Fibre

Khimp fibre for blending with cotton or polyester fibres

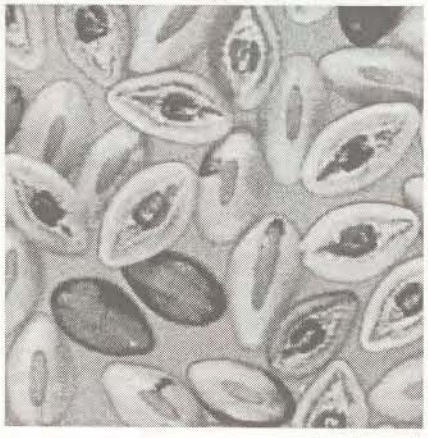
***Leptadenia pyrotechnica* (Forsk.) Decne** is a widely grown fibre crop and is popularly known as *khimp* in Rajasthan, *khip* in Gujarat and *kip* in Punjab. The plant grows abundantly in the Thar Desert of Rajasthan throughout the year. It is used in rope making, as animal fodder and for thatching purposes.

The *khimp* fibre is more or less similar to cotton linters and can be used as a raw material for textile and pulp and paper industries. In order to explore the possibility of putting the fibre to wider use, Mojumder and others from National Institute of Research on Jute & Allied Fibre Technology, Kolkata examined the chemical constituents of *khimp* fibre.

The fibres are quite strong, as indicated by their tenacity values, but the fibre in its original form cannot be spun due to its short filament length. It could be used in combination with cotton and polyester to produce blended yarn for making diversified value added products. The fibre appears to have good potential as raw material in pulp, paper, and other cellulosic industries [Mojumder *et al, J Sci Industr Res*, 2001, **60**(8), 675-677].

Food

Making fibre rich ***chapatti*** *by mixing Isabgol husk in Wheat flour*



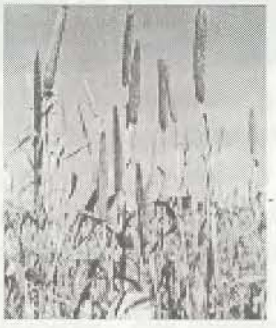
Isabgol (***Plantago ovata* Forsk.**) seed and husk are commonly used as laxative in chronic constipation, dysentery and diarrhoea. It is rich in dietary fibre and is accepted as natural fibre by pharmaceutical and other allied industries. With the aim of increasing fibre content in wheat flour which is most commonly consumed in the form of *chapatti*, a study was conducted to incorporate isabgol husk at the level of 0.5, 1.0, 1.5, 2.0, 2.5 and 3.0 per cent. Farinograph and pasting characteristics of flour improved as the level of fibre was increased. The *chapattis* made with flour containing isabgol were found acceptable at all the levels of supplementation. However, dough became sticky in handling but browning was even (Ahluwalia & Kaur, *J Food Sci Technol*, 2001, **38**, 75).

Rapeseed or Canola protein isolate as human food ingredient

In Canada, Burcon Nutra Science Corporation is going to launch a commercial vegetable protein isolate, derived from canola meal. The company says, if accepted by the consumers it will be the world's first commercial production of protein isolate from canola meal which is a by-product of vegetable oil production. For extracting this isolate, inexpensive canola meal is used as raw material and a high quality, cost-effective plant-based protein is obtained which is equivalent to meat, eggs, and milk protein in nutritional effectiveness and functionality [*Food Ingred Anal Intern*, 2001, **23**(1), 5].

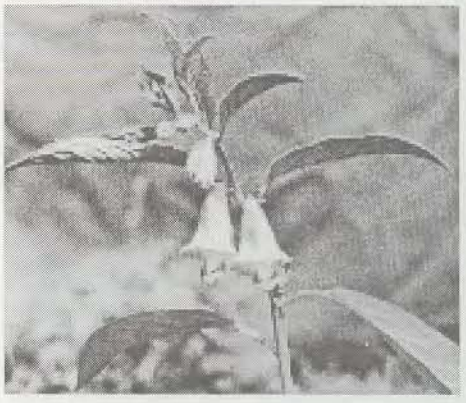
Sesame and millet composite flour biscuits

Throughout the world children like to eat biscuits but most of them are, however, poor source of protein. Therefore, manufacturers are turning towards enrichment of cereal-based foods with other protein sources such as oil seeds and legume for their high lysine content.



In Nigeria, millet, ***Pennisetum typhoides*** **(Burm.f.) Stapf & C.E. Hubbard** is a widely grown crop. It is reported to have a considerably higher protein content than most other millets, but its protein is limiting in lysine. Sesame (***Sesamum indicum*** **Linn.**) is also grown largely as an oilseed crop. Sesame seed protein has a good balance of amino acids with a chemical score of 62% and net protein utilization of 54 per cent. These properties give sesame the potential of being a source of protein supplementation in millet based foods. A research to ascertain the effect of adding sesame seed flour to millet flour based biscuits has been done at Department of Food Science and Technology, Federal Polytechnic, Nigeria.

