[1] Arora, C., Prakash, A., Prasad, J.P., Madhu, Y., Gopinath, S. V., Singh, S., Kumar, P., Singh, A., Kumar, A., Singh, V. (2018). A Comparative Study of Various Compendial Biuret Methods for Estimation of Protein in Human Biologicals, Indian Journal of Pharmaceutical Sciences, 80, 946-949.

OPTIMIZED FLOW-BASED PROTEIN CONTENT MONITORING IN BY-PRODUCTS HYDROLYSATES WITH TWO MERGE ZONES INTEGRATION

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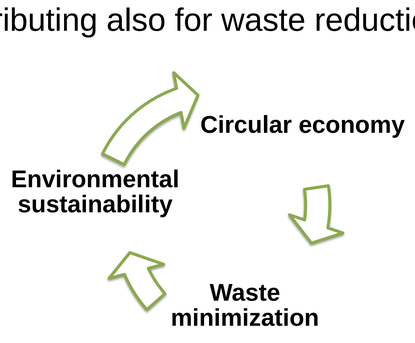
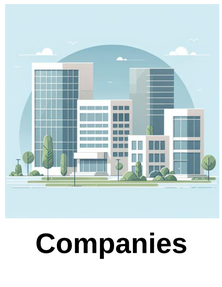
Introduction

The interest in protein **hydrolysates** has been growing exponentially due to their nutritional and functional benefits for both human food and animal feed, contributing also for waste reduction.





Companies

By-products

Hydrolysis process

Hydrolysates

Flow-based method

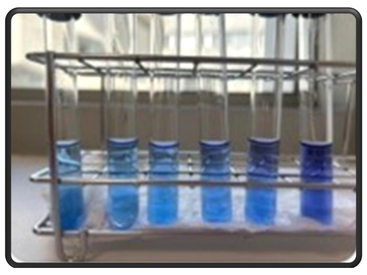
Industry

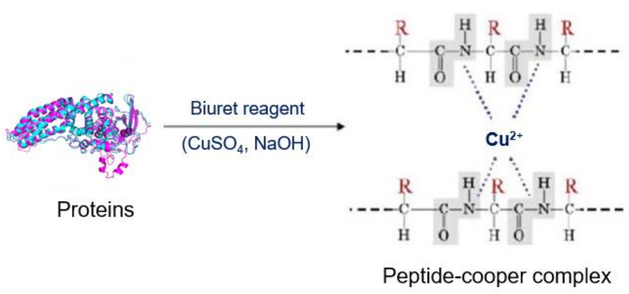
By-product valorization

Objectives

- Develop a flow-based spectrophotometric method for total protein quantification
- Monitoring the total protein content in by-products hydrolysates
- By-product valorization

Biuret Method

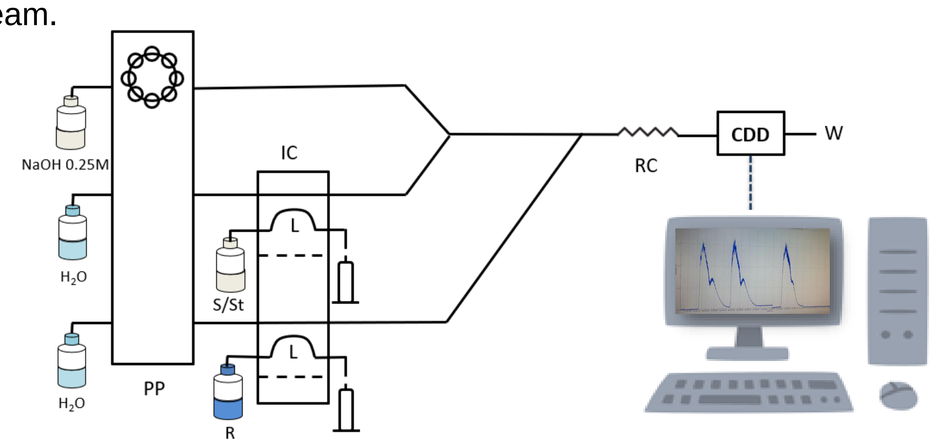




The conventional and reliable **Biuret method** was used. This method was chosen for its ease of preparation and the use of reagents with associated lower toxicity **[1]** when compared with other conventional colourimetric methods.

Flow Injection Analysis (FIA)

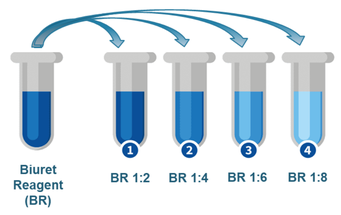
The flow-based approach consisted of a double injection of the sample/standard and reagent, using a commutator, in a continuous stream.

