Maize is the principal source of food for millions of people, particularly in Latin America and Africa. It is non-allergenic and mild in taste, and is therefore suitable for use as a basis for weaning food. Probiotics are live microbial feed or food supplements, which beneficially affect the host by improving its intestinal microbial balance. The first recorded probiotics were fermented milks produced for human consumption. Since then, probiotics have been increasingly included in both fermented and unfermented products.

A fermented probiotic maize porridge with high energy density and low viscosity was prepared by scientists at Department of Food Science, Agricultural University of Norway, Norway, using maize flour and barley malt. The porridge was fermented with four probiotic strains (grown separately): Lactobacillus reuteri, L. acidophilus (LA5 and 1748) and L. rhamnosus GG. These strains were inoculated at two levels; to obtain approx. 6 or 7 log cfu/g in the porridge at 0 hour. The porridge was fermented for 24 hr at 37°C, and analysed for viable cell count, pH, organic acids, volatile aromatic compounds and sugar content. The inoculated cell concentration was shown to be particularly important during the first hours of the fermentation period, showing a delayed production of most metabolites in porridge inoculated with approx. 6 log cfu/g.

Most strains reached maximum cell count after 12 hr fermentation (7.2–8.2 log cfu/g), with a pH below 4.0. Depending on the strain, lactic acid was produced in amounts ranging from 1360 to 4000 mg/kg. L. reuteri metabolised succinate, while pyruvate and small amounts of diacetyl were detected in porridge inoculated with L. acidophilus LA5 and L. acidophilus 1748. High amounts of diacetyl (6mg/kg) and acetoin (27mg/kg) were detected in porridge inoculated with L. rhamnosus GG. Porridge inoculated with L. acidophilus LA5 and L. acidophilus 1748, contained acetaldehyde, while both L. reuteri and L. rhamnosus GG reduced the acetaldehyde to ethanol. L. reuteri utilised both maltose and glucose as carbohydrate sources, while L. acidophilus LA5, L. acidophilus 1748 and L. rhamnosus GG utilised only glucose.

These results have shown the importance of the inoculation rate. Low inoculation rates could be favourable from an economical point of view, but depending on the strain, it may then be necessary to ferment the samples for a longer time period (at least 12 hours). Inoculation rate will be even more important if the purpose is to compare the metabolites of strains in a certain time-interval, since the detected metabolites followed a defined profile depending on the rate of inoculation [Helland Merete H, Wicklund Trude and Narvhus Judith A, Growth and metabolism of selected strains of probiotic bacteria, in maize porridge with added malted barley, Int J Food Microbiol, 2004, 91 (3), 305-313].

Scientists at Division of Home Science, University of Agricultural Sciences, Bangalore prepared Papad (a wafer like product) by substituting 50 % of mixture of black gram dhal flour and sago flour with finger millet flour and compared with black gram dhal papad for sensory attributes, dough characteristics, rolling properties and nutritional quality. The product had higher sensory score of 4.7 on a five point Hedonic scale [Vidyavati HG, Begum J Mushtari, Vijayakumari J, Gokavi Sumangala S and Begum Shamshad, Utilization of Finger millet in the preparation of Papad, J Food Sci Technol, 2004, 41 (4), 379-382].

Ragi or Finger millet (Eleusine coracana Gaertn.) has recently received food scientists’ attention. It is a rich source of Ca (300-350 mg%), P (283 mg%) and Fe (3.9%). It also contains balanced amount of amino acids and 72% carbohydrates. Many traditional food items are prepared from ragi grains.
Buckwheat sprouts as vegetable

Buckwheat, *Fagopyrum esculentum* Moench. (Hindi — *Kuttu*) is not a cereal but it has been used both as food and a traditional medicine. In Korea, it is milled into flour and is used largely for noodles and curds, in addition its pericarp is used for pillow stuffing materials. Buckwheat is abundant in nutrients, such as protein, amino acids and minerals. Buckwheat is cited as an origin plant of rutin which is a kind of flavonol glycoside compounds used in preventing edema, haemorrhagic diseases and stabilizing high blood pressure due to its effectiveness in controlling blood vessel. Based on high lysine contents present in Buckwheat sprouts they are recommended as new source of vegetable. The sprouts have a soft and slightly crispy texture and an attractive fragrance, but do not have beany flavour as soybean sprouts do. Buckwheat sprouts are abundant in amino acids, minerals and crude fibre. Researchers at Republic of Korea have studied further the changes in free sugars, fatty acids, free amino acids, water-soluble vitamins and flavonoids during cultivation to evaluate the nutritional properties of buckwheat sprouts.

Linoleic acid was found to be the major fatty acid of buckwheat sprouts and increased up to 52.1% at 7 days after seeding (DAS) and total unsaturated fatty acid composition was greater than 83%. Free amino acid contents in buckwheat sprouts were almost four-times higher than those of buckwheat seeds. Based on the results, it is concluded that the abundance of lysine, 3-aminon-butyric acid (GABA) and sulfur containing amino acids in buckwheat sprouts provides a high nutritional value as a new vegetable. Rutin (quercetin-3-O-rutinoside), quericitrin (quercetin-3-O-rhamnoside), chlorogenic acid and two unknown compounds are also presented in both buckwheat seeds and sprouts. Among the water-soluble vitamins, vitamin B1 + B6, vitamin C and two kinds of unidentified compounds are present in the buckwheat sprouts. Vitamin C contents of buckwheat sprouts were increased and its maximum content (171.5 mg/100g) was observed at 7 DAS. On the other hand, vitamin B1 + B6 contents were moderately increased [Kim Sun-Lim, Kim Sung-Kook and Park Cheol-Ho, Introduction and nutritional evaluation of buckwheat sprouts as a new vegetable, *Food Res Int*, 2004, 37(4), 319-327].

Fruit

Value added ripe mango powder

Mango is the most popular tropical fruit and is very much relished for its succulence, exotic flavour and delicious taste throughout the world. Moreover it is a very good source of beta-carotene. Researchers at Department of Food Science and Nutrition, ANGRAU, Hyderabad carried out studies to develop mango powder for incorporation in recipes and to study the acceptability. Mango powder was prepared by using mango pulp, milk concentrate (*Khoa*) and wheat flour in 80:5:15 ratio. The mango pulp was prepared from three varieties of mangoes ‘Baneshan’, ‘Suvarnarekha’, ‘Totapuri’ and their blends in 50:50 ratio. The dried pulp was then scrapped and made into powder and packed in flexible packaging material.

The study revealed that there was good sensory and consumer acceptance of mango powders incorporated recipes like, laddu, payasam, porridge, sandwich, stuffed parantha and vegetable fry at 15%. The powder could be easily incorporated at the end of preparation or just before the final stage. Further as the addition of these powders improve the colour of the recipes this can serve as a colourant in general for many recipes. In addition, these powders can also be incorporated in preparations like ice-cream, custard and infant mixes. These powders can be promoted as health food [Hymavathi TV and Khader Vijaya, Studies on Acceptability of value added ripe Mango (*Mangifera indica* Linn.) powders, *Beverage Food World*, 2005, 32(2), 32-34].