

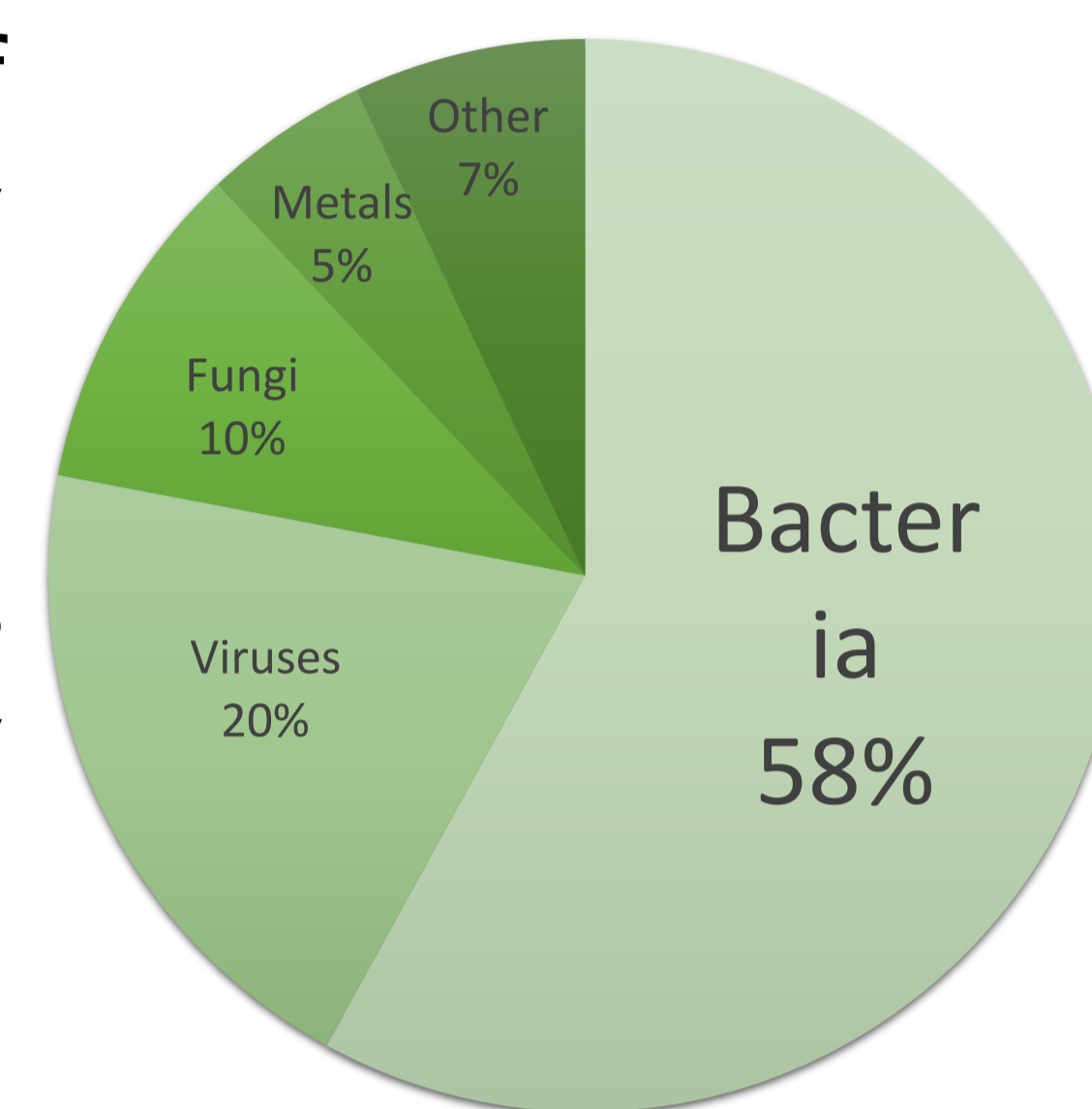
Yeasts with broad spectrum antimicrobial activities: characterization of bioactive molecules and their involvement in active biopackages

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Background and projectual idea

