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Conventional and Non-conventional Foods as Probiotic Carriers

Francesco Letizia (f.letizia@studenti.unimol.it)
Dept. of Agricultural, Environmental and Food Sciences (DiAAA), University of Molise, Campobasso, Italy
Tutor: Prof. Massimo Iorizzo

Abstract

This PhD project is aimed at the isolation and characterization of microorganisms (yeasts and lactic acid bacteria) to be used as probiotics in human diet. In addition to the classic selection criteria (antimicrobial activity, health safety, gastro-intestinal transit resistance, etc.) further selective tests will be performed to evaluate other specific properties including antioxidant activity (e.g., glutathione synthesis), enzymatic activity (e.g., glucosidase, rhamnosidase, protease), production of exopolysaccharides (EPS) and gamma-aminobutyric (GABA). After preliminary screening, some of these potential probiotics will be used in the fortification of different foods.

State of the Art

Probiotics are "live strains of strictly selected microorganisms which, when administered in adequate amounts, confer a health benefit on the host" (Martín and Langella 2019). Probiotic microorganism must show non-pathogenic properties; ability to survive in the digestive tract; adherence to the intestinal epithelium; colonization of the intestinal tract; production of antimicrobial substances; adequate survival (stability) in the form of powder, liquid or food (Shewale et al. 2014).

Possible effects of probiotics on human health

Metabolic effects
- Vitamin, fatty acids, polyphenols, GABA and protein synthesis
- Lower serum cholesterol
- Improved lactose intolerance

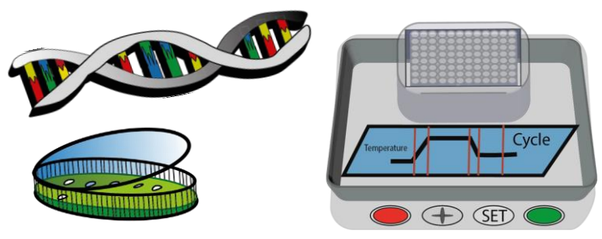
Immunomodulation
- Decreased allergic reactions and food allergy
- Reduced inflammation
- Stregthened innate immunity

Normalised gut microbiota
- Improvement in gut disorders and infections
- Reduction of colon cancer risk
- Reduction of irritable bowel syndrome

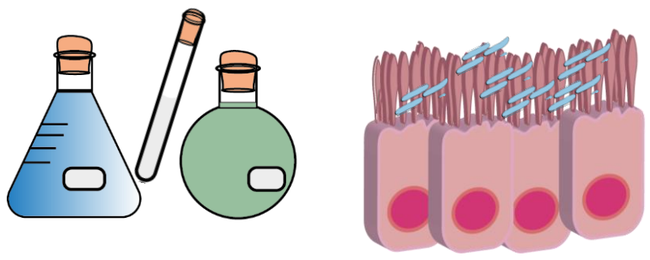
Inhibition of pathogens growth
- Production of anti-pathogenic compounds, like bacteriocins, organic acids, diacetyl, acetaldehydes, H_2O_2 and peptides
- Suppression of endogenous and exogenous pathogens

PhD Objectives and Milestones

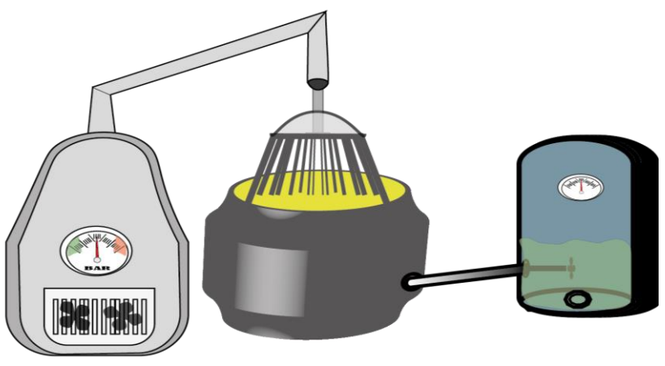
✓ **First year activity:**
Isolation of microorganisms from different sources, genotypic and phenotypic characterization

