UNIVERSITY OF LIFE SCIENCES
"KING MIHAI I" FROM Timisoara
Multidisciplinary Conference on Sustainable Development
30-31 May 2024

2024 MULTIDISCIPLINARY CONFERENCE ON SUSTAINABLE DEVELOPMENT

Studies on different chemical parameters of dairy products by spectrophotometric methods

Verboncu Denisa-Mirabela[1,2], Menghiu Gheorghita[1,2*]

[1] Advanced Environmental Research Laboratories; West University of Timisoara, Oituz 4A, 300086 Timisoara, Romania,
[2] Department of Biology–Chemistry; Faculty of Chemistry, Biology, Geography, West University of Timisoara, Pestalozzi 16, Timisoara 300115, Romania
*Corresponding author e-mail: gheorghita.menghiu@e-uvt.ro

Abstract: *The present research focused on the determination of chemical parameters for nine commercial dairy products (milk, yogurt and sour cream) manufactured by different companies, using spectrophotometric chromogenic analysis and validation of these methods for dairy products.*

Introduction

Milk, the fluid secreted by the female of all mammals, is often described as the most "almost perfect" food. Pasteurization and processing result in many dairy products that are commonly consumed, and they are part of the category of foods that provide a balanced diet through the multitude of chemical compounds they contain (proteins, lipids, vitamins). Over time, consumption of dairy products has increased, with more than 50 million tons of dairy products being sold in 2023. Due to the large quantities consumed, great attention must be paid to the way these foods are produced, as well as the ingredients contained and the nutritional value of the product.

Material and method

A stock solution with a concentration of 25 mg/mL was made from each selected dairy product, from which the following was determined: the concentration of reducing sugars using the 3,5-dinitrosalicylic acid (DNS) method, with lactose solution as the positive control solution; protein concentration using the bicinchoninic acid method, with bovine serum albumin solution as a positive control; the presence of starch using the Lugol's reagent method and starch solution for the positive control. The methods were carried out in microtitration plates, working in duplicate, plates that were subjected to spectrophotometric analysis.

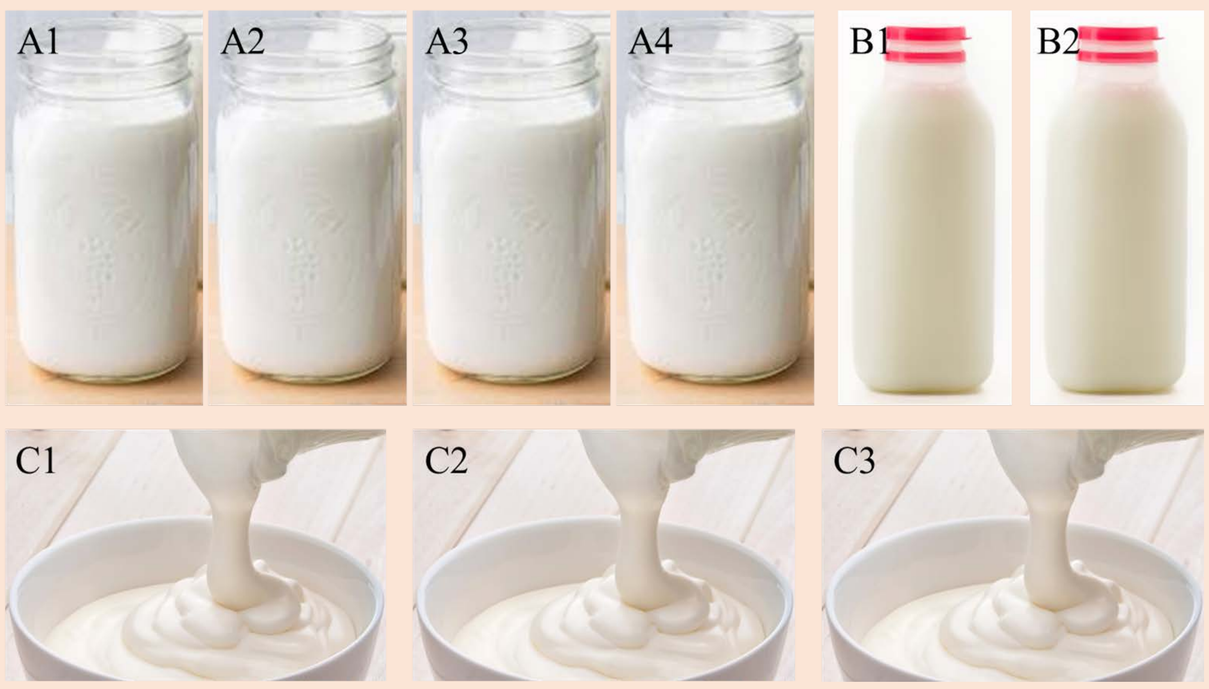

Fig. 1. Dairy products used in the study: A) 1, 2, 3, 4 – yogurt; B) 1, 2 – milk. C) 1, 2, 3 – sour cream;

