

Proposal No. _____

The Anderson Research Grant Program 2003 – 2005

Project Title: SURVEY OF THE MICROBIOLOGICAL QUALITY OF THE WHEAT CROP FROM THE NORTHERN PLAINS AND EVALUATION OF OZONE FOR REDUCING MICROBIAL LOADS AND MYCOTOXIN CONTENT IN WHEAT

Principal Investigator(s)

Name	Institution/Agency/Other
Charlene E. Wolf-Hall	North Dakota State University
Frank A. Manthey	North Dakota State University
Monisha Chakraborty	North Dakota State University

(Attach an additional sheet is more space if needed.)

Project Contact:

Name:	Charlene E. Wolf-Hall
Address:	Department of Veterinary and Microbiological Sciences
	Great Plains Institute of Food Safety
	1523 Centennial Blvd
	114A Van Es Hall
Phone:	701-231-6387
Fax:	701-231-7514
E-mail:	charlene.hall@ndsu.nodak.edu

Period of Proposed Project Dates:

Beginning: September 2003 Ending: August 2005 _____

Amount Requested (maximum \$20,000 per year for two years):

Year 1: \$20,000 _____ Year 2: \$20,000 _____



Problem Identification and Related Research

Cereal grains contain a wide assortment of microflora including bacteria, actinomycetes, molds and yeasts (5). Once harvested and stored under ideal conditions, cereals have water activities below minimums needed for microbial growth; however, they still contain large numbers of viable, but dormant bacteria (10). Enteric pathogens, such as *Salmonella* spp. may be among this microflora, if fecal contamination has occurred anywhere from pre-harvest through milling. Other spore forming bacterial pathogens such as *Bacillus cereus* and *Clostridium botulinum* may be present as well. Nonpathogenic bacteria can present spoilage problems in milled products and foods made from milled products. Bread and pasta (particularly fresh pasta) are susceptible to microbial growth during processing and storage (10). Molds and yeasts in milled products can also contribute to spoilage in products. For these reasons, microbiological standards for cereals and milled products have been deemed necessary by food processors. However, some currently used standards may not be practical or based on sound scientific information.

Flour from hard red spring (HRS) wheat (*Triticum aestivum* L.) is used to make bread. Pasta is usually made from semolina, the coarsely ground endosperm of durum wheat (*T. turgidum* var. durum L.). The Northern Plains produces over 90% of the HRS wheat and nearly 80% of the durum wheat in the United States (24).

The milling industry commonly analyzes for the presence of *Salmonella* and *Staphylococcus aureus* and for acceptable levels of coliforms and/or *Escherichia coli*, molds, yeasts and aerobic plate counts. Some mills also test for *Listeria* if requested by the customer. Mycotoxins such as deoxynivalenol (DON) are also tested for incoming wheat and finished milled products. The United States Food and Drug Administration has an advisory level for DON in finished wheat products destined for human food set at 1 : g/g (2).