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Origin of haloacetic acids in milk and dairy products

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Chlorine-based disinfectants are the most common sanitizers used in the dairy industry to clean equipments and surfaces due to their effectiveness and simple use. Nevertheless, chlorine reacts with any natural organic matter present in foods and/or equipments to form disinfection by-products (DBPs); haloacetic acids (HAAs) being the major class of non-volatile DBPs. Firstly a chromatographic method was developed in order to determine the origin of HAAs in milk and dairy products. The sample treatment involves deproteination of milk and centrifugation, and then the derivatization/extraction of the HAAs in the supernatant into an automatic static headspace unit. The methylation of the HAAs was performed with tetrabutylammonium hydrogen sulfate as the ion-pairing reagent and dimethylsulfate as the methylation agent. About 20% of the samples (milk, milkshake, cream and yogurt) analyzed contained 2 HAAs at low concentrations (<2 μg/L), which can be ascribed to the contamination from sanitizers usually employed in the dairy industry. An experiment performed on the preparation of infant formula using different types of water showed that the boiling of tap water, containing HAAs, did not remove them. So, the infant formula should be prepared in mineral water free of DBPs. Another point that must be taken into account is the adulteration of milk with water. The experiments showed good correlations between the volume of water added to the milk and the total HAA concentration; therefore, the presence of HAAs in raw milk could be an indicator of adulteration with treated water.

Biography

Mercedes Gallego completed her PhD in 1980. She is Full Professor of Analytical Chemistry at University of Córdoba. She has published about 250 papers in reputed journals. In the last decade, her research has been focused on the study of disinfection by-products related to the detection of new species and their distribution in water and food that come into contact with treated water. As a teacher, she has directed 25 PhD theses and she has had numerous foreign researchers under her guidance.

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