

MICROBIAL PRODUCTION OF HEAT STABLE ANTIOXIDANT HYDROLYSATES AND PROTEASES FROM SQUACQUERONE CHEESE WHEY

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SPOKE, WP AND TASK

Spoke 8 - National Research Centre for Agricultural Technologies AGRITECH. WP1-Task 8.1.2: Valorisation of the waste by biotechnology processes to obtain high value molecules or new products.

INTRODUCTION AND AIM

- ✓ Cheese whey (CW) is a source of nutrients that can be valorized in to high-added value compounds (Augustyniak et al., 2023; Romano et al., 2024).
- ✓ Few studies have focused on CW valorization by microorganisms for simultaneous production of bioactive compounds and proteases (Rochin-Medina JJ et al., 2018).

AIM: development of a process for the valorization of whole squacquerone cheese whey (SW) into bioactive compounds-enriched hydrolysate and enzymes through microbial routes.

MATERIALS AND METHODS

13 isolates from sea and desert

Culture in SW

Cell free supernatant (CFS)

1) Antioxidant activity by ABTS assay (from T0 to 72h, after thermal treatment at 121 °C for 20 min)

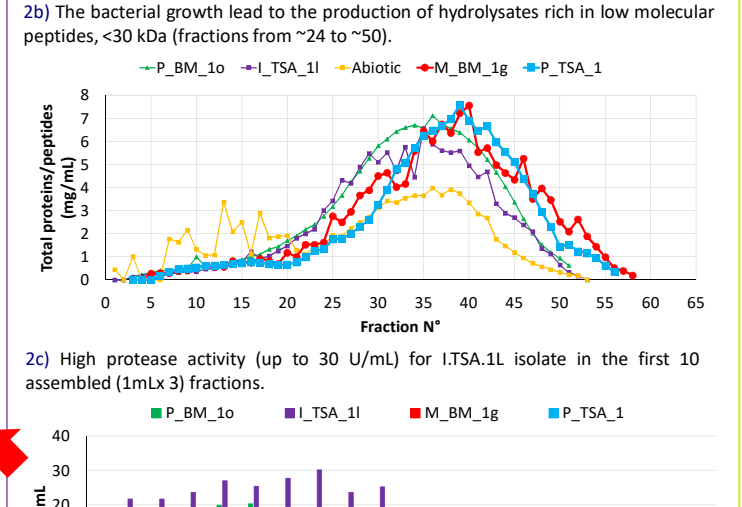
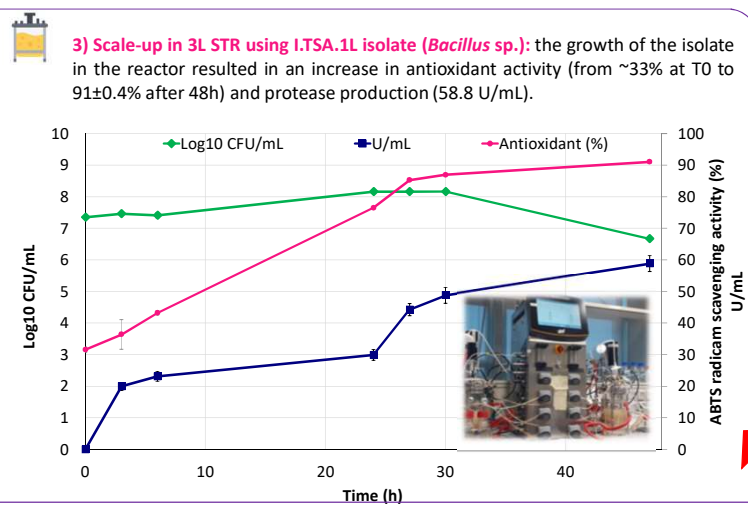
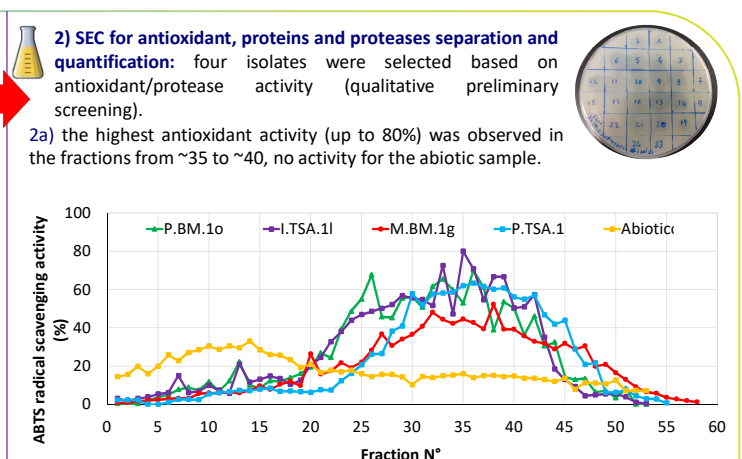
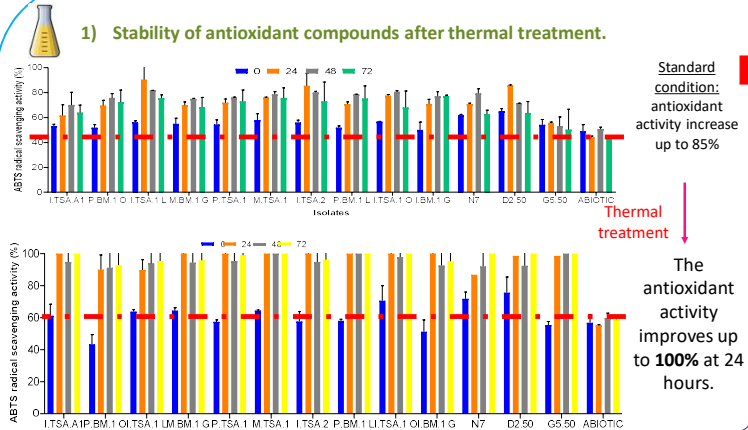
2) Selection of 4 best isolates for:

- antioxidant compounds recovery by Sephadex G-50 (Size-Exclusion Chromatography, SEC; MW: 1-30 kDa) 60 fractions (1 mL/fraction)
- total soluble proteins/peptides quantification (IMPLEN P3000 NanoPhotometer)
- protease quantification (casein assay) on assembled fractions (3x1 mL/fraction)

3) For the best isolate: scale-up the production of bioactive compounds in 3L STR

$$\text{Antioxidant (\%)} = \frac{Abs_{blank} - Abs_{sample}}{Abs_{blank}} * 100$$

RESULTS AND DISCUSSIONS



Conclusions: The study is the first report on the valorization of whole SW into bioactive compounds and enzymes with potential application in different sectors as a sustainable management strategy for this cheese making byproduct.

REFERENCES

Augustyniak A. et al. (2023) <https://doi.org/10.1016/j.jff.2023.105528>; Romano R. et al. (2024) <https://doi.org/10.1002/cjce.25367>; Rochin-Medina JJ et al. (2018) <https://doi.org/10.1177/1082013217724705>