# From Cells to Bioactives: Assessing Postbiotic Potential in Non-conventional Yeasts

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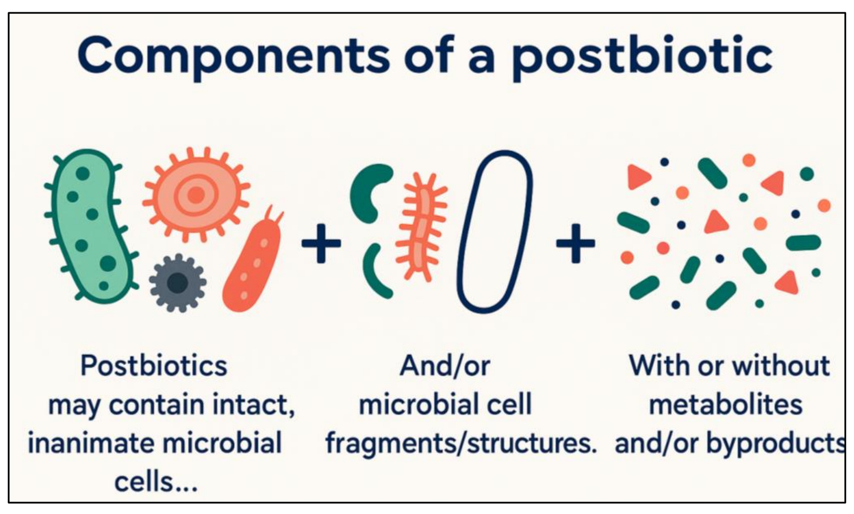
## INTRODUCTION

Postbiotics, encompassing non-viable microbial cells and their bioactive metabolites, represent an emerging class of functional ingredients with antimicrobial, antioxidant, and immunomodulatory properties. Compared to probiotics, they offer enhanced safety, stability, and applicability in food systems[1].



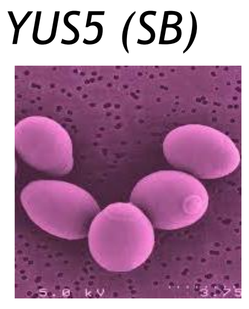

Despite growing interest, yeast-derived postbiotics remain insufficiently characterized, as most studies emphasize lactic acid bacteria. Non-conventional yeasts such as *Kluyveromyces marxianus* and *K. lactis* exhibit rapid growth, thermotolerance, and metabolic versatility, making them suitable for postbiotic development. Their structural polymers, including β-glucans and α-mannans, further contribute to their bioactivity[2].

This work comparatively evaluates S. *boulardii* YUS5, *K. lactis* ATCC8585, and *K. marxianus* BSK105 to elucidate their postbiotic potential through analysis of cell-free supernatants, lysates, and co-cultivation strategies.

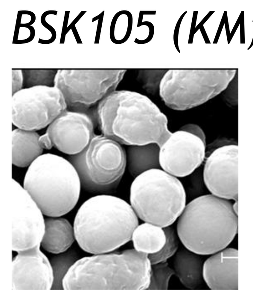
## MATERIALS & METHOD

**Organisms:**

*Saccharomyces boulardii* YUS5 (SB)



*Kluyveromyces marxianus* BSK105 (KM)



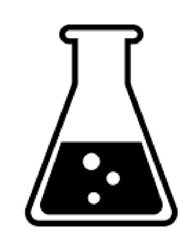
*Kluyveromyces lactis* ATCC8585 (KL)

**Cultivation:** Aerobic, 2xMineral medium[3], 1 L Flasks

**Sampling:** At stationary phase

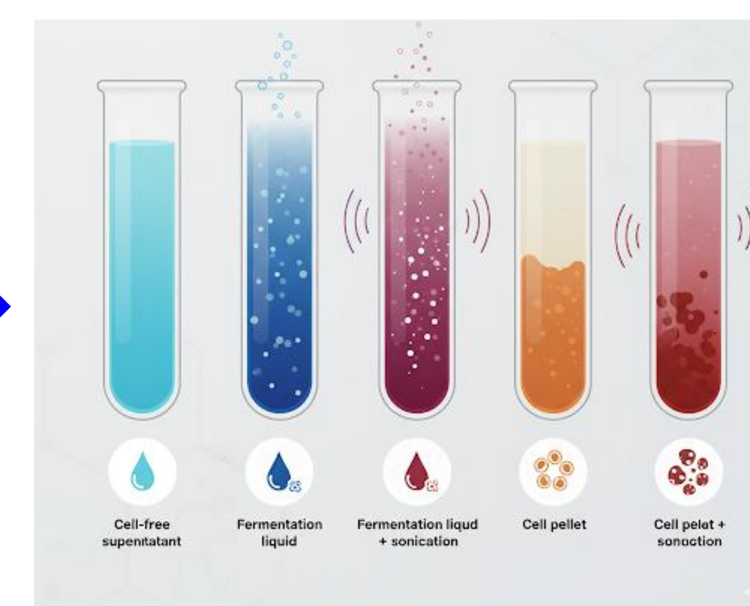
**Process:** Cultivation, Postbiotic formulations, Quantification

