

FLOURS AND ISOLATED PROTEINS FROM OIL MEALS

India produces about 3 million tons (MMT) of soya cake, 2 MMT ground nut cake, 3 MMT rape seed cake, 3MMT cotton seed cake and 1 MMT sunflower cake.

Apart from the above we produce 6 to 7 MMT rice bran

Most of these products end up as cattle feed or exported.

One area with huge potential and not being exploited by Indian entrepreneurs (except for soya bean) is converting part of these protein sources into products suitable for human consumption.

Vegetable protein in a number of forms can be produced from oil seeds/ defatted oil meals.

- Flour from whole seeds, that can be mixed with wheat flour/corn flour / millet flours
- Flour from defatted oil meals, that can be mixed with wheat flour/corn flour / millet flours
- Protein isolates/ hydrlysates from defatted oil meals / stabilized deoiled rice bran

Among these protein isolates and hydrolysates are value added products

Protein isolate is used in making a variety of foods. It may be found in:

- beverage powders, infant formulas, liquid nutritional meals,
- bottled fruit drinks
- power bars
- soups and sauces
- meat analogs that resemble conventional foods in color, texture and taste
- breads and baked goods
- breakfast cereals
- weight and muscle gain products in the fitness market.

Protein hydrolysates from protein Isolates (protein hydrolysates are less viscous and have better solubility) they are used in

- bottled fruit drinks
- power bars
- soups and sauces
- Food flavoring
- Culture media.

Proposal

Manufacture of Protein isolates from oil cakes and converting them to hydrolysates can be taken up as a profitable industrial project. Exploiting rice bran source could be highly profitable

Since rice bran develops a bad taste soon after the milling process because of the presence of lipase, an enzyme, in the bran layer, it becomes essential to stabilize the bran to avoid it to become rancid. Heat treatment and enzyme treatment methods are available for stabilizing rice bran.. deoiled bran can be effectively used for making protein concentrates and suitably used in various food formulations like weaning foods, dry mixes, baked foods, whipped toppings, salad dressings etc. owing to their high water and oil binding capacities as well as air-water interface stabilizing and emulsifying properties,

The functional properties of protein concentrates from rice bran are better than casein and some soy protein isolates, and could be an inexpensive ingredient for a wide range of food products.

Product mix

Flours from whole seeds/ defatted meals	30000 Tons per year
Protein Isolates	30000 tons per year
Protein hydrolysates	6000 Tons per year

Manufacturing process

Making protein isolates is a 3-step process

In the first stage, the flakes are slurried with water under alkaline conditions so that the protein (which become more soluble under these conditions of pH) as well as the oligosaccharides can go into solution. The polysaccharide containing insoluble residue is then removed by centrifugation.

In the second stage, the supernatant liquid of stage 1 containing the protein and the "sugars" in solution is acidified to the iso electric point of the protein (pH where their solubility is minimal). This results in the precipitation of the protein, which can be separated from the oligosaccharide containing supernatant.

In the third stage, the solubility of the precipitated proteins is reversibly restored and they are resolubilized by neutralising after redilution with fresh water.

Finally, the protein isolate solution is spray dried and packed in multilayer paper bags.

Hydrolysed proteins are made by enzymatic hydrolysis of protein isolates in two stages

Technology

CFTRI can provide the technology

Raw materials: Deoiled cakes, hydrochloric acid, Caustic lye, enzymes

Utilities

Requirement of power, fuel and water are moderate

Plant and Machinery

Flakers, Homogenizers, Mixing vessels, centrifuges and spray dryers, boiler, watertreatment plant etc.

Project cost : Rs. 50 crores

Turnover and profitability

Rs. 250 crores with net profit margin of 6 to 8.5 is possible.

Suggested location

Near solvent extraction plants

Strategy/ options

This project is ideal for solvent extraction units seeking diversification into value added products. Rice bran stabilization and export can be tried in a small way (investment of about 5 crores). A pilot unit with emphasis on market development can also be tried

Consultancy from APITCO : Sourcing technology. Selection of plant and machinery. Market study. Detailed project report preparation.