INTRODUCTION

I. INTRODUCTION

Soybean represents an important economical source of edible oil and proteins. Tremendous popularity of soybased products is due to their functional versatility and excellent nutritional value, making them acceptable in many new food formulations with relative ease (Kinsella, 1979).

Oriental countries have a long history of utilizing soybean products as traditional foods. The representative soybean products of Japan and China are soymilk, tofu, fermented whole soybean, tempeh, shoyu, miso (Fukushima, 1979). In the developed countries technology for manufacturing soybean protein isolates to be used in meat products, dairy analogues, infant formulas and bakery products has improved considerably over the years (Morr, 1979).

In India, the consumption of soybean as a source of edible oil has grown to some significance only recently, in comparison to its direct utilization as a pulse or protein source. The oil milling industry has attached more importance to the oil extraction from soybean, paying very little attention to the quality of the deoiled cake, disposed off mainly as cattle feed. Attempts to introduce soybean in various Indian recipes, have

been sporadic. There has been little effort for continued product quality improvement or sustained marketing promotion.

Two different approaches such as the inclusion of soybean as pulse substitute and soymilk or soy slurry as a dairy substitute are adapted in the incorporation of soybean in various products. In many of these situations , heat treatment or fermentation has been considered as an essential step to eliminate or reduce the antinutritional and off flavour factors of soybean.

Among the traditional Indian products prepared with soybean as a pulse or a blend with wheat include "idli" (Akolkar and Parekh, 1983), and "chapatis" prepared with the addition of soy flour to wheat flour (Rathod and Williams, 1973) and bakery products (Kulkarni, 1991 ; Sinha, 1992). The incorporation of soybean in these products at optimum levels provide nutritional improvement in terms of amino acid balance without altering the acceptability characteristics of the final product.

However, products prepared utilizing soybean as a pulse substitute has a limitation of being effective mainly against heat labile antinutritional factors, such as trypsin inhibitors whereas other antinutritional factors viz., phytic acid and oligosaccharide are not destroyed by the thermal treatment given in the preparation of these products.

Due to the universal acceptability of milk and dairy based products, the utilisation of soybean has often been attempted in the form of a variety of dairy analogues such as flavoured milk, infant formula, coffee whitener, sweet and sour cream, margarine, cheese, frozen dessert and whipped topping, utilising vegetable proteins.

Development of the dairy analogues started from the preparation of acidophillus milk by Kellog (1934), followed by many yogurt and cheese-like products using soymilk alone or in combination with milk and skimmed milk, mostly utilising lactic fermentation (Hang and Jackson, 1967 ; Wang *et al.*, 1974 ; Metwalli *et al.*, 1982 ; Yang and Taranto, 1982 ; Cheng *et al.*, 1990) and cheese spreads (Singh and Mital, 1984). Among the indigenous milk products, paneer, popular in north India is the most exploited product with soybeans (Singh and Roy, 1994). However, among various dairy substitutes reported, only flavoured soymilk was once introduced as a substitute for dairy milk commercially , and gained rather limited popularity due to its residual off flavour. Moreover, the cost was not very attractive compared to dairy milk (Mital and Steinkraus, 1979 ; Barraquio and De voort, 1988).

Using soybean for preparing the above dairy substitute has the advantage of utilizing thermal processing which destroys

trypsin inhibitors. Since soymilk also serve as a medium for the growth of lactic acid bacteria (Angeles and Marth , 1971), effect of the antinutritional factors such as oligosaccharides and phytic acid, which are not eliminated during heat treatment, can be effectively reduced during lactic fermentation. Apart from overcoming the antinutritional factors, lactic fermentation has the further advantage of overcoming off flavour characteristics of soybean. The development of soybased products has to utilise the advantages of these processes in the improvement of overall acceptability characteristics.

In the Indian context the popularity and commercial importance of milk based desserts acquire special significance particularly due to their unique socio - cultural role, where sweets signify the spirit of celebration and joy during different social and festive occasions and also due to their overall image as a wholesome nutritional product.

Among various milk based desserts traditionally prepared in India, shrikhand a popular delicacy of Gujarat and western India, belongs to the group of fermented milk products. The traditional technology of shrikhand making involves, coagulation of milk by lactic fermentation , preparation of "muska" by drainage of whey from the curd and blending of additives like

sugar, colour and flavouring ingredients (Patel and Chakraborty, 1988). The traditional process does not involve any heat treatment, consequently the storage life of shrikhand is rather limited. However, heat treatment in the final stage of shrikhand preparation has also been introduced for prolonging its shelf-life (Chakraborty, 1995). Developement of such acid type product with added sugar requires to be explored for the development of soybased desserts.

Another product similar to shrikhand interms of composite acid and sweet taste is known as cheese cake in the West. The product uses soft cheese or cheese curd as a basic ingredient. Cheese cakes of dairy milk system are prepared from different varieties of uncured cheese blended with the ingredients such as sugar, bread flour, milk powder, egg and flavouring agents. The choice of ingredients i.e., variety of cheese, quantity of egg and the method of baking results in different varieties of cheese cake, namely Heavy type German, French and California cheese cake (Tressler and Sultan, 1975).

The preparation of cheese cake includes baking as a terminal heat processing step. Normally cheese cakes are baked in water bath or if baked in the oven, they are supported with the bottom pan of water or the bottom of the cheese cake is covered with baked cookies, mainly to prevent the excessive

drying or burning of the bottom crust. The baking of the cheese cake is considered to be complete when it feels springy to touch in the center. Cheese cakes are more like a custard than a cake and feels like a baked custard pie (Tressler and Sultan, 1975; Sultan, 1986). Such a type of product, if processed in the package and opened just before consumption, is likely to have the potential advantage of public health safety and longer shelf-life.

Studies evaluating the substitution of dairy milk with soymilk systems in such starch thickened or egg thickened desserts are rather limited (Schaefer and Holdt, 1992). Since the preparation of soft cheese type of product from soybean, i.e., soybean muska involves the conversion of soymilk to soycurd and draining to separate whey from curd, lactic fermentation can be utilized in the preparation of soymuska to improve the organoleptic qualities of the final product. The resultant "muska" thus obtained can be used as a basic ingredient in the preparation of cheese cake. Therefore, considering the increasing demand and importance of dairy milk-based sweet preparations in the Indian diet, the present study was planned to utilize soybean in the development of a cheese cake type product with desirable organoleptic properties, by incorporating lactic fermentation as an essential step in processing combined with the in-container heat treatment of cheese cake.