Blends of millet and sesame flour containing 0, 30, 40 and 50% sesame flour on a replacement basis were prepared. The amounts of sesame flour which replaced millet flour were those needed to increase protein between 10 and 30% in the product. The basic formulation used was: flour, 45.5%, shortening, 20%, sucrose, 20%; baking powder, 0.5%, beaten whole egg, 5% and tap water, 9%. The dry ingredients were weighed and thoroughly mixed. Fat was added and mixed until uniform. The egg and water were added and the dough thoroughly kneaded. The dough was rolled on a pastry board to a uniform thickness of 0.8 cm and cut into 6 cm diameter rounds. Biscuits were baked at 180°C for 10-15 minutes.



Biscuits made from millet flour are heavier and of a larger diameter than those made from the blends as the latter ones have reduced diameter, weight and thickness. Biscuits prepared from the flour blends also have higher scores for flavour, crispiness and overall acceptability than those made from 100% millet flour. The dark colour (brown) is the only disadvantage of this blend which is due to sugar caramelization and Maillard reactions between sugars and amino acids. This can also be reduced by adding sulphur dioxide. Thus sesame and millet composite flours could be used to produce biscuits with improved nutritional quality (Alobo, *Plant Foods Hum Nutr*, 2001, **56**, 195-202).

Modern method of parboiling of rice

Parboiling is one of the premilling treatments given to paddy to improve its quality. In the conventional/traditional methods, the soak water and rice invariably emit a bad smell, which is ascribed to microbial fermentation during soaking. Also prolonged soaking of paddy resulted in loss of nutrients, development of foul odour and decolourisation of rice.

Pressure parboiling is one of the modern methods in which penetration of moisture into the paddy is in the form of water vapour under pressure. Paddy is soaked in cold or warm water for required period and then water is drained out. The air entrapped inside the rice kernel is driven out by the penetration of water vapour; therefore the presence of bellies in the parboiled rice is avoided. The rice obtained by this method has pleasing, slightly yellowish and uniform colour.

Thirupathi and others at Tamil Nadu Agricultural University, Coimbatore designed a pressure-parboiling tank with uniform steam distillation assembly. They used 'CO.45' paddy variety for conducting the experiments. Three levels of soaking time, steaming pressure and steaming time were selected to study their effect on milling and cooking qualities. Maximum head rice yield, breaking hardness value, translucence index and minimum cooking time were achieved, when the paddy was soaked for 30 min and then steamed under 123.6 kPa pressure for 22 minutes [Thirupathi *et al*, *Madras Agric J*, 2000, **87**(7-9), 376-78].

Cassava-soy weaning food

Cassava or Tapioca, ***Manihot esculenta* Crantz** root is one of the most widely grown and utilized crop in the tropics, especially Nigeria. But due to its cyanogenic properties and high viscosity it is not used for weaning foods. However, it is reported that cyanogenic potentials could be eliminated using careful processes such as peeling, grating, dewatering, drying and roasting. The high viscosity could be reduced by addition of malted grains. Hence cassava has great potential for development as weaning food if it is formulated with amylases and fortified with soybeans to meet the energy-protein requirements of babies.

Soybean is already in use to improve the protein contents of weaning foods. A study was done at Department of Food Science and Technology, University of Agriculture, Nigeria for the biological evaluation and effects of Cassava-soy weaning food on rat organs. The results revealed that the weight of organs (small intestine, pancreas, liver and heart) of rats fed Tapioca + sprouted soybeans and Tapioca + sprouted soybeans + malted sorghum flour based diets were not higher than those of organs of rats fed cerelac (maize + sorghum or millets). It is concluded that cassava products could potentially be employed successfully in the preparation of weaning foods of comparable quality to available commercial brands and it would be more affordable to the parents in the areas where cereals are more expensive (Babajide *et al, Plant Foods Hum Nutr*, 2001, **56**, 167-173).

Reduce the antinutrients of Mucuna seeds

The malnourished tribal people and low income group peoples eat the boiled/cooked seeds of the legume ***Mucuna pruriens* (Linn.) DC.** var. ***utilis* (Wall.ex Wight) Burck**. Although it is a rich source of protein its utilization causes vomiting and diarrhoea when large amounts are consumed. The antinutrients present in these beans are: phenolics, tannins, trypsin, chymotrypsin and amylase inhibitors, lectins, phytic acid, alkaloids, hydrogen cyanide, glucosinolates, non-protein amino acids, toxic fatty acids, saponins and oligosaccharides. Flatulence is the most common symptom associated with abdominal pain and diarrhoea especially in children and therefore, to reduce these problems pretreatment is required before consumption. The oligosaccharides raffinose, stachyose and verbascose, commonly found in pulses are reported to be the major cause of flatulence.

These saccharides contain either one, two or three galactose units joined to sucrose by α-1, 6 linkages. Owing to the absence of an α-1, 6-galactosidase enzyme capable of hydrolyzing the α-1, 6-galactosidic linkage, these oligosaccharides accumulate in the lower intestine and undergo anaerobic fermentation by bacteria, which may result in the production of flatus gases (H_2, CO_2 and small amounts of CH_4), abdominal rumbling, diarrhoea and attendant discomfort.

Siddhuraju & Becker investigated effect of various processing methods, particularly those adopted by Indian village people on the loss of α-galactosides and changes in mono- and disaccharides of Mucuna beans. It is found