3.0 Scope

The review of literature on spreadability of butter presented in Chapter 2 indicated that the structure and rheological behaviour and its relation to edible attributes, have been the subject of extensive study in recent years; but very little information is available regarding butter made from buffalo milk. Further, buffalo milk being the major source of milkfat in India, a knowledge of structure and rheological properties of buffalo milkfat besides being of fundamental value, may help in understanding dairy problems arising out of seasonal and regional variations. After studying these variations it may be possible by suitable modifications of manufacturing conditions, to counteract the effect of seasonal and regional variations in butterfat composition and thus to produce a butter of uniform consistency throughout the year.

The review of literature also indicated that no attempts were made for improving the spreadability of buffalo butter and utilization of different fractions of butterfat for different purposes such as the manufacture of butter comparatively rich in oleic and linoleic acids for dietic applications, low melting butter for use in the production of readily wettable dried whole milk as well as in chocolate and ice cream industry.
There is a scope for fractionation of buffalo butterfat to study its utility in the production of some of the products listed above and also to produce low fat butter to compete qualitatively with the cheaper butter substitutes like margarine.

Spray dried butter powder was taken for investigation not only for studying its spreadability but since it also solves the problems of storage and transportation in tropical countries like India. It could be used largely for reconstitution into milk in place of dehydrated butter and for spreading on toast or bread tossing vegetables, frying, preparations of Sauces and making cakes and pastry. The dry butter could also be used for processing into other products i.e. ice cream, concentrated milk, processed cheese and in the baking industry.

3.1 Plan

It is seen from the preceding section that there is scope for studying and improving the spreadability of buffalo butter by modifying different processing conditions. The work, therefore, was planned to study:

3.1.1 effect of regions and seasons of the year on different rheological parameters of table butter from buffalo milk.
3.1.2 use of low melting triglycerides on different rheological parameters of table butter from buffalo milk.
3.1.3 Use of surface active agents on different rheological parameters of table butter from buffalo milk.
3.1.4 different levels of butterfat on different rheological parameters of table butter from buffalo milk.
3.1.5 standardising the method of manufacture of spray dried butter powder from buffalo milk and study of different rheological properties of the recombined butter therefrom.

3.1.1 To study the effect of different regions, seasons and its interaction on properties like spreadability score, penetration value, yield stress, viscosity, melting point, refractive index, oiling off, iodine value, saponification, R.M. value, Polenske value, short chain and long chain triglycerides and fatty acid composition of butterfat, a 4x2 factorial experiment in randomized block design was planned with two trials, taking four regions as one factor and the seasons as another factor. The four different regions of India were: (i) North-western; (ii) South-eastern; (iii) Mid-western and (iv) Western; and seasons were: (i) Winter (September - February) and (ii) Summer (March-August).

3.1.2 To study the effect of addition of low melting triglycerides on different parameters like spreadability score, penetration value, yield-stress, viscosity, melting point, refractive index, oiling off, iodine value, saponification value and R.M. value, a randomized block design with five replicates was planned. A batch of buffalo cream was equally divided into 5 parts. Five treatments of low melting triglycerides at levels of 0.0% (control), 15%, 20%, 25% and 30% of the total butterfat were added randomly into five parts of buffalo cream before churning. After thorough mixing, butter was manufactured by maintaining other conditions same.
3.1.3 A randomised block design with five replicates has also been planned to study the effect of addition of surface active agents on different parameters like spreadability score, penetration value, yield stress, viscosity and oiling off at two levels of Tween and Lecithin. A batch of cream was equally divided into five parts. The five treatments

(i) Control—No addition of surface active agents,
(ii) Addition of Tween-60—at the rate of 0.5% of total fat,
(iii) Addition of Tween-60—at the rate of 1.0% of total fat,
(iv) Addition of Lecithin—at the rate of 0.5% of total fat,
(v) Addition of Lecithin—at the rate of 1.0% of total fat,

were allotted at random to each of the five parts of the batch. These treatments were given before churning of the cream. All other conditions were maintained constant for all the batches.

3.1.4 To study the effect of different levels of butterfat in butter on different parameters like subjective score, penetration value, yield stress and viscosity, a randomized block design with five replicates was planned. Buffalo butter prepared from the same buffalo cream was divided into five parts. These different parts of butter were used as ingredients for preparing low fat butter at different levels of butterfat.

3.1.5 A method was standardized for manufacture of butter powder with the help of spray drier. This butter powder after reconstitution was studied for its properties, like spreadability score, penetration value, yield stress and viscosity.