

ABSTRACT

The TROPI FRÜT limited is the largest UHT treated milk producer in Sri Lanka. This company has lost millions of rupees recently owing to a milk coagulation problem. During this coagulation whey proteins separated from milk. In each occasion the whole batch was affected without any default in processing method. As there are heat resistant bacteria and bacterial enzymes, which can cause coagulation in milk. Firstly the presence of bacteria and secondly the enzymes that could present in the milk were assayed and finally the structural changes of the UHT milk was analyzed to study the changes that could have happen to casein.

Methylene blue dye reduction test and the Rezasurin test both showed no reduction activity in milk proving the absence of the bacteria in this UHT milk. Three enzymes lipase, urease and protease activity was tested, lipase and urease enzymes gave negative results. While the protease activity gave some positive results indicating the presence of heat stable bacterial protease in milk. Acid protease activity, which is used to detect plant protease by Anson (1939), was applied for the first time in milk to analyze the protease activity and at a pH range of (2-8) at room temperature. A protease enzyme, activity was detected between pH 2-8. The highest peak of this enzyme was between pH 3.5 to 4.5. This enzyme has very low molecular weight as it was detected at the dye front of a 12% acrylamide gel. However, this band was very faint therefore the concentration of the enzyme is minute. The results of UHT treated control milk samples indicated there were neither enzyme activity nor the bacterial activity. This study confirms the presence of enzymatic activity in UHT treated coagulated milk. These heat resistant enzymes may have released from psychrotrophic bacteria. These bacteria could have multiplied at the time of refrigeration during the bulk storage.

Finally the structural change of casein was studied using poly-acrylamide gel electrophoresis. It clearly showed in the coagulated UHT milk samples the molecular weight of the casein has increased when compared to the casein bands of the control UHT milk and the fresh cow milk sample. These conformational changes of casein molecules are due to many reasons. However, further studies are needed to isolate these enzymes and their enzymatic activity and also to reasons out the causes for the structural changes of casein