**Fermentation**



Mono/Co-culture

**5 Postbiotic formulations**




Heat inactivation: 80 °C, 30 min

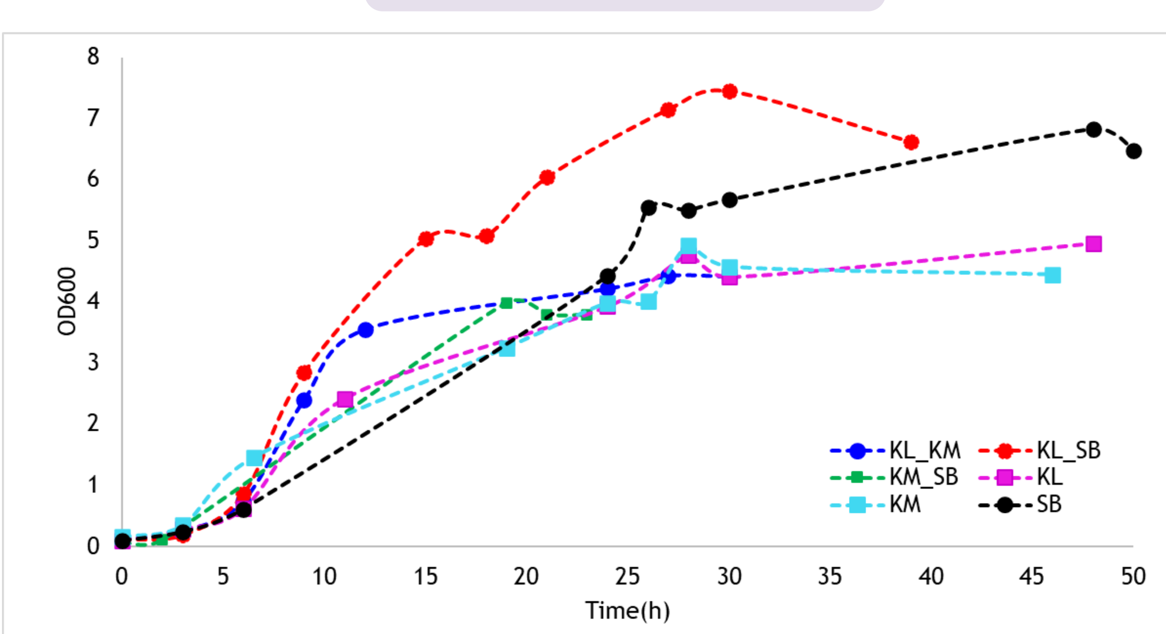
**Characterization**

- Biomass concentration (OD600)
- Organic acids, sugars (HPLC)
- Total polyphenolics (F-C reagent)
- Antioxidant activity (ABTS)
- Cell wall ingredients (FTIR, HPLC)

