

Development of a Vegetable Protein based Tea Whitener as a Milk Substitute for the Low Income Consumers

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A market study was carried out in the city of Baroda to estimate the milk purchase and utilisation patterns of the consumers particularly in the low income group. The study revealed that the low income consumers used bulk of their milk purchases in tea. The need for the development of a vegetable protein based Tea Whitener as a substitute for milk, was identified and the estimated volumes projected.

The whitening properties of coffee creamers were studied. A spectrophotometric method for the quantification of whitening power of coffee creamers was developed. The whitening power (ΔL) of coffee creamers can be defined as the change in lightness-values (L) brought about by the addition of a creamer to standard black coffee. A ΔL -value of 19 was considered desirable. This was equivalent to the whiteness produced by the addition of 15 g. Creamilk (19% fat) to coffee prepared by dissolving 3 g instant coffee in 180 g distilled water. Lightness values can quickly be determined by measuring percentage reflectance at 565 nm (R_{565}) and estimating $L = \sqrt{R_{565}}$. Therefore, with the described method rather inexpensive spectrophotometers can be used to obtain Hunter L -values. A simple Fortran WATFIV programme has been developed to evaluate the whitening and coloring power of coffee creamers.

Samples of coffee creamers prepared under commercial conditions of processing exhibited a uniform relationship, at normal level of use, between the whiteness produced by fat

as approximately equivalent to 2.2 times the whiteness produced by SNF. A constant whitening curve ($\Delta L=19$) was observed indicating a straight line relationship between the whitening properties of fat and total milk solids. Concentrated skim milk with 30% SNF has the same whitening effect as that of Creamilk containing 10% fat and 8% SNF. The total color of prepared coffee was, however, dependent on the ratio of fat to SNF.

Quantification of contribution to the whitening power of coffee creamers by its constituents can lead to the evolution of an entirely new range of coffee whiteners based wither largely on fat or even on SNF. With the fluctuating prices of these milk constituents it would now be possible for the manufacturers to market a standardised product using various proportions of these constituents without loss of whitening ability.

The contribution of homogenization and boiling of the coffee creamers on their whitening ability was studied. Homogenization can more than double the whitening and coloring power of coffee creamers. The whitening ability increases with higher homogenization pressures. This is attributed to the increase in the light reflecting surface areas. Boiling the whiteners denatures the water soluble milk proteins resulting into a marginal increase in whitening power. Hard water produces a lighter colored tea/coffee.

A prototype of a liquid tea whitener was developed which is comprised of 2% fat, 3% protein and 8.5% solids non-fat. The primary puprpose of the product is to whiten tea and, due to its composition and low cost, improve the nutrition of low income users. The white-ner resembles fluid milk in color and consistency. It is slightly sweeter than milk and has a bland flavour. A mini-market test carried out at Baroda indicated that this product is quite acceptable to the segment of population for which it has been designed.