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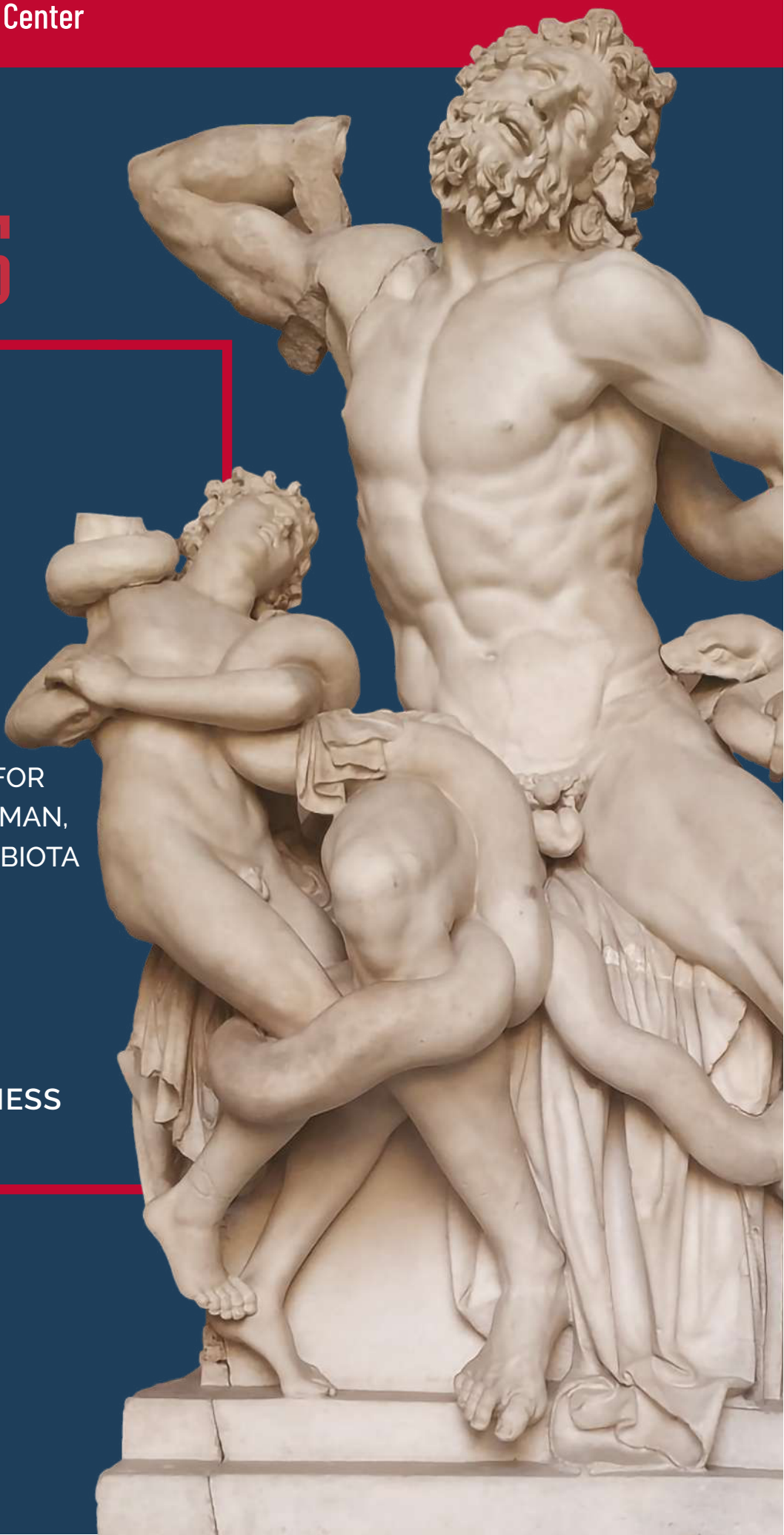
NUTRACEUTICALS, BOTANICALS & PHYTOCHEMICALS FOR NUTRITION AND HUMAN, ANIMAL AND MICROBIOTA HEALTH

4TH SCIENCE & BUSINESS SYMPOSIUM



O.C. 105_153 | QUANTIFICATION OF PASTEURIZED AKKERMANSIA MUCINIPHILA MUCT BY FLOW CYTOMETRY: PROTOCOL OPTIMIZATION AND INTER-LABORATORY RING TEST