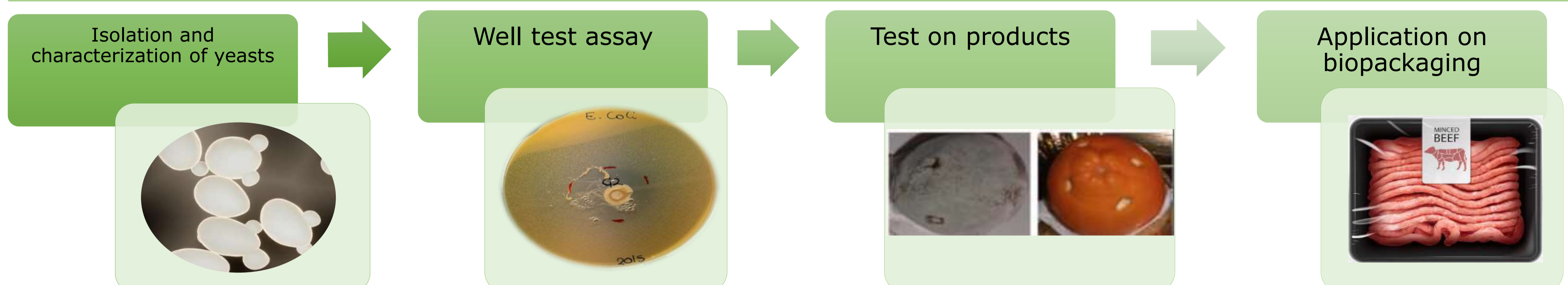
Food-borne illness (FBI) are caused by the ingestion of contaminated foods and/or beverages. Approximately 250 bio-agents could cause FBI, including bacteria, viruses, fungi. Over the past decade, preservative bioactive molecules have been heavily relied upon as sources of natural antimicrobials. In particular, they constitute more than two-thirds of newly approved medicinal products used for pharmaceutical applications.



- *Salmonella spp.*
- *Campylobacter spp.*
- *Escherichia coli (EHEC)*
- *Listeria monocytogenes*
- *Vibrio cholerae*
- *Shigella spp.*
- *Staphylococcus aureus*

Integrating antimicrobial molecules into packaging to create active biopackaging can help prevent the development and spread of spoilage and pathogenic microorganisms.

Abstract



This study aims to characterize yeasts isolated from various sources such as fruits, cheese, malt, and other anthropized environments for their antimicrobial activity against pathogens.

A general screening plate-test for the expression of antimicrobial activity was performed on more than 104 cultures belonging to 12 yeast genera, among which 17 shown great antimicrobial properties, in particular 4 strains of *Brettanomyces bruxellensis*. To develop biopackaging for perishable fruits and vegetables, the second step will involve studies on mold inhibition and the characterization of molecules responsible, such as peptides, glycoproteins, metabolites, or mechanisms like cell-cell contact and quorum sensing.

