1. INTRODUCTION

Honey is the food derived entirely from the work of honey bees operating upon the nectar of flowers and other sweet exudation of plants. In India, the consumption of honey is mainly restricted to medicinal purposes. Honey is well known for healing of wounds and its effect on nervous system. Honey facilitates better physical performance and resistance to fatigue. Honey is used for treating various digestive and assimilation problems. Honey also helps in calcium fixation in bones, cures anaemia, anorexia, insomnia and reduces fever. Honey is valued also for some of its therapeutic attributes. It improves the resistance of the body by improving the biological processes of organs and systems. It facilitates proteins and fat digestion thus constitutes an excellent anti-dyspeptogenic factor (Shamala and Jyothi 1999). Honey has tonic effect. Its medicinal property neutralizes fatigue, compensatory hypotonia, as well as the adverse effects of the other substances added when used in the preparation of beverages (Shamala and Jyothi 1999). Honey provides immediately available calories, for healthy and sick people. Honey consumption benefits digestive apparatus, respiratory system, skin and wound healing and eye disorders. Honey is also good for diabetics and to normalize kidney function.

Honey has a number of by-products viz royal jelly, bee venom and waxes which imparts a peculiar flavor, can be properly removed before processing. Honey crystallizes during storage if not properly processed or pasteurized. Crystallized honey is considered to be adulterated with sugar. The proper processing of honey can overcome the problem of crystallization.

Honey was the only sweetening agent before the advent of cane and beet sugars. Most of the honey produced is consumed as table honey. It gives 304 kcal of energy per 100g. Honey has been used in bakery products, fruits and vegetables products, breakfast cereals, alcoholic and non-alcoholic beverages, milk products, desserts, roasted foods, health foods and many other related foods. Utilization of honey helps in improvement of flavour, keeping quality,
moisture retention, and sensory qualities of bakery products. It is an excellent binding material in foods and can act as an ideal base for sauces.

There are about 2,76,000 bee keepers in India. The national production of honey is about 27,000 tonnes per annum. The production has come down by 75 per cent over the last few years in several places because of the damage caused by Thia Sac Brood Virus disease. The total world production of honey is around 11,70,000 tonnes. China which is the largest producer, exports 70,000 tonnes of honey compared to 1000 tonnes by India. The consumption of honey as a food is very low in India due to food habits, high cost and utilization of major quantity for medicinal purposes (Shamala and Jyothi 1999).

To produce a tablespoonful of honey, a single bee has to visit about 2000 flowers, while a pound of honey in the hive is due to minimum of 38,000 bee trips to and from the flowers. In India, the major quantity of honey is obtained during spring (January to April) in the plains, and in autumn (October-November) on the hills. The bees collect nectar of low sugar content (exceeds 40 per cent) and concentrate it to honey of high sugar content (80 per cent) which is stored hygienically for months together without spoilage.

There are normally two types of honey (ripened and unripened) are available in the market. Unripened honey is the unsealed honey in bee hives and becomes ripened only after it is sealed with air proof wax caps. Honey is highly concentrated water solution of two sugars, fructose and glucose, with small amounts of at least 22 other more complex sugars. Many other substances also occur in honey, but the sugars are by far the major components.

Processing of honey is the practical means for preventing granulation and fermentation, otherwise it can easily deteriorate the quality. Heat processing of honey is essential to extend its shelf life, preventing granulation and arresting fermentation. However, uncontrolled heat processing of honey results into hydroxymethylfurfural formation which darkens colour of honey. Although raw is the best honey, but processing is needed to meet the market requirements.
Honey with a glucose/water ratio < 1.7 tends to remain liquid for a long time, while ratio > 2.1 usually crystallizes within weeks. During processing, several steps are taken to prolong the liquid state of honey. Pasteurization delays the process of crystallization by dissolving the crystals. It also kills yeast cells and thereby eliminates the possibility of fermentation. To delay crystallization, some researchers recommend heating the honey to 77°C for 5 minutes, cooling rapidly to room temperature, bottling and storage of honey at 0°C (Assil et al 1991).

With an increasing amount of honey production, an understanding of the changes in honey during storage is essential to maintain its quality. In India, however, very little work has been carried out on keeping quality of honey and no comparative studies on ripened and unripened honey have so far been reported. The present studies are aimed to assess the effect of different treatments and storage conditions on the quality of ripened and unripened honey and to find out the optimum storage condition at which the losses occurring during storage are minimized. Keeping in view the significance of processing of storage of ripened and unripened honey, the present study was undertaken with the following objectives:

- To study the nutritional properties of raw and heat processed honey in relation to different packaging materials and storage intervals.
- To utilize processed honey in the preparation of various food products.
- To evaluate the nutritional relevance and consumer's acceptability of the prepared honey based food products.