

1. INTRODUCTION

Traditional foods are based on culture, custom and natural environment of a region of the world, and consumed by the people for a long time (Watanabe 1986). A variety of traditional foods, such as kinema, gundruk, sinki, mesu, churpi, shel-roti and jnards in Darjeeling district of West Bengal and the state of Sikkim (Tamang et al. 1988), chu-ra in Tibet (Batra and Millner 1976) and dokhra or churpi in Nepal (Karki 1986) are prepared and consumed by various ethnic groups. Approximately 70% inhabitants of the Darjeeling district and about 90% in the state of Sikkim (a total of about 1.15 million) consume large quantities of traditional foods and beverages. Some ethnic groups are economically dependent upon these local products (Tamang et al. 1988).

Churpi is a popular traditional milk product of Darjeeling hills, Sikkim (Tamang et al. 1988), Nepal (Karki 1986) and Bhutan. It is prepared by the combined action of acid and heat treatment of milk and curd. Karki (1986) defined churpi as "a hardened cheese in the form of cubes and consumed by biting or chewing as betelnut". The product, sold in the markets of Darjeeling hills, Sikkim and Bhutan as light amber to dark brown coloured cubical or cylindrical blocks and used as masticatory, is faintly sweet and distinctly smoky with very hard and compact body. The interesting characteristic of churpi is its pronounced gumminess and chewability. The origin of churpi making is lost in unrecorded history. Preparation of churpi in Bhutan is controlled by "Dukpa" community. But in Darjeeling and Sikkim, it is prepared by the villagers irrespective of caste and creed.

Texture, which is an important fundamental sensory property of all foods, can be regarded as a manifestation of the rheological

properties of a food. de Man (1980) defined food texture as "the way in which the various constituents and structural elements are arranged and combined into a micro- and macro-structure, and the external manifestation of this structure in terms of flow and deformation". The structural organization of food, thus, is influenced by chemical composition and various physical forces. The external manifestation of food structure is related to the mechanical (rheological) and sensory textural properties of the food. Texture is an important quality attribute as it affects processing and handling (Charm 1962), and influences shelf-life, consumer acceptance and food habits (Matz 1962). It may even be more important than flavour in certain foods (Szczesniak and Kleyn 1963). The knowledge of some of the rheological properties of food may give important clues to its acceptability and may be of utmost importance in determining the nature and design of processing method and equipment (de Man 1980), and for predicting the product quality under certain manufacturing conditions.

Sensory evaluation of texture in foods belongs to the domain of psychology known as psychophysics that directly concerns the correlation of sensory experience with physical measures (Moskowitz et al. 1973). Successfully established psychophysical models could be of considerable significance also to the development of new or imitation products and process modifications for existing products. These necessitate predicting how the food system will react under certain conditions (Patil et al. 1990). This will be particularly relevant to indigenous milk products such as churpi which, hitherto manufactured by traditional processes only on cottage scale, may be scaled up by introducing technological innovations.

The consumers of Indian traditional milk products are subjected to varied tastes and textures. But, little is known about the

desirable sensory and chemical properties of these products. Thus, there is an urgent need for determining the quality parameters for these products.

Realizing the popularity and importance of Indian traditional milk products, a need for suitable technologies for commercial production of products with uniform quality had been emphasized by the National Commission on Agriculture (1976). Actions have also been initiated by the Food and Agricultural Organization of the United Nations for upgrading the traditional technologies for food conservation and processing (Faure 1986).

Keeping the above points in view, churpi, which is one of the most popular traditional milk products of several parts of south-east Asia, has been chosen for the present study with the following objectives:

- (a) obtaining information in as much details as possible on the methods used by the local people to prepare churpi;
- (b) assessing the physico-chemical qualities and sensory attributes of market samples of churpi prepared in Darjeeling hills, Sikkim and Bhutan;
- (c) elucidating the rheological and sensory textural properties of market samples of churpi;
- (d) correlating sensory attributes with some intrinsic parameters of churpi;
- (e) studying the influence of composition on the Instron texture profile of churpi;
- (f) correlating objective data (instrumental) with subjective (sensory) data on texture of churpi so as to enable prediction of the latter from the former;
- (g) optimizing different process parameters in the preparation of churpi from cow milk;

- (h) studying the sensory and physico-chemical changes during the production of churpi; and
- (i) evaluating the cost of production of churpi.