

SOY PROTEIN HYDROLYSATE

Protein Hydrolysates as Functional Ingredients

Proteins are nutritionally a source of energy and amino acids while functionally they affect the physicochemical and sensory properties of various foods. The role of proteins in the diet as physiologically active components has been increasingly acknowledged. Many dietary proteins possess specific biological properties which make these components potential ingredients of functional or health-promoting foods. Such proteins or their precursors may occur naturally in raw food materials exerting their physiological action direct or upon enzymatic hydrolysis *in vitro* or *in vivo*. Dietary proteins are a source of biologically active peptides. These are inactive within the sequence of parent protein and can be released during gastrointestinal digestion or by enzymatic hydrolysis. Bioactive proteins are found among many biological plant materials such as corn, rice glutelin and prolamin, wheat gluten and soy protein (Korhonen et al., 1998). The biological activity of most of these proteins is attributed to specific peptide sequences, which are freed by enzymatic hydrolysis. Of all oilseeds, soybeans are commercially the most important source of protein. Soybeans have been shown to possess:

- ❖ Anti-carcinogenic properties and both animal and human studies have demonstrated that a soy protein diet reduces high plasma cholesterol levels (Messina and Messina, 1991).
- ❖ Enzymatic digests of soy produce Angiotensin-Converting Enzyme (ACE) – inhibitory peptides thereby exerting an antihypertensive effect.
- ❖ Isoflavones are also present in the hydrolysates and these have been shown to be beneficial to health as they reduce the risk of heart disease, osteoporosis and cancer, when consumed along with soy protein.

Protein hydrolysates from soy flour: CFTRI process

CFTRI has a process for the preparation of protein hydrolysates using single enzyme and double enzyme systems. These are covered by two Indian patents. The product characteristics are as follows:

- Creamish yellow powder with free flowing characteristics
- Concentrated source of protein
- Easily digestible and freely soluble in water
- 2% w/v solution in distilled water is almost neutral
- Can be an ingredient for preparation of high protein and speciality foods like high protein beverages, geriatric foods and athletic foods
- The process results in a 36% yield on flour basis. The degree of hydrolysis is 33%.
- The trypsin inhibitor content is reduced by ~70% and there is no detection of lipoxygenase or urease activities. These are undesirable factors, which are antinutritional factor in soy flour. The presence of lipoxygenase leads to the production
- There were no losses in the amino acid composition due to processing. Thus it was possible to retain the nutritive value of the protein in the hydrolysate.
- The bitterness perception minimum threshold was 0.2 gm/100 ml.

PLANT & MACHINERY

Principal equipments: can seamer machine, dehumidifier, de-mineralizer, boiler, spray drier, drum drier, jacketed kettles, forced circulating, basket centrifuge and weighing machine

Auxiliary equipments: Material handling units, trolleys,

PROJECT COST – FIXED COST – WORKING CAPITAL (in Rs. '000)

a) Land & Building (900sqm)	675.00
b) Building and civil construction	1500.00
c) Plant and machinery	15734.00
Miscellaneous fixed assets	150.00
Pre-operative expenses	150.00
Total fixed capital	18209.00
Working capital margin	2029.00

PRODUCTION CAPACITY

Capacity of the unit: 133Kg product/day/2shift

Working: 300 days per annum

TECHNOLOGY/MANUFACTURING PROCESS – Availability

The technology for the manufacture of soy protein hydrolysate has been developed at CFTRI, Mysore, using appropriate equipment for optimal product recovery of right quality. The CFTRI has the necessary expertise to provide technical assistance and guidance for setting up the project. The CFTRI can offer further technical assistance for project implementation under technical consultancy arrangements.