Results and discussions

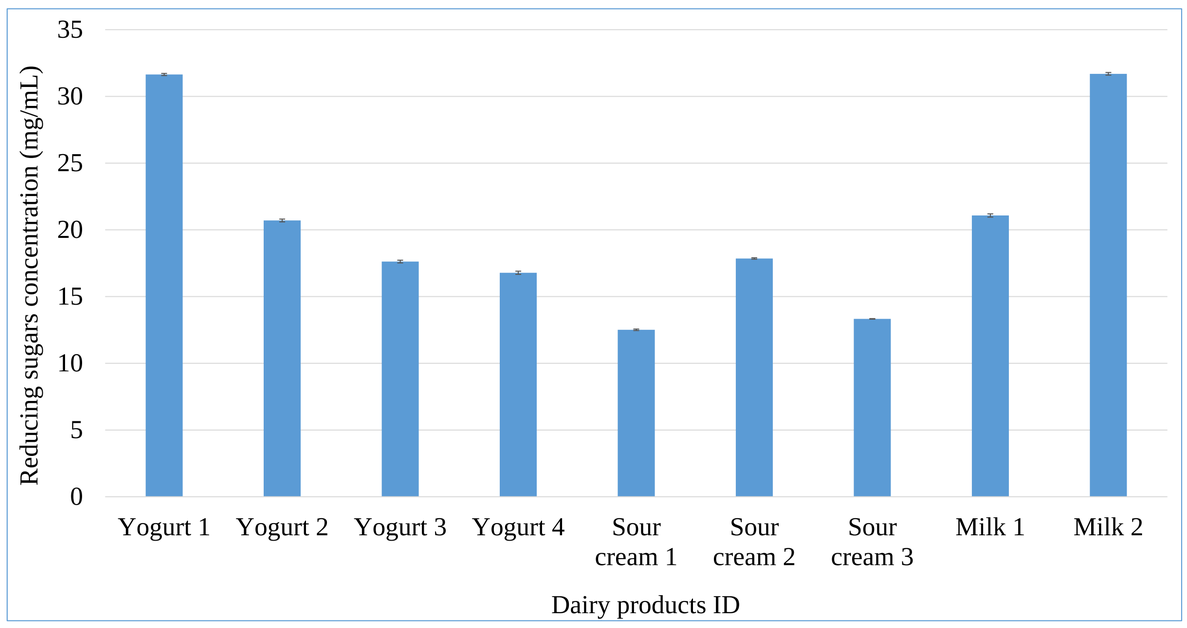

Fig. 2. The concentration of reducing sugars present in selected dairy products (DNS method).

