**Beverage**

Storage stability of mango soy fortified yoghurt powder

Yoghurt (fermented milk product) contains more digestible protein, more calcium and certain B group vitamins. Besides nutritional value, it has hypcholesterolaemic and antitumouric effects also. Studies have indicated that consumption of soy protein decreases total serum cholesterol and minimizes risks of several cancers. Mango pulp which contains a high proportion of sugar, mostly monosaccharide, is easily adsorbed by the digestive system. Fortification of yoghurt with soy solids and mango pulp not only increases its nutrient content including minerals and vitamins but also adds to its health promoting value.

Since the shelf-life of yoghurt is very short i.e. 1 day at ambient temperature (25–35°C) and about 4–5 days at 7°C. Yoghurt can be dried by freeze, spray, microwave or convective drying methods which take into consideration the viability and activity of the yoghurt bacteria. The scientists at Post Harvest Technology Centre, Department of Agricultural and Food Engineering, Indian Institute of Technology, Kharagpur, evaluated the stability of mango soy fortified yoghurt (MSFY) powder packaged in two different packaging materials, viz. high density polypropylene (HDPP) and aluminium laminated polyethylene (ALP) pouches and stored under accelerated storage conditions (38 ± 1°C, 90 ± 1% relative humidity).

During experiment mango soy fortified yoghurt (MSFY) powder was obtained after recirculatory convective drying, conditioning and grinding and was packaged in pouches. The shelf-life of MSFY powder was predicted on the basis of free flowness of product under accelerated storage condition and was calculated to be 45 and 54 days in HDPP and ALP, respectively. The storage stability of MSFY powder in terms of quality parameters free fatty acid (FFA), thiobarbituric acid (TBA), hydroxymethyl furfural (HMF), starter counts and colour change was studied in both packaging materials. The magnitude of quality change of MSFY powder measured during storage suggests that ALP was better than HDPP. The kinetics of quality parameter change was of zero order [Pradyumnan Kumar and Mishra HN, Storage stability of mango soy fortified yoghurt powder in two different packaging materials: HDPP and ALP, J Food Eng, 2004, 65(4), 569-576].

Camel milk as an adjunct to insulin therapy

Researchers at Department of Medicine, S.P. Medical College, Bikaner, National Research Center on Camel, Bikaner and Maharana Pratap University of Agriculture and Technology, Udaipur, India observed that camel milk supplementation reduces the insulin requirement in Type 1 diabetic patients. It is found that one of the camel milk protein has many characteristics similar to insulin and it does not form coagulum in acidic environment. This lack of coagulum formation allows the camel milk to pass rapidly through the stomach together with the specific insulin like protein/insulin and remains available for absorption in intestine.

Scientists determined the long-term efficacy and safety of camel milk as an adjunct to insulin therapy in patients with Type 1 diabetes. The important observation of this study was the significant reduction in insulin doses to obtain glycemic control at the end of 1 year in patients taking camel milk. It is suggested that camel milk is having antidiabetic activity possibly because of: Insulin like activity, regulatory and immunomodulatory functions on β-cells; there is a good amount of lysozyme, lactoferrin, lactoperoxidase, immunoglobulin G and secretory immunoglobulin A in camel milk. It is found that amino acid sequence of some of the camel milk proteins is rich in half-cystine, which has superficial similarity with insulin family of peptides.

