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## PRODUCT DEVELOPMENT AND BY-PRODUCTS OF TEA

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### INTRODUCTION

Tea has been described as the world's most popular beverage next to water. Of all the beverages available to man, tea not only satisfies thirst but it is a form of cheap nourishment. In many work places a cup of tea with milk and sugar soothes tired muscles and spurs people into activity once again.

Various kinds of tea are consumed at a range of temperatures from piping hot to ice cold. From a nutritional point of view, tea brews contain proteins, carbohydrates, lipids, vitamins and minerals.

Up to now black tea is the only tea based product of commercial importance in Sri Lanka and the mode of preparation is the conventional brewing which often is time consuming. It is mainly because of the time involved and the cumbersome nature of the preparation of a tea brew that packeted or loose tea lost its ground to tea bags. This has given a fresh concept to the brewing of tea. This change is largely due to the growing world demand for a substitute for the inconvenience encountered in brewing a cup of tea and of waste disposal.

However, the demand for tea has stagnated in the consumer countries particularly in Europe and in the West. This was due to beverages such as instant coffee capturing the market by adopting a vigorous marketing strategy which immensely boosted the sales of this product. The entrepreneurs involved in the tea trade had, hence to turn to novel methods of production for survival in a competitive market.

### **Instant Tea**

It was soon realised that a much more convenient alternative was to produce a tea that could be presented in an instant form. This was how instant tea made its appearance in the horizon. At first this was soluble only in hot water. But further research on this aspect resulted in the production of a cold water soluble instant tea which catered to the needs of a new generation.

To produce instant tea the initial tea extract has to be concentrated to a certain degree of soluble solid content. Following concentration, the liquor obtained is directly dried to obtain the hot water soluble instant tea. In the case of cold water soluble instant tea, the concentrated tea solution is chilled and clarified using a special resin prior to drying. In this way one can remove the tea cream, which is insoluble at room temperature. This tea cream is a complex formed by the interaction of caffeine and polyphenolic compounds.

### **Flavoured Teas**

Sri Lanka is world renowned for its quality teas. High quality or seasonal teas are generally produced during the dry periods of the year, in certain tea growing regions in the country. However the teas that are produced during the rest of the year in these

regions, and in other tea growing areas are relatively plain in their character. Quality teas generally fetch premium prices at the auctions owing to their distinct flavour characteristics. On the other hand, teas with a plain character fetch relatively poor prices. However it was realised that, if these non seasonal teas could be presented in a value added form, the prices that the latter could obtain would be much higher than what is presently obtained, if they were to be sold in their native form. Market surveys carried out in this respect indicated, that one of the most effective value added forms in which tea could be sold is to present it with a host of flavours, both exotic and local. It has now been possible to flavour teas with cardamom, cinnamon, ginger and clove which are local flavours. Continental flavours such as lemon, strawberry, bergamot, apple and mint have also been successfully employed to flavour teas.

The present international market demand for scented teas, is a testimony to the success story of the above concept. It is pertinent to mention, that the TRI was the first place in Sri Lanka where trials for scenting of teas were carried out in a scientific manner using a host of flavours, which resulted in perfecting the technique which has now been transferred to the industry.

The scenting of tea is generally carried out using refired tea, to ensure the removal of excess moisture, as otherwise it could act as a barrier against efficient adsorption of the relevant flavour. Subsequent to refiring, the tea is placed in a cylindrical drum which contains a strip of filter paper with the relevant flavour that is to be imbibed. An agitator installed inside this drum continuously exposes all the tea particles uniformly, to the flavour that is coated on

the filter paper. This process is carried out for approximately 30 min for each round, and the scented teas when taken out are placed in laminated bins to retain the flavour immediately.

Flavoured teas have to be well packeted, as otherwise the flavour will be removed from the teas as they are volatile in nature. The packing material which is used has to be impermeable to gases and moisture. Work carried out on this aspect has shown that triple laminated aluminium foil is the most suitable packing material. This will retain the flavour for a longer time compared to other packing materials.

### **Liquid Teas**

With changes in consumer habits for food based products, the demand for ready to drink beverages started to grow since the early seventies. The above change had a direct bearing to the change in the behavioural trends, with the consumers, the world over.

With more efficient and frequent transportation, effective media campaigns and greater numbers visiting holiday resorts for vacations, the demand for refreshing chilled beverages also increased. This is reflected in the soaring sales records of chilled beverages. Taking a cue from such trends the Institute embarked on the processing of a tea cordial and a ready to drink carbonated tea.

The results of the research carried out on these lines have been very successful and it is envisaged that the products developed would be transferred to the industry in the foreseeable future. The advantage of the product produced at the Institute as against other commercial chilled beverages is that the former is a product made from a natural base whereas most of the others are synthetic

products. Ready to drink carbonated teas come in various types of flavours including orange, lemon, apple, pineapple and strawberry.

### **Tea Sherry**

A further addition on our laboratory shelves is the tea sherry. In producing the tea sherry, the level of alcohol formed through fermentation is fortified by the addition of alcohol up to a level of 11%. Work is being persued to perfect the above product, and we are hopeful that we would be able to develop it before long.

In addition to the above , plans are underway to attempt, to develop a tea liquor. We are hopeful that we would be successful in this attempt as we have been in the case of tea sherry.

### **By-products from Waste Tea**

In order to enhance the profitability of the tea industry, we have to diversify our efforts by developing methods to obtain by-products from waste tea and also from various parts of the tea bush.

One of the rich sources of caffeine is the waste/refuse teas, which accounts for 3-4% of the total black tea produced. The caffeine could be extracted using solvents such as dichloromethane and chloroform. The caffeine extracted in this manner could be used in cough syrups and drugs that are used as a stimulant to cardiac muscles and the central nervous system. In this instance the caffeine extracted in the above manner has an advantage over that produced synthetically, because the residual products in the latter could have negative effects unlike the natural caffeine.

Russian workers have developed methods to extract dyes which can be used as food dyes. There are three different coloured compounds, green, yellow and brown corresponding to chlorophyll, partially oxidised and fully oxidised polyphenols respectively.

Tea polyphenols are very effective antioxidants and could be used for the prevention of the development of rancidity in oils. Rancidity is the process where complex fatty acids are oxidised to form simple fatty acids resulting in off odours. In their presence oxygen has more affinity for polyphenols than the fatty acids and thereby prevents rancidity.

#### **Refuse tea**

Refuse tea as well as the infused leaves contain 20-30 % of protein. This is useful as animal and poultry feed.

Saponins are present in tea seeds as well as in the tea roots. These may be used as detergents. A detergent is a substance which acts on surfaces. Recent work indicates that isolated saponins could be used in the control of the shot-hole borer pest of the tea plant. However, more work needs to be done on this aspect.

Tea seed oil is extracted from the seeds of the tea plant. It is an edible oil having very similar properties to that of olive oil. It is less saturated than coconut oil. Therefore if required, it could be used for the production of margarine.

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