INTRODUCTION

I. INTRODUCTION

Soybean, originated as early as 160 BC in China, has gained worldwide importance at present as a source of protein and edible oils. Soybean has been utilised for centuries in South Asian countries in the form of milk and fermented food product. However, soybean utilization is a relatively new experience in India, when in the late 1960's, yellow variety soybean was introduced as a legume crop. It is now getting established primarily as an oil seed crop.

The technology to use the meal portion of soybean for human consumption has not been developed to render the products as an economical source of protein in our country. Extruded/texturised soy products made from soymeal such as Nutri nuggets, Nutrella, MealMaker, and flavoured soy milk drinks have been in the Indian market as some what low key commercial ventures. However, these efforts by no means indicate any significant in-road made by soy products in the Indian houses. This is in sharp contrast to the soybean utilization pattern in advanced countries, where the soymeal is utilized as a major source of protein in human food.

In India earlier work has been essentially to substitute the pulses with soybean in Indian dishes. A few attempts have been made by Rajalakshmi and Vanaja, (1967); and Vijayalakshmi and Vaidehi,(1982), to utilise soybean in varieties of Indian culinaries like idli, dosa, khaman, dhokla, etc. In most of these cases, heat treatment and fermentation were successfully

combined to counteract the effect of several anti-nutritional components present in soybean, such as trypsin inhibitors, hemagglutinins, saponins and oestrogens, flatulence producing oligosaccharides, phytic acid etc. (Liener, 1981; Ali and Gandhi, 1988).

Considering the universal acceptance of milk and dairy products, it is naturally tempting to develop dairy analogues from soybean, as it has functional properties similar in many ways to those of milk. In fact, in countries like Japan, Indonesia and Thailand, soy milk is routinely used both at household and commercial levels.

In spite of the pioneering work at Pantnagar in the 70s (Mital, et al., 1974. 1975) on soy milk, much commercial success has not yet been achieved. The unique flavour associated with soymilk is perhaps not quite acceptable to the Indian palate due to its typical beany flavour' (Ali, 1992). This may be the reason that soymilk preparations are marketed as flavoured drink.

In this regard, the utilization of soybean in cheese type of products has certain potential advantages over several other dairy analogues. Cured varieties of cheeses are particularly known to undergo extensive changes in flavour, body, and texture. A similar approach towards the development of cheese like products, may make soybean more acceptable.

Several investigators world wide have attempted to use soy protein isolates in cheese type of products. However, the

isolates are not available in India, hence, utilization of whole soybean seems to be a more reasonable approach.

Soybean has often been used as a partial substitute or an extender of milk in the manufacture of cheese by employing conventional techniques. Hang and Jackson (1967) prepared cheese like products from soy bean with the addition of rennet extract and skim milk (85%). Lundstedt and Lo FY-Y (1973) developed a cheese like product from soybean curd by fortifying it with butter fat and milk SNF and by inoculating it with penecillium requeforti and also S.diacetilactis. Hofi et al. (1976) prepared domiati cheese from a mixture of buffalo milk and soybean milk in the ratio of 4:1. Lee and Marshall (1979) coagulated the curd made from mixture of 80% raw milk and 20% soy protein solutions with rennet. A substitute of Ras (a hard cheese) was made by Abou-El-Ella (1980) successfully from soymilk. The product developed a cheesy flavour after three months of ripening. Garikipati et al. (1983) studied the utilization of soy milk in the manufacturing of cheddar cheese. The cheese was highly acceptable when cow's milk was replaced to the extent of 20% by soy milk.

The practicability of mixing a cheese textured tofu curd with an extra sharp cheddar cheese by grinding and emulsification was studied by Rosenan and Herrick (1981). Fuji Oil Ltd (1976) patented a method for making processed cheese like product from soy cheese, which involved mixing the cheese under high shear with a casein-containing product, dairy cheese, dried skim milk,

and emulsifying salts. Kudo et al. (1979) patented a cheese type product based on heat treated soybeans and unheated natural cheese. Singh and Mittal (1984) and , Kumari and Singh (1985) tried out a slurry approach using 36-42% milk solids and 67-58% of soy solids to develop a soy based cheese spreads.

Cheese is a value added product and is socially appreciated in India as a western delicacy. Over past few years, the sale of cheese has been increasing in restaurants and fast food shops. The processed cheese market, which contributes about 2000 tonnes a year, is gaining popularity as a modern and, status food (Katiyar, 1992). The present demand for cheese in India is estimated as 6,500 tonnes annually and confined mostly to urban centres, and the armed forces (Choudhary, 1992). However, the demand is growing apace as the taste for cheese is spreading. Cheese from milk, though nutrient dense, is however, expensive, and is thus affordable to a limited extent by the large population. Hence, cheese analogues made from soy bean have the potential to form a low cost nutritious alternative and may have an important role in the growing potential market.

One of the important cost determining factors for cured varieties of cheeses is the period of curing which may range from a few weeks (eg.high moisture cheeses such as Danbo) to a year or more (eg. hard cheeses such as parmesan). In this regard the work of Kristoffersen et al. (1967) requires a special mention wherein a slurry approach was developed to shorten the ripening period.

Using this slurry approach, it has been possible to develop within 8-10 days, the desired cheddar flavour which normally takes 3-9 months in regular cured cheddar cheese.

A slurry type product is particularly suitable for preparing cheese spreads. Currently cheese spreads are gaining popularity in India, due to their milder cheese flavour complemented by other flavour ingredients added in them. Cheese spreads are being favoured as an attractive alternative to butter for bread slices and sandwiches. Besides the slurry method, cheese spreads can also be prepared by blending natural cheese with fermented soy curd concentrates (eg. **maska'**). In this regard, both slurry and blending approaches deserve further attention.

Studies are required to be undertaken to reduce the milk solids/cheese solids in soy based cheese spreads, and also to investigate the possibilities for the application of several flavour additives in the spread. If soy based cheese type products have to be made acceptable to a wider population in our country, the development of a quick curing, high moisture and mild flavoured spread type of product appears to be the approach in the right direction.

Keeping the above factors in mind, the present study was proposed to utilise soybean in the developement of mild flavoured cheese spreads employing both slurry, and blend approaches.