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PROJECT 1 ABSTRACT
(1 Page Limit)

Widespread use of chemical pesticides can be viewed as a non-sustainable agricultural practice because of concerns over increasing pest resistance and potentially deleterious environmental consequences. By contrast, the use of naturally occurring microorganisms to biologically control plant diseases is a sustainable agricultural practice but faces several challenging hurdles during product development. The overall goal of our USDA-ARS and Ohio State University research team is to develop strategies and microorganisms to play a key role in the integrated management of FHB. Reliability of performance can be a particularly vexing concern where known efficacious strains occasionally fail to provide pathogen control. However, recent biocontrol literature has demonstrated and proposed mechanisms to account for greater and more consistent reductions of plant disease when using strain mixtures. A second impediment to the commercialization of biocontrol agents is the lack of adequate knowledge of fermentation and formulation technologies needed to maximize strain tolerance of the biological stresses encountered during industrial cultivation, cell separation, processing (drying or dewatering biomass), formulation and storage. In previously funded research, we have developed fermentation and formulation methodologies to produce a series of steadily improved products containing stress tolerant biomass of the yeast *Cryptoccoccus nodaensis* OH 182.9. Our current dried diatomaceous earth formulation of OH 182.9, while possessing a long shelf-life and efficacy, would receive greater user acceptance if formulated as a wettable granule containing minimal amounts of potentially abrasive inert ingredients. A primary objective of our proposed FY 05 research, therefore, will be to determine dose-response bioefficacy curves for 2 newly discovered choline-utilizing biocontrol strains in order to select the most economical dose of these strains for multiplexing with our two most efficacious strains from previous work (*C. nodaensis* OH 182.9 and *Bacillus subtilis* OH 131.1). Combinations of two, three and four strains will be evaluated in replicated field studies conducted in Peoria, IL and Wooster, OH. A second objective of this work will be to develop a fluidized-bed drying methodology for strain OH 182.9 to produce a wettable granule product that maximizes cell survival, shelf-life and product ease of use. Completion of this research will advance the development of a user friendly, wettable granule FHB biocontrol product based on our patented yeast *C. nodaensis* OH 182.9 and provide solutions to biocontrol reliability concerns by identifying effective combinations of our individual FHB biocontrol strains. Upon further scale–up and testing with a commercial development partner, a biocontrol product of FHB that is based on strain OH 182.9 alone or in combination with newly discovered antagonists should significantly contribute to an effective integrated control program against FHB.