Detection of Vegetable Oils in Dairy Products Using the Polymerase Chain Reaction Technique

Motahareh Sadat Hosseini[1] ⓘ, Mehrnoosh Shirdeli[1] ⓘ, Saeede Sadat Hosseini[2*] ⓘ

1. Department of Food Hygiene and Safety, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Department of Microbiology, School of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Corresponding Author:
Saeede Sadat Hosseini
ss.hosseini69@gmail.com

How to cite this paper:

Hosseini MS, Shirdeli M, Hosseini SS. Detection of vegetable oils in dairy products using the polymerase chain reaction technique. Journal of Community Health Research. 2019; 8(1): 1-2.

Milk and its products have been among the most important foodstuffs providing human needs since thousands years ago, which, in addition to having a high nutritional value, plays a significant role in preventing many diseases (1). Moreover, children, pregnant women, lactating women, and the elderly are the main consumer group of dairy products (2). The high nutritional value of milk has led to its high consumption throughout the world; however, increasing demand has made the food prone to fraud (3). One of the most common frauds is replacing a part of its fat with lower-priced vegetable or animal fats with the aim of increasing the profitability of products. In general, milk fat consists of 98% triacylglycerol, 2% other fatty acids, such as diacylglycerol, monoacylglycerol, free fatty acids, phospholipid, cholesterol, lipid soluble vitamins, and essential fatty acids. Therefore, the food containing this substitute is not only economically a type of fraud, but may also threaten human health (4, 3). Besides, any milk quality reduction can seriously threaten the health of sensitive consumer groups (5). Recently, the use of vegetable oils, especially Palm in the dairy industry has become one of the main concerns of the consumers. Therefore, people prefer to consume traditional dairy products which endanger public health (3). Milk is a rich source of protein, sugars, salts, and vitamins and has high levels of water; therefore, it has a high potential for the growth of bacteria. If it does not comply with health rules, it can act as an important factor to cause food poisoning and gastrointestinal disorders. It is worth mentioning that many infectious diseases, such as tuberculosis, brucellosis, typhoid, streptococcal infections, etc are transmitted through milk (7, 6). Sometimes the speed of fraud is surpassed by the speed of fraud analysis science. Therefore, the use of the polymerase chain reaction as a golden standard and a highly sensitive test can be a useful tool for detecting fraud and identifying the origin of imported oils in dairy products (8). Accordingly, it is suggested to use polymerase chain reaction test (PCR) in the food quality control labs routinely to prevent endangering public health and to ensure that the consumers have accurate information on the products.

References

1. Dashti G, Rostami R, Pishbahar E. Effect of consumers characteristics on consumer preferences for milk in Tabriz City. Journal of Food Research (University of Tabriz). 2015; 25(3): 407-417. [Persian]

2. Akbay C, Tiryaki GY. Unpacked and packed fluid milk consumption patterns and preferences in Turkey. Agricultural Economics. 2008; 38(1): 9-20.

3. Raftani Amiri Z, Salmani S. Detection of vegetable oils in industrial dairy products of Kermanshah using chromatography methods. Iranian Journal of Food Science and Technology. 2017; 14(69): 205-214. [Persian]

4. Ntakatsane M, Liu X, Zhou P. Rapid detection of milk fat adulteration with vegetable oil by fluorescence spectroscopy. Journal of Dairy Science. 2013; 96(4): 2130-2136.

5. Zarei M, Maktabi S, Nasiri M. Fraud identification of cow's milk in buffalo's milk and its products using the polymerase chain reaction. Jundishapur Journal of Health Sciences. 2016; 8(4): e36555.

6. Beauman C, Cannon G, Elmadfa I, et al. The principles, definition and dimensions of the new nutrition science. Public Health Nutrition. 2005; 8(6a): 695-698.

7. Leslie W, Lean M, Woodward M, et al. Unidentified under-nutrition: dietary intake and anthropometric indices in a residential care home population. Journal of Human Nutrition and Dietetics. 2006; 19(5): 343-347.

8. Khanzadi S, Jamshidi A, Razmyar J, et al. PCR-based detection of cow and goat milk in sheep milk and dairy products marketed in Mashhad city of Iran. Iranian Journal of Veterinary Medicine. 2013; 7(4): 257-262.