PI: David Schisler
PI's E-mail: schislda@ncaur.usda.gov
Project ID: 0405-SC-028
FY03 ARS Agreement #: NA
Research Area: CBC
Duration of Award: 1 Year
Project Title: Pilot-scale Production, Stabilization and Field Testing of a Biocontrol Product.

PROJECT 1 ABSTRACT
(1 Page Limit)

As a result of public concerns about the safety of our environment and food supply, it has become a national research priority to develop new pest management technologies that reduce our use of chemical pesticides. Microorganisms naturally present in agricultural ecosystems are being studied as environmentally compatible alternatives or supplements to reduced levels of traditional chemicals for reducing plant disease. Specific advantages to developing strategies for biologically controlling Fusarium head blight (FHB) include public acceptance of an environmentally friendly disease control option, compatibility with other disease management measures and biocontrol durability. Several major hurdles stand in the way of producing an economical, effective commercial biological control product for use against FHB. A key impediment to the commercialization of biocontrol agents is the lack of knowledge of cultivation and formulation technologies needed to commercialize efficacious strains via maximizing strain tolerance of the biological stresses encountered during industrial cultivation, separation, processing (drying or dewatering biomass) and storage. In past research with our patented FHB biocontrol strain *Cryptococcus nodaensis* OH 182.9, we have established that the strain reduces FHB in field tests on hard red spring, durum and soft red winter wheat when biomass of the yeast was produced using pilot-scale liquid fermentation production protocols and stored as a frozen concentrate. The development of a dried product would have potential advantages of ease of handling, convenience in transportation, favorable economics and commercial-producer and consumer acceptance. We have discovered that temperature shocking OH 182.9 during inoculum production in liquid culture greatly enhances the stress tolerance of the cells, as demonstrated by only negligible losses in viability of frozen cells after months in storage. A primary objective of our proposed research will be to determine the timing and type of biomass temperature shock required to produce a product that is both effective and possesses an extended shelf life when in a dried state. The second objective of this work will be to utilize this information to develop pilot-scale quantities of a dried OH 182.9 biocontrol product processed using state of the art rotary drum vacuum filtration followed by product air drying. The shelf-life of this product will be determined and its efficacy tested in field trials conducted at Peoria, Illinois and Wooster, Ohio. If our research is successful at developing these new technologies for producing, formulating and storing cells of biocontrol agents, farmers will be provided with new biological pest control tools that will reduce wheat crop losses without adding to the chemical input already burdening our environment. Breakthroughs in these areas of technological development would also generally facilitate the manufacture and marketability of many environmentally friendly biological control agents capable of controlling numerous diseases in cereals and other crops.