

Summary

Title – Development of Processing Technology for the Manufacture of Organoleptically acceptable Soybean cheese.

Research Institute - Industrial Technology Institute Successor to Ceylon Institute of Scientific & Industrial Research.

Chief Scientific Investigator – Dr. (Mrs.) N. Ediriweera.

Research Assistant - Mrs. A.M.B.N Wijesooriya.

Period of Contract:

Date of award - 2nd May 1995
Date of completion - 2nd May 1998.

Scientific Background and Scope / Objectives of Project

- ✓ • To develop methodology to process soybean cheese comparable in nutritive value to cheese from cow's milk and acceptable in general with regard to palatability, flavour texture & shelf life.
- To study the beneficial effects of heat and fermentation to remove or minimize the unacceptable flavours and antinutritional factors, control proteolysis to limit the formation of bitter peptides and to develop methods to improve flavour.

Experimental Method –

Locally available soybean variety pb - 1 was used for this study. The selection of suitable variety for this study was done on following basis.

- a. Minimum undesirable flavour development character of soy milk extracted by FDM – Z type edible pulp milling & centrifugal machine.
- b. High quality of protein – moisture, protein, carbohydrates & Fat content of milk was determined by AOAC methods

In soymilk extraction, optimization of the duration of soaking period was done by soaking dehulled soybean in running tap water for 2hr, 4hr & 6hr. Optimization of the soaked soybean to water ratio for soymilk extraction was done by grinding soaked soybean with four different proportions of water - 1:4, 1:5 & 1:10 at 85°C.

The extracted soymilk was checked for pH, Refractometer reading (Brix) and volume of the Extract.

Four chemical coagulants - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (anhydrous)(0.3%-0.6%) & $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ (0.3%- 1.5%) at 65°C – 80°C and Acetic acid (4%) & Citric acid (4%) at 80°C – 90°C were used for the preparation of soy curd.

These optimum conditions were determined by weight of the yielded curd.

Above curds were evaluated for taste & texture by sensory evaluation panel of the CISIR to select the most suitable chemical coagulant.

Microbial cultures were used for the flavour development of soy cheese curd.

Lactobacillus bulgaricus & *Streptococcus thermophilus* cultures were isolated from freeze dried yoghurt culture using Lactobacillus Streptococcus Differential. Medium & MRS Medium.

Experiment was carried out to prepare soy curd using the above isolated lactobacillus pure culture.

Commercially available freeze dried cheese cultures were also used for the preparation of curd from soymilk to get a curd with desired texture. Cow's milk was used as a control.

For shortening the period of maturation & improve the texture of soy cheese, soy curd was blended with three months old natural cheese, containing active cells of selected flavour developing bacteria.

Soy bean curds prepared with 4% citric acid & 4% acetic acid were blended with natural cheese at four different ratios and most organoleptically acceptable blending ratio was selected by sensory evaluation test.

Soy curd blended with natural cheese was allowed to mature. Sensory evaluation tests were carried out in fortnightly to detect the development of flavour & texture of blended the cheese at four stages. Data was analyzed by Randomized Block Design method.

Results Obtained

According to the results of the sensory evaluation test variety Pm – 25 was the best with respect to the development of less undesirable flavour, during the milk extraction procedure. Although variety Pm – 13 contained the highest percentages of protein, fat and carbohydrate, the most popular and commonly available variety cultivated by farmers is Pb – 1. Therefore Pb – 1 variety was used for this study..

Considering the increase of T. S. S value of extracted soy milk, it was decided to soak soy seeds for 4 hours & used 1:4 proportion of seeds: water in the milk extraction procedure.

The optimum Temperatures & concentrations of four chemical coagulants which gave maximum curd yields were; $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ - 0.4% & $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ -1.2% at 65°C and Acetic acid (4%) at 80°C & Citric acid (4%) at 85°C.

According to the results of sensory evaluation test there was no statistically significant difference among the taste of these curds.

Soy curds resulted from isolated lactic acid cultures & commercially available freeze dried cheese cultures were not satisfactory in order to use as a base for the preparation of organoleptically acceptable soy cheese.

Soy curd (prepared, using 4% citric acid) blended at the ratio of 3:2 with the 3 months old natural cheese showed significant improvement in flavour & texture after 8 weeks.

Conclusion

Soy curd (prepared using 4% citric acid) blended with three months old natural cheese at the ratio of 3:2 could be used for the production of organoleptically acceptable processed soy cheese after the maturation period of two months. ✓

× Constraints encountered –

The project has had several set backs. The major problem has been four Research assistants leaving the project for permanent employment. The present Research Assistant was on maternity leave and for a period of six months the project was delayed. Thereafter, when she returned, due to the restructuring and modifications of the microbiological laboratories the work was suspended.