



# Antimicrobial Characteristics of *Saccharomyces cerevisiae* and their Industrial Applications

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## DESCRIPTION

Yeasts represent a large and heterogeneous group of microorganisms currently attracting scientific and industrial attention. The numerous and diverse biological activities make it a promising product for a wide range of applications not limited to the food sector. In addition to its major contribution to the flavor development of fermented foods, it is now well known for its antagonistic action against undesirable bacteria and fungi. These activities are associated with nutrient competitiveness, acidification of the growth medium, tolerance to high concentrations of ethanol, and release of killer antifungal toxins or antimicrobial compounds such as 'mycosine' and antimicrobial compounds. Food design with probiotics (microorganisms that confer health benefits) has primarily focused on *Lactobacillus* and *Bifidobacterium*, but the yeast *Saccharomyces cerevisiae* var. *Boulardii* has long been known to be effective in treating gastroenteritis. This review examines the antibacterial activity of yeast. We discuss the mechanisms underlying this antagonistic activity and recent applications of these biologically active yeasts in the medical and veterinary fields.

The term "yeast" originally comes from the Dutch word "gist" and refers to the foam produced during the fermentation of beer wort. Other words related to yeast, such as the French word "levure", refer to the role of yeast in raising bread dough. Few other microorganisms can match yeast in historical, economic and scientific importance. In addition to their role in the production of fermented foods and beverages, yeasts play a variety of roles in animal feeding and the veterinary, medical, biomedical and pharmaceutical industries. One of these tasks is mainly to fight other microorganisms such as unwanted yeasts, molds and bacteria.

The antibacterial activity of several products, including commercial formulations currently used in sugar and alcohol factories, has been tested against *Saccharomyces cerevisiae* and the natural pollutants *Lactobacillus fermentum* and *Leuconostoc mesenteroides* by consistent MIC (Minimum Inhibitory Concentration) tests determined by the use of antagonistic bacteria to inhibit pathogenic bacteria has been extensively studied over the years, but little attention has been paid to yeast, which has a similar role. Therefore, research and potential applications of antimicrobial compounds secreted by yeast are still in the early stages of development. The discovery of yeast antagonism has had a major impact on many fields such as food, agriculture, medicine, veterinary medicine, and environmental protection. The next section of this paper provides an up-to-date summary of published results on the antagonistic properties of yeast.

Over the last decades, antagonistic yeast starter cultures have been used in various food processing industries. It is well known that end-product quality in industries such as winemaking, sausage making, cheese aging, bakery, and cocoa and coffee bean 'fermentation' is directly affected by spoilage microbial development. Antagonistic yeast starter cultures primarily contribute to product safety by inhibiting growth of pathogens during fermentation, and complement product organoleptic properties and shelf life by inhibiting spoilage organisms. The antibacterial activity of several products, including commercial preparations currently used in sugar and alcohol factories, has been tested against *Saccharomyces cerevisiae* and the natural pollutants *Lactobacillus fermentum* and *Leuconostoc mesenteroides* by consistent MIC (Minimum Inhibitory Concentration) testing.

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