## RESULTS & DISCUSSION

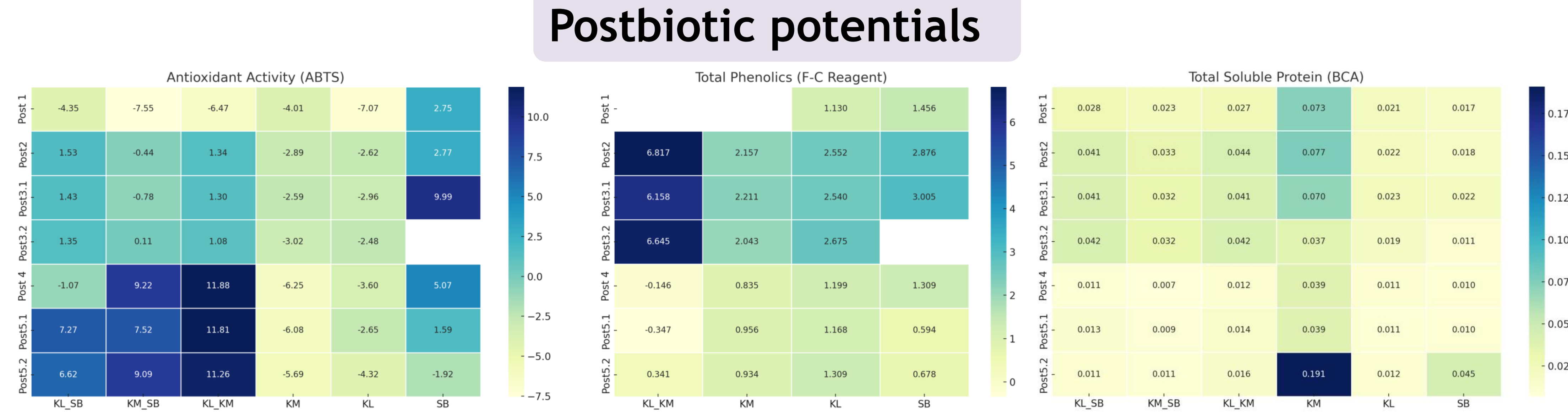
The cells were cultivated in mono- and co-culture until reaching the stationary phase, after which five distinct postbiotic formulations were prepared and their postbiotic potential was quantitatively evaluated.

### Growth profiles




- KL_SB shows the highest overall biomass yield, demonstrating strong synergistic growth between *K. lactis* and *S. boulardii*.
- KL_KM, KM_SB, and KM reach moderate plateaus, indicating balanced but less intensive growth.

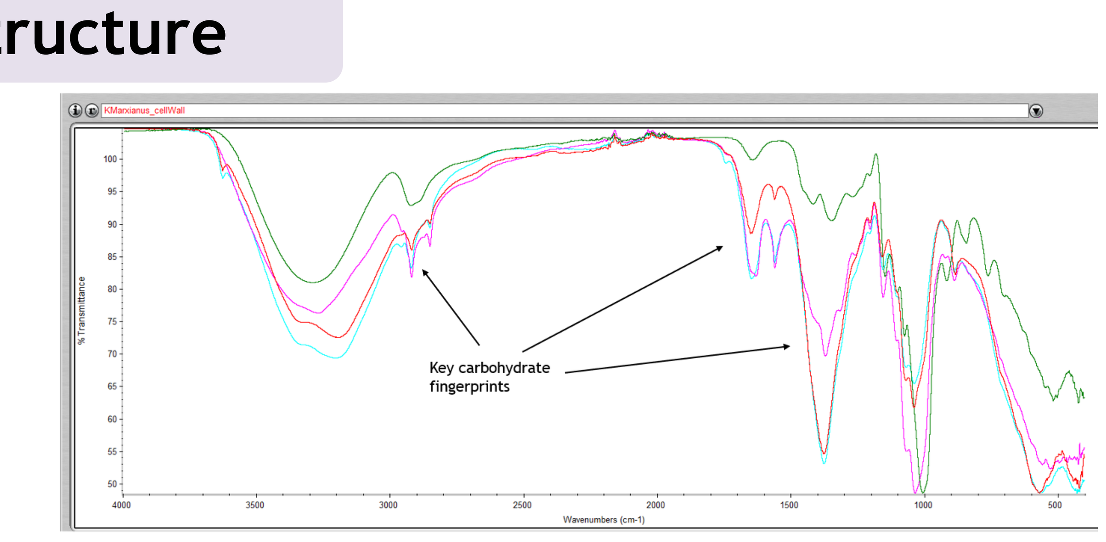
### Postbiotic potentials




- Phenolic concentration peaked in KL_KM (Post 2-3) → activation of secondary metabolism
- Highest ABTS activity in Post 3.1, especially in KL_SB and KL_KM formulations.

### Cell wall structure

- FTIR spectra showed characteristic β-glucan peaks.
- The band patterns were comparable to reported yeast cell wall profiles[4].




## CONCLUSIONS

- Mono- and co-cultures were successfully used to produce five postbiotic formulations.
- Co-culture strategies improved bioactive compound yield and functional quality of the postbiotic preparations
- The KL_KM and KL_SB formulations demonstrated the most synergistic biochemical performance
- Synergistic metabolism between *K. lactis*, *K. marxianus*, and *S. boulardii* enhanced postbiotic quality.
- FTIR analysis confirmed β-glucan-like structural patterns consistent with yeast cell wall profiles.

## REFERENCES

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## ACKNOWLEDGEMENT

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