Stefania Arioli [1] - Bart A. Smith [2] - Francesco Severi [3] - Anneleen Segers [2] - Morgane Dress [2] - Leen Rymenans [2] - Andjela Martinovic [4] - Viola Termine [1] - Diego Mora [1] - Willem M. De Vos [5]

University of Milan, Deparment of Food, Environmental and Nutritional Sciences, Milan, Italy [1] - The Akkermansia Company SA, The Akkermansia Company SA, Mont-Saint-Guibert, Belgium [2] - Centro Sperimentale del Latte, Sacco System, Centro Sperimentale del Latte, Sacco System, Zelo Buon Persico, Lodi, Italy [3] - Montenegrin science & technology hub - epiSTEMe, Montenegrin science & technology hub - epiSTEMe, Cetinje, Montenegro [4] - Wageningen University, Laboratory of Microbiology, Wageningen, Netherlands [5]

Objective: This study aimed to optimize an accurate and reliable method for the quantification of pasteurized freeze-dried biomass of Akkermansia muciniphila MucT by flow cytometry, to ensure reproducibility and accuracy in an inter-laboratory ring test.

Methods: Protocol optimization, based on ISO 19344, required a preparation set-up and the choice of the appropriate diluent for the efficient rehydration of freeze-dried cells and for limiting cell aggregates. Then the method was applied in a mass balance calculation over the production process and in an inter-laboratory ring test among six independent laboratories.

Results: The optimized quantification protocol allowed a more efficient cell counting with a lower standard deviation and coefficient of variation as compared with microscope-based quantification. The protocol was successfully applied in a mass balance calculation on the entire production process, a standard validation in industrial processes to produce microbial biomass starting from batches with high cell density to obtain standardized batches with defined and lower cell dosage. Finally, the inter-laboratory trial, carried out among six independent laboratories using a ring test design, revealed good accuracy and precision of the optimized quantification protocol with an average CV ranging between 12.3 and 24.1 % and a Z score max of 2.64.

Conclusions: Our study revealed that developed flow cytometry protocol is a fast, reliable, reproducible and accurate method for the enumeration of the pasteurized A. muciniphila MucT.

O.C. 106_171 | EVALUATION OF THE STABILITY OF AKKERMANSIA MUCINIPHILA IN A PLANT-BASED ICE CREAM WITH GERMINATED QUINOA FLOUR DURING STORAGE

Silvia Melissa Garcia Torres [1] - José A. Teixeira [2] - Christian R. Encina-Zelada [3] - Daniela Machado [1] - Cristina L. M. Silva [1] - Ana M. Gomes [1]

Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal [1] - University of Minho, Centre of Biological Engineering, School of Engineering, Braga, Portugal [2] - Universidad Nacional Agraria La Molina, Departamento de Tecnología de Alimentos, Facultad de Industrias Alimentarias, Lima, Peru [3]

Objective: The growing demand for plant-based diets and interest in ancestral crops have driven the development of innovative functional foods, such as plant-based ice creams. Akkermansia muciniphila, a next-generation probiotic, is notable for its therapeutic potential and its ability to modulate metabolic and inflammatory disorders, including obesity and metabolic syndrome. However, its incorporation into frozen food matrices has been scarcely explored. This study evaluated a plant-based ice cream formulated with germinated quinoa flour (Rosada de Huancayo variety, Peru) as a potential vehicle for delivering A. muciniphila.

Methods: The formulation also included coconut and sunflower oils, along with sugars such as dextrose, glucose, and sucrose. A. muciniphila was added in free form during the mixing stage. As a control, free cells frozen in saline solution were used. Both sample types were stored at –20 °C for 60 days. Microbiological quality (enterobacteria, mesophilic bacteria, yeasts, and molds), overrun (day 0), hardness (every 15 days), and the viability of A. muciniphila (days 1, 7, 14, 21, 28, 40, and 60) were evaluated.
Results: The ice cream exhibited an overrun of 11.9%, with hardness ranging from 35.9 N to 237.3 N, and maintained good microbiological quality throughout the storage period. The viability of A. muciniphila remained above 10^8 CFU/g in both treatments, with no significant differences from the initial counts ($p > 0.05$).

Conclusions: These results demonstrate that quinoa-based ice cream is a viable matrix for maintaining A. muciniphila stability during frozen storage, reinforcing its potential in functional plant-based foods and enabling new strategies for incorporating next-generation probiotics.