

## ABSTRACT

Milk powder is a widely consumed dairy product manufactured by evaporating milk to dryness. Purposes of drying are to preserve milk and reduce its bulk. Milk powder is available in the forms of whole milk powder and skim milk powder. Powdered milk is frequently used in the manufacture of infant formula, confectionery, baked goods, etc. In the 2008 infant milk scandal in China, melamine adulterant was found in infant milk powder formula, added to mislead tests into reporting higher protein content. Melamine may have been added to protein content tests after water was added to fraudulently dilute the milk. Because of melamine's high nitrogen content (66% by mass versus approx. 10-12% for typical protein), it can cause the protein content of food to appear higher than the true value.

Melamine is an industrial organic chemical with formula  $C_3H_6N_6$  (1,3,5-Triazine-2,4,6-triamine). It is combined with formaldehyde to convert melamine to a very durable thermosetting resin. Also used as a fertilizer in Asia. Melamine by itself is nontoxic in low doses, but when combined with cyanuric acid it can cause fatal kidney failures due to the formation of insoluble melamine cyanurate. Recent adulterations with melamine and related analogues have created the need for more detailed testing of protein based food and feed ingredients. Sri Lankan government announced the maximum melamine content in the milk powder as 1mg per kilogram, as a result of widespread concern over its potential health hazards, thus there is a need to carry out analysis of melamine in milk powder in Sri Lanka, using routine analytical techniques.

The present research was aimed to determine the Melamine content in several milk powder brands in Sri Lanka in order to ensure the consumer safety. The first approach was to develop the method to quantify melamine. Most commonly used method for melamine analysis of milk is the HPLC method. But this method has limitations such as ppm levels of limit of detection (LOD) and difficulties in correct identification of melamine peak. Therefore the potential of using Gas chromatography mass spectrometry (GC-MS) technique to analyze samples was investigated. The GC-MS method was developed by referring to the FDA method for analyze melamine in pet foods. The method involves sampling, extraction, chemical derivatization, detection and confirmation of identity.

Results indicated that, the samples qualitatively and quantitatively satisfied for melamine levels. Recovery percentage was 84.08% and the (LOD) was 50ppb. Therefore developed method can effectively be used to analyze milk powder samples for their melamine content. Thirty commercially available samples (including different brands, varieties, and batches) were analyzed using the above method and none of the samples contained melamine. Therefore it can be concluded that the newly developed technique is effective and accurate for analyzing melamine in milk powder and milk powders marketed in Sri Lanka are safe with regard to melamine adulteration.