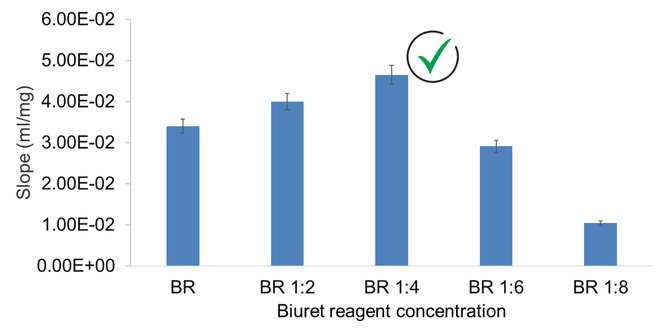


Flow injection manifold for the quantification of total protein content; PP, peristaltic pump; IC, injector commutator; L, loop (400 µL); S/St, sample/standard; R, Biuret reagent ($CuSO_4$ 0.028 mol/L; $Na_3C_6H_5O_7$ 0.17 mol/L; Na_2CO_3 0.24 mol/L); RC, reaction coil (100 cm); CCD, detector (λ= 554 nm); W, waste.

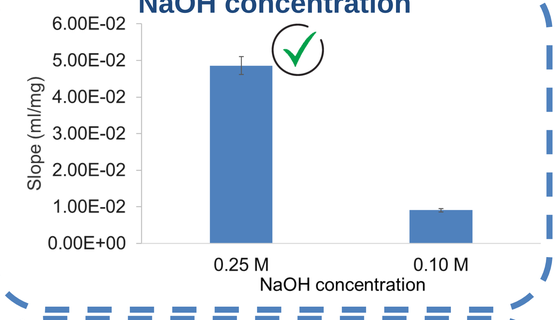
Optimization studies

Biuret reagent concentration

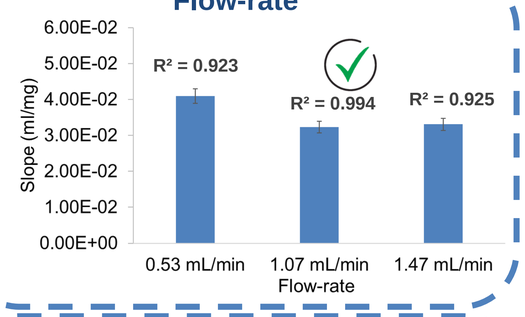




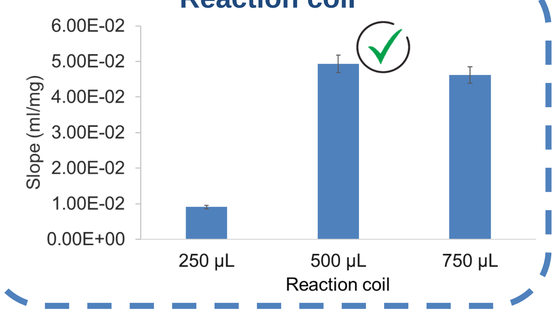
NaOH concentration



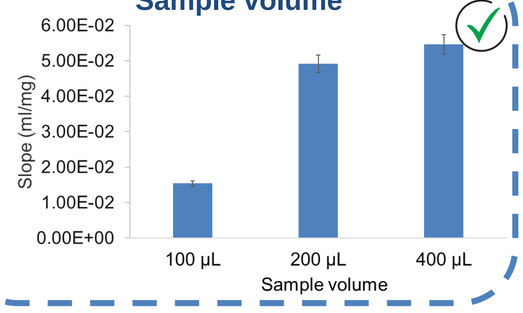
Flow-rate



Reaction coil



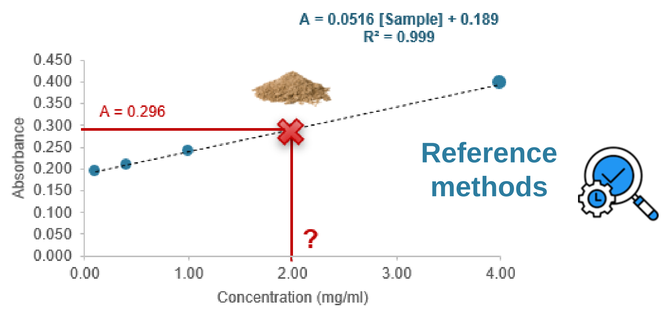
Sample volume



For all the performed tests, the features were chosen based on the one that provided the highest sensitivity, based on the slope of the calibration curve. For the flow-rate test, the correlation of the different calibration curves was also evaluated.

Ongoing work…

- Interferences study - evaluation of using different matrices, used in the hydrolysis process, in the quantification of the total protein content
- Method validation



Reference methods

Conclusion

Efficient tool for the food industry, enhancing quality control and nutritional assessments

References

[1] Arora, C., Prakash, A., Prasad, J.P., Madhu, Y., Gopinath, S. V., Singh, S., Kumar, P., Singh, A., Kumar, A., Singh, V. (2018). A Comparative Study of Various Compendial Biuret Methods for Estimation of Protein in Human Biologicals, Indian Journal of Pharmaceutical Sciences, 80, 946-949.

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