Physical, mechanical properties and antifungal activity of bioactive film containing *Williopsis saturnus* var. *saturnus* antagonistic yeast

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The mold growth leading physical, chemical and sensory changing in food products and carrying health risks with toxin production is a main problem in the food industry. In our study, as an alternative solution, bioactive materials were developed by incorporating *Williopsis saturnus* var. *saturnus* at different concentrations (0; 3.2; 6.8 and 8.8 cfu/cm²) into whey protein concentrate (WPC) based edible films. Viability of *W. saturnus* var. *saturnus* in the films was investigated during the time of the storage. Moreover, the antifungal activity of the films incorporated with *W. saturnus* var. *saturnus* was also tested against *Penicillium expansum* and *Aspergillus niger*. The effect of the antagonist yeast occurrence in the film on physical properties and microstructural properties of the films were analyzed. The optical properties and the mechanical properties of the film samples were also observed by SEM and Instron, respectively. The results showed that bioactive WPC films containing 8.8 log cfu/cm² *W. saturnus* var. *saturnus* were able to maintain more than 60% of the initial antagonist yeast population. In addition, the films incorporated with the antagonist yeasts reduced mycelium growth of *P. expansum* and *A. niger* on the medium by more than 29% and 19% at pH 4.5, respectively. Incorporation of more than 3.2 log cfu/cm² antagonist yeasts significantly increased water vapor permeability of the films (*P*<0.05). Increased population of the yeasts also significantly increased percent water solubility of the films (*P*<0.05). Moreover, the distribution of the antagonistic yeasts in the films presented homogenous microstructure at SEM. Increasing concentration of the killer yeasts in the films presented a significant tendency to greenness and yellowness as well as lightness values (*P*<0.05). The concentrations more than 3.2 log cfu/cm² of killer yeast population in the films significantly increased tensile strength but decreased percent elongation at break (*P*<0.05).

Recent Publications


Biography

Gulsah Karabulut graduated from Ankara University, Department of Food Engineering in 2011. She started her graduate studies in Sakarya University Department of Food Engineering. She is currently working as a research assistant at the Department of Food Engineering at Sakarya University. Work areas include food microbiology, edible films, biodegradable packaging, biocontrol applications.

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