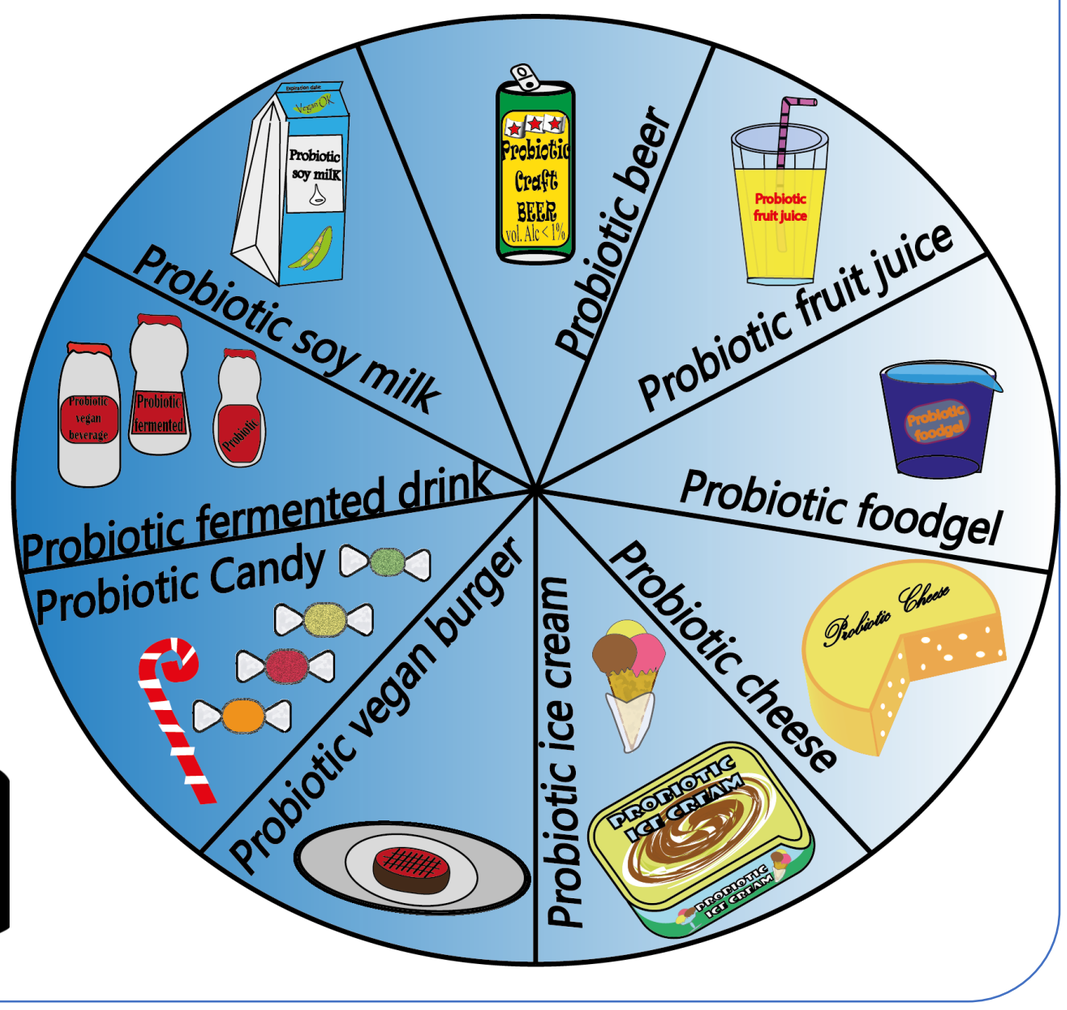


✓ **Second year activity:**
Assessment of functional and probiotic properties of the isolated microorganisms



✓ **Third year activity:**
Employment of selected microorganisms in fortification of different foods not usually used as probiotic carrriers





References

Shewale RN, Sawale PD, Khedkar C, Singh A (2014) Selection criteria for probiotics: A review. *Int J Probiotics Prebiotics* **9**:17–22;
Martín R, Langella P (2019) Emerging Health Concepts in the Probiotics Field: Streamlining the Definitions. *Front Microbiol* **10**:1047–1047.