Preliminary results

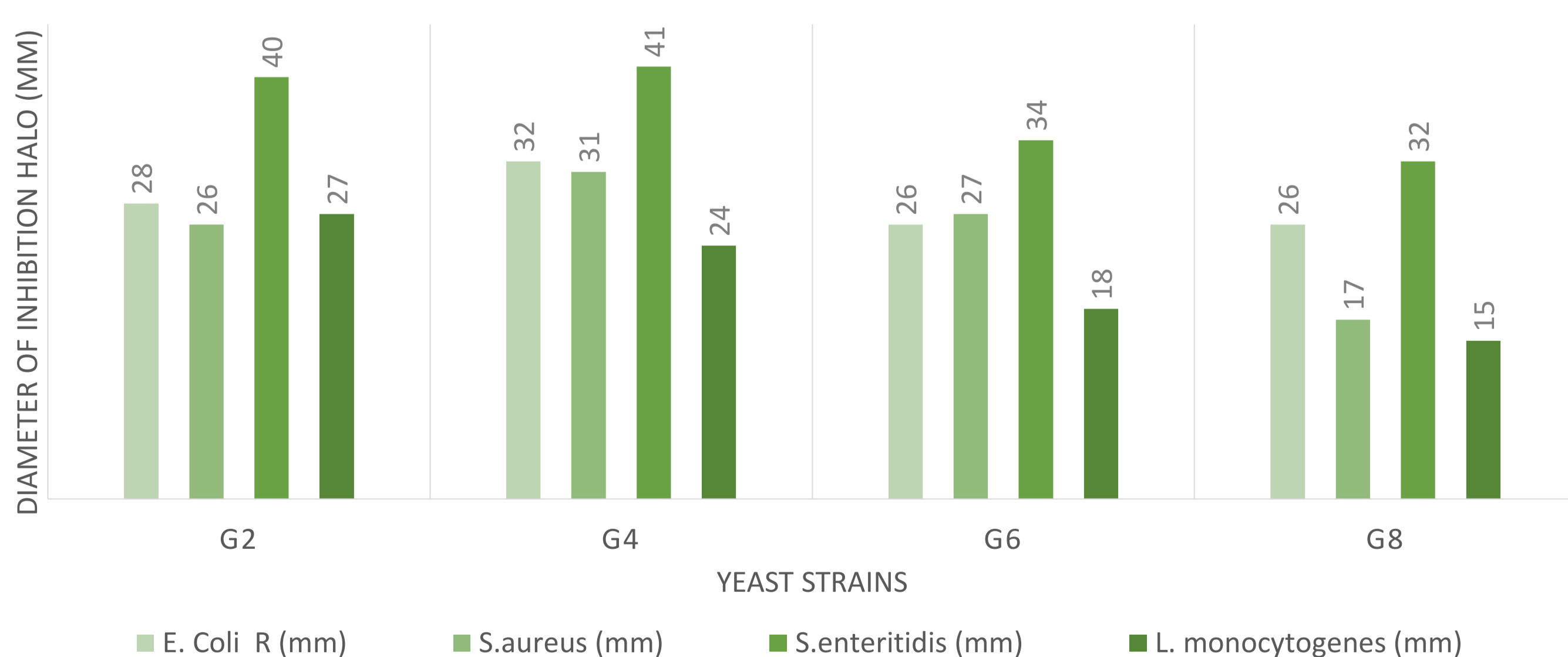
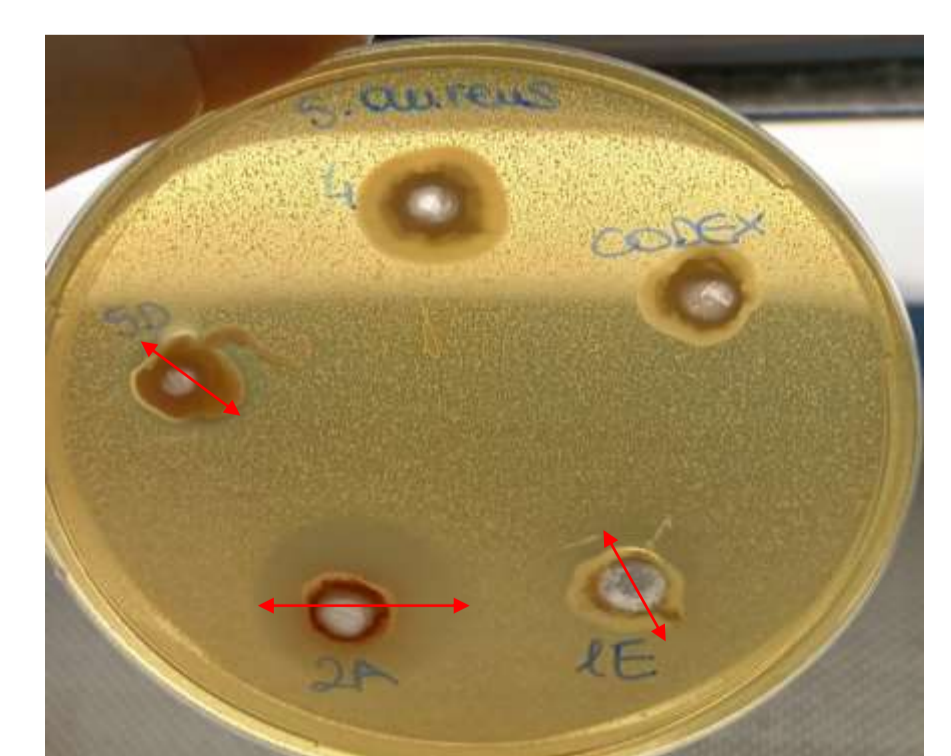


Figure 1. This graphic shows four strains of the *Brettanomyces* genus. For each strain, the diameter of the inhibition halo against *E. coli* (orange), *S. aureus* (yellow), and *S. enteritidis* (green) is represented. Down, the plates with tested strains are shown.

Out of 104 preliminary assayed yeasts, strain 2A identified as *Metschnikowia pulcherrima* seems to be responsible of:

- **Iron depletion**
- Secreted lytic enzymes
- Competition for nutrients
- Volatile compounds
- Increased ROS production
- Biofilm formation



Future prospects after antimicrobial characterization



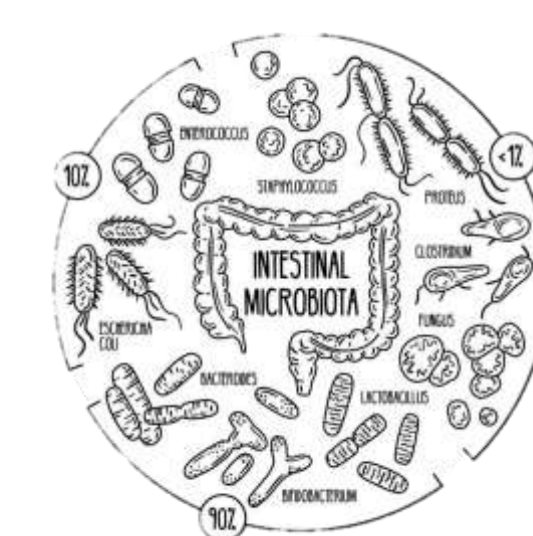
Active biopackaging



Sanitary application



Probiotic



Food industry

