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Shaping the Future of Sustainable Food Ecosystems

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BOOK OF ABSTRACTS

- Challenges and Opportunities in the Food System of the Transborder Region
- Innovation, Technology, and Food Security in a Changing Global Landscape
- Nutrition and Consumer Trends: Enhancing the Value of Endogenous Resources
- Quality, Food Safety, and Environmental Responsibility
- Marketing, Digitalization, and the Future of the Food Sector
- Strategic Developments in the Net4Food Project

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P188 | A FLOW-BASED METHOD AS A MORE SUSTAINABLE TOOL FOR TOTAL PROTEIN MONITORING IN INDUSTRIAL PROCESSES

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The growing interest in protein hydrolysates highlights the need for fast and reliable analytical methods to assess their nutritional and functional properties. Total protein quantification is a key parameter for characterizing by-products, monitoring hydrolysis processes, and evaluating hydrolysates. In this work, a sustainable flow-based spectrophotometric method was developed and optimized using the Biuret method [1]. The flow injection analysis (FIA) system employs a double injection strategy in a continuous stream, significantly reducing reagent consumption compared to the conventional procedure, with a 75% decrease in Biuret reagent and an 83% reduction in sodium hydroxide, while maintaining analytical accuracy (Figure 1). Optimization of flow and chemical parameters enabled robust performance across different matrices used during enzymatic hydrolysis. The dynamic range of the method was 0.100–2.00 mg mL^{-1}, presenting a limit of detection and quantification of 0.069 and 0.290 mg mL^{-1}, respectively. The results were in agreement with those obtained with the reference method (<10% deviation). Additionally, the herein proposed method reduced the analysis time from 30 to 3 minutes per sample (triplicate). The proposed protocol offers a faster, greener, and reliable tool for the food industry, supporting sustainability in quality control and nutritional evaluation.

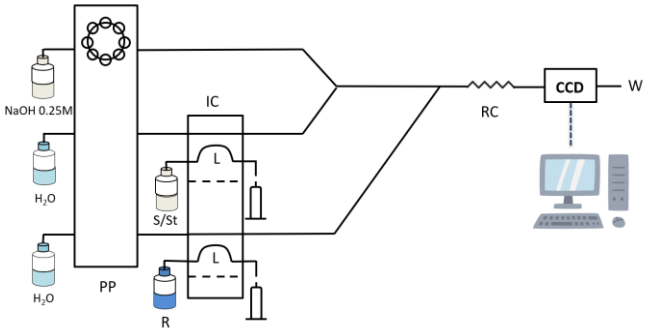

Figure 1 – Flow injection manifold for the quantification of total protein content; PP, peristaltic pump; IC, Injector commutator; L, Loop (400 µL); S/St, sample/standard; R, Biuret reagent ($CuSO_4$ 0.027 mol L^{-1}; $C_6H_5Na_3O_7.2H_2O$ 0.15 mol L^{-1}; Na_2CO_3 0.24 mol L^{-1}); RC, reaction coil 100 cm; CCD, detector (λ= 554 nm); W, waste.

References

[1] C. Arora *et al.*, National Institute of Biologicals, 201, 2018, 309.

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