FY19 USWBSI Project Abstract

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PROJECT 1 ABSTRACT
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Mycotoxins represent the most significant problem to brewing companies. The primary source of mycotoxins is brewing grains, which include barley, wheat, rye, maize and rice. The Fusarium mycotoxin, deoxynivalenol (DON), is most prevalent in North America and on a worldwide basis. Past research has shown that Fusarium contaminate grains can produce higher DON compared to original grains during malting processing and DON present on malted barley can be transferred to beer at very high levels of recovery, and thus represents a food safety threat.Currently, the most effective way to control FHB infected grains for malting company is to avoid malting grains that contains DON more than 0.5 ppm.There is an urgent need within the farmer and malting industries to develop new antifungal strategies against Fusarium growth and production of mycotoxins, would benefit growers and the industry, as they could allow the utilization of some FHB infected grain.

Recently, chitosan received lots of attention due to antifungal activities, biodegradable and nontoxic properties. Chitosan is soluble in acidic condition and the free amino groups on the polymeric chains contributes to its positive charge. The antifungal activity of chitosan is dependent on many factors including environmental conditions such as pH, food matrix and its structural conditions such as molecular weight. Neverlethess, its commercial application in liquid food matrix is limited because of poor solubility in water. Potentially, nanostructured based chitosan delivery systems could improve their solubility in water without adversely affecting antifungal activity of chitosan. However, there is currently no information about the potential application of chitosan nanoparticles targeting fusarium and mycotoxins during malting processing. There is therefore a need for basic research to determine the relationship between functional performance (e.g., antifungal and antimycotoxigenic efficacy) and physical properties of chitosan-nanoparticles during mating processing. This project is designed to address these important problems.