of biodiesel fuel using non-edible oil like Karanja oil (in place of vegetable oil) will surely improve the production process of biodiesel [Vivek & Gupta, *J Sci Ind Res*, 2004, 63(1), 39-47].

Insecticide/Fungicide

*Ac*orus *gramineus* rhizome against stored-product insects

Repeated use of chemical insecticides has been found to disrupt biological control by natural enemies and led to resurgence of stored-product insect pests, sometimes resulted in the development of resistance and undesirable effects on non-target organisms. During the search of plant extracts and essential oils as an alternative source of stored-product insect-control agents, the rhizome from *Ac*orus *gramineus* Solander was evaluated for its potential to manage stored-product insects against the rice weevil, *Sitophilus oryzae* (Linn.), the adzuki bean weevil, *Callosobruchus chinensis* (Linn.) and the cigarette beetle, *Lasioderma serricorne* (E) which are the most widespread and destructive primary insect pests of stored cereals, stored legumes and stored tobacco and tobacco products.

During experiment activity was examined using direct contact application and fumigation methods. The biologically active constituents of the *Ac*orus rhizome were characterized as the phenylpropenes *(Z)*- and *(E)*-asarones by spectroscopic analysis.

These results indicate that the toxicity of asarones might be due to the *cis* configuration rather than to the position of the double bond. In a fumigation test, *(Z)*-asarone at 0.577mg/cm² was much more effective against adults of all three insect species in sealed containers than in open ones, indicating that the insecticidal activity of the compound was largely attributable to fumigant action.

However, for practical use of these compounds as novel fumigants, further research on safety issues is essential to protect workers during the application and aeration process of asarones and consumers from residual materials on stored commodities [Chan Park et al, *J Stored Prod Res*, 2003, 39(3), 333-342].