In conclusion, camel milk as an adjunct to insulin therapy appears to be safe and efficacious in improving long-term glycemic control and helps in reduction in the doses of insulin in patients with Type 1 diabetes [Agrawal RP, Beniwal R, Kochar DK, Tuteja FC, Ghorui SK, Sahani MS and Sharma S, Camel milk as an adjunct to insulin therapy improves long-term glycemic control and reduction in doses of insulin in patients with type 1 diabetes A 1 year randomized controlled trial, Diabetes Res Clin Pract, 2005, 68 (2), 176-177].
Cacao beans, which are the seeds of *Theobroma cacao* Linn., are rich in polyphenols, including catechins and their oligomers. Raw beans are fermented, dried and ground to produce cacao liquor, which is the main ingredient of chocolate and cocoa powder. The antioxidative effect of cacao polyphenols has been reported previously. Additionally, a clinical study in healthy volunteers revealed that a daily intake of cocoa powder decreased the susceptibility of LDL to oxidation. Herbal medicines containing flavonoids, which are natural antioxidative substances, have been reported to show anti-atherosclerotic activity without decreasing the plasma cholesterol concentration in the Kurosawa and Kusanagi hypercholesterolemic (KHC) rabbit. Researchers from Japan evaluated the resistance of crude polyphenols extracted from cacao liquor to LDL oxidation and its anti-atherosclerotic effect during 6 months of administration to KHC rabbits. They investigated the properties of cacao liquor polyphenols (CLP), which have an antioxidative effect on low-density lipoprotein (LDL) and an anti-atherosclerotic effect in the spontaneous familial hypercholesterolemic model, the KHC rabbit. After 6 months of dietary administration of CLP at 1% (w/w) to the KHC rabbits, a higher total cholesterol concentration was observed in the treatment group compared to the control group. However, no other effects were noted in lipid profiles in plasma or lipoproteins. The plasma concentration of thiobarbituric acid reactive substances (TBARS), which is a lipid-peroxidation index, was significantly decreased 1 month after the start of CLP administration compared to that of the control group. The antioxidative effect of CLP on LDL was observed from 2 to 4 months of administration. The area of atherosclerotic lesions in the aorta in the CLP group (32.01±1.58%) was significantly smaller than that in the control group (47.05±3.29%), and the tissue cholesterol and TBARS concentrations were lower in the CLP group than in the control group. The anti-atherosclerotic effect of CLP was confirmed both rheologically and histopathologically. An *in vitro* study using KHC rabbit-derived LDL revealed that CLP significantly prolonged the lag time of LDL oxidation that was induced by a lipophilic azo-radical initiator, 2,2’-azobis(4-methoxy)-2,4-dimethyl-valeronitrile (V-70), or Cu2+ from a low concentration of 0.1µg/mL. The antioxidative effect of CLP was superior to those of the well-known antioxidative substances, vitamin C, vitamin E and probucol. Therefore, CLP suppressed the generation of atherosclerosis, and its antioxidative effect appeared to have an important role in its anti-atherosclerotic activity.

In conclusion, CLP suppressed the development of atherosclerosis in the KHC rabbit, which is an FH model. The consumption of food or drinks produced from polyphenol-rich cacao beans, such as chocolate and cocoa powder, might therefore be beneficial in preventing the onset of atherosclerosis and cardiovascular diseases [Kurosawa Tohru, Itoh Fumi, Nozaki Aiko, Nakano Yoshihisa, Katsuda Shin-ichiro, Osakabe Naomi, Tsubone Hirokazu, Kondo Kazuo and Itakura Hiroshige, Suppressive effects of cacao liquor polyphenols (CLP) on LDL oxidation and the development of atherosclerosis in Kurosawa and Kusanagi-hypercholesterolemic rabbits, *Atherosclerosis*, 2005, 179 (2), 237-246].

### Production of concentrated kiwifruit juice

Studies have demonstrated that Kiwifruit, *Actinidia chinensis* Planch. is rich in nutrients followed by papaya, mango and orange particularly in having highest level of vitamin C (3–5 times more than citrus fruits) and it is a good source of dietary fibre, vitamin E, folic acid and minerals (P, K, Ca, Mg, Mn). Research efforts have been done to develop and optimise an integrated membrane process, on laboratory scale, for the production of concentrated kiwifruit juice as alternative to the traditional vacuum evaporation [Cassano A, Jiao B and Drioli E, Production of concentrated kiwifruit juice by integrated membrane process, *Food Res Int*, 2004, 37(2), 139-148].