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PROJECT 1 ABSTRACT

(1 Page Limit)

Results of research on FHB management clearly indicate that only by integrating the best of all possible tools for disease control will significant reduction of FHB be achieved. 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. In 2001, a frozen biomass concentrate containing the active ingredient *Cryptoccoccus flavescens* (nomen nudum = *C. nodaensis*) OH 182.9 was tested in the Uniform Fungicide Trial (UFT) of the USWBSI and demonstrated to be effective in reducing FHB severity. Not generally recognized is the fact that this product reduced deoxynivalenol (DON) by nearly 30% on average across all seventeen of the 2001 test sites that reported FHB symptoms. Since this time, we have developed fermentation methodologies that have resulted in a steadily improved product containing stress tolerant cells of active ingredient (AI) *C. flavescens* OH 182.9. With this success, commercial interest in licensing this technology for the purpose of producing a commercially available biocontrol product for the agricultural community has surfaced. Therefore, in order to determine if stress tolerant AI is as or more effective in reducing DON as the AI used in the 2001 studies and to facilitate the transition of AI OH 182.9 to commercial production our research objectives are: 1) to evaluate stress tolerant AI OH 182.9 for ability to reduce DON and FHB symptoms in field tests conducted in Illinois, Missouri, Michigan and Ohio and 2) to develop a commercially viable liquid production medium and test cells of AI OH 182.9, produced therein, for biocontrol equivalence to stress tolerant AI in greenhouse and field studies. In order to achieve objective 1, stress tolerant biomass of AI OH 182.9 will be produced in multiple runs of 100 L B-Braun D-100 fermentors, concentrated using a Sharples 12-V tubular bowl centrifuge, and the resultant biomass paste frozen until application on two or more varieties of wheat at each of the 4 state field locations. For objective 2, industrial production media will be developed using inexpensive carbon and nitrogen sources such as molasses, Pharmamedia, Hy-Case Amino or corn steep liquor. Cells of AI OH 182.9 resulting from the commercial prototype medium that support high yields of biomass will be assayed against our best stress tolerant AI and the fungicide Proline for efficacy against FHB in greenhouse and field tests in Illinois and Ohio. The research proposed herein directly addresses the third MGMT FY 08 research priority: "Develop the next generation of management tools for FHB/DON control". Completing the research described in this proposal will clarify the potential of stress tolerant AI OH 182.9 to reduce DON in grain and contribute to the goal of developing protocols for producing efficacious AI OH 182.9 in a commercially feasible medium; a crucial step in the development of OH 182.9 into a commercially available tool for the integrated management of FHB.