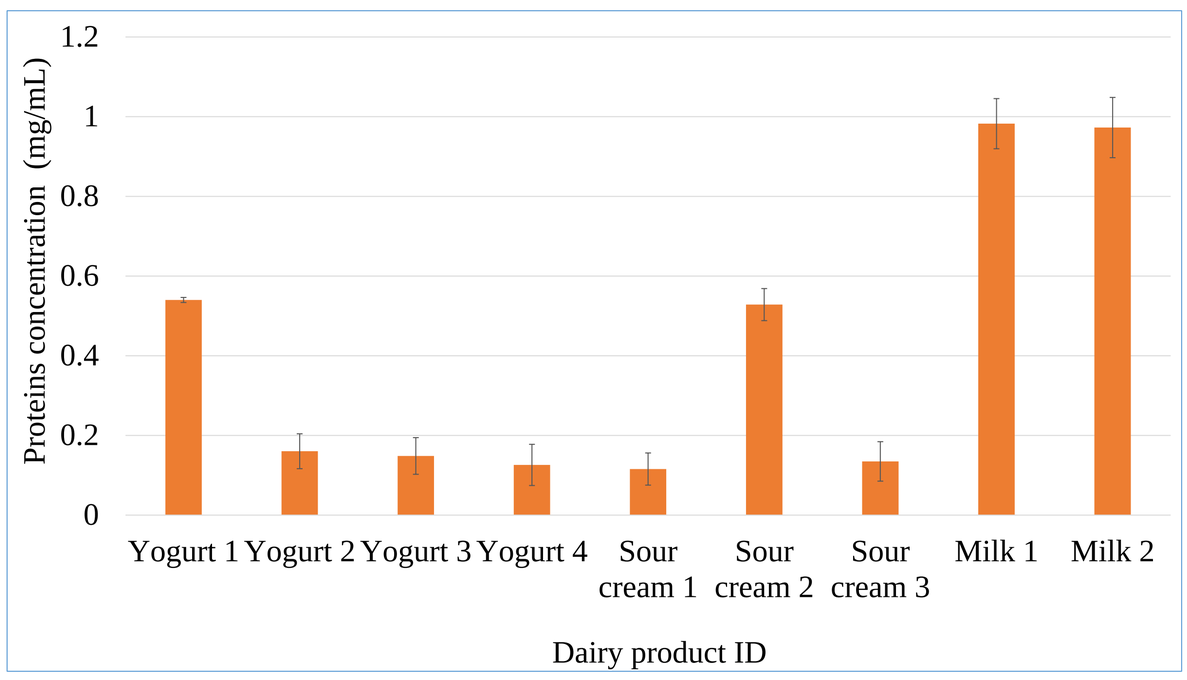

Fig. 3. The protein concentration present in the selected dairy products (bicinchoninic acid method).

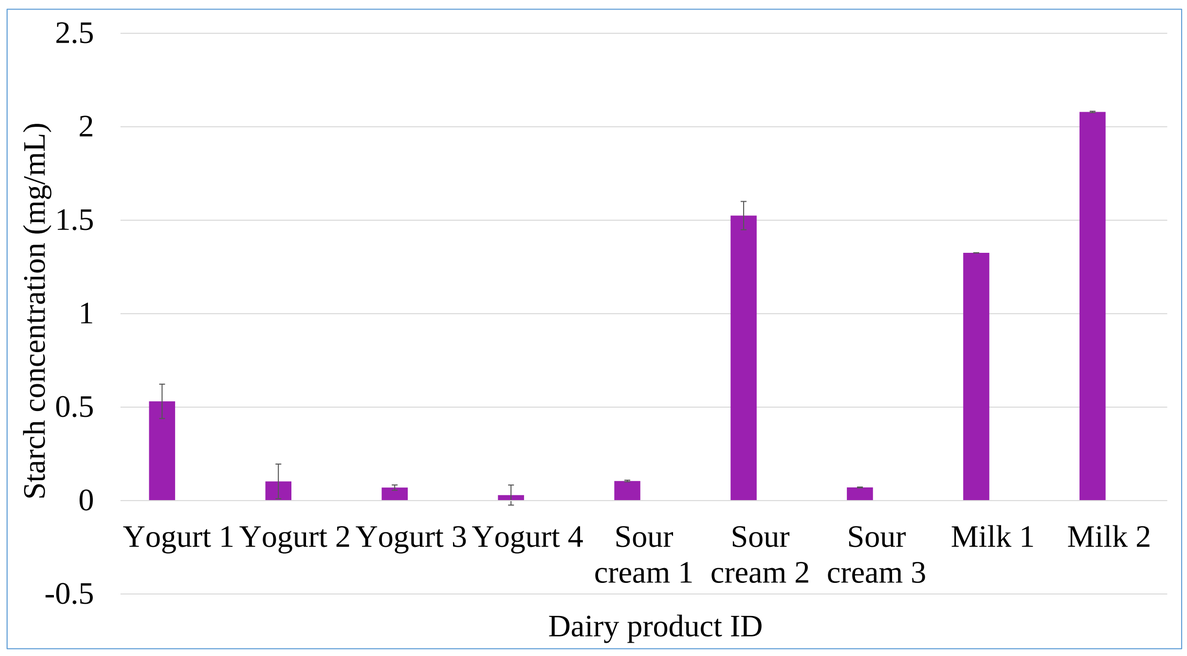

Fig. 4. The starch concentration present in the selected dairy products (Lugol's reagent method).

Conclusion

The results show that reducing sugars are predominant in dairy products, being found in an average concentration of 20.35 mg/mL, while proteins are present in small amounts compared to reducing sugars, presenting average concentrations of 0.64 mg/mL, a value more than 31 times lower. The spectrophotometric methods used were confirmed to be applicable for dairy products determinations, with minor optimizations.

Acknowledgement: his research was funded by the GRANT PNIII-P3-284, ChitoWound—Biotechnological tools implementation for new wound healing applications of byproducts from the crustacean seafood processing industry and by the UVT 1000 Develop Fund of the West University of Timisoara.

West University of Timisoara
Advanced Environmental Research Laboratories
CHITO WOUND