

Fecal Coliform Strain Identification to Facilitate Water Resource Management in South Dakota

Eric Jorgenson

Abstract

Water pollution by fecal coliforms is an increasingly important issue throughout the nation. The past 20 years have provided a dramatic growth in bacterial source tracking methods. In our study, a database of approximately 2800 *Escherichia coli* isolates from seven different host sources obtained from four different ecoregions in South Dakota, is being constructed. *E. coli* is isolated from raw fecal samples and wastewater samples on mFC and EMB agar plates. An EC-Mug assay is performed to confirm that each isolated strain is *E. coli*. These isolates are sent to Florida for antibiotic resistance analysis and the results and database are sent back here for statistical analysis. Once comparisons between ecoregions and animals are made the testing of the database will begin. This will be done by taking water samples with a known source of pollution will be tested. Finally, blind water samples will be taken from various lakes and streams to implement the bacterial source tracking method and the database will be turned over to the SD DENR and the State Health Department.

Mass Balance of Phytosterols and Tocols During Corn Ethanol Production

By: Tina Rausch

Abstract:

Phytosterols and tocopherols (tocopherols and tocotrienols, otherwise referred to as vitamin E) have the potential for many health benefits associated with atherosclerosis, low-density lipoproteins (LDL) oxidation, smooth muscle proliferation, and cancers. Because of these potential health benefits, any resources containing phytosterols and tocopherols are very valuable. Corn is a good source of these phytochemicals, however the byproducts of dry-milling plants remain under-utilized. Therefore, by determining the quantities of phytosterols and tocopherols in various fractions throughout the dry-milling process, we are able to tap into a new source for these phytochemicals, increase the demand for corn-based products, and impact our economy.

Agrobacterium-mediated An Antisense Gene Transformation of Soybean

Xiang Liu

Abstract

During oil biosynthesis of soybean, diacylglycerol (DAG) is a branch point for oil biosynthesis and membrane biosynthesis, and the membrane biosynthesis must be catalyzed by cholinephosphotransferase (CPT). Based on a mechanism that an antisense RNA can block the translation of corresponding mRNA, it is expected to increase soybean oil biosynthesis by blocking CPT synthesis. So the main purpose of this experiment is to transfer CPT antisense gene into soybean using Agrobacterium-mediate. To obtain transgenic plant, first a CPT antisense gene is inserted into plasmid pCB302 and located upstream of a resistant gene (bar) of herbicide to form plasmid pCB-GF1. Then the plasmid is transferred into Agrobacterium EHA105 that will infect soybean cotyledonary nodes and transfer the T-DNA into soybean cells. Although Agrobacterium-mediated transformation is versatile method, the frequency of transformation of soybean is still very low, not only because the insertion of transgenes is random but also because many factors affect the process of transformation. So in this experiment, the effects of T-DNA, density of Agrobacterium, concentration of AS, and light intensity will be tested during co-culture to get the best strategy. Finally the expression of the presumed transgenic plants will be analyzed.

Expression of stem rust resistance gene Sr25 in wheat

Lanfang Bai

Abstract

The infection-induced expression of wheat stem rust resistance gene Sr25 was investigated in leaves of near-isogenic lines Sr25 /9* LMPG and LMPG-6 (intermediate resistant and susceptible to the stem rust fungus (*Puccinia graminis* f.sp. *tritici*) using differential display. The preliminary data showed several types of gene expression patterns: 1) Polymorphic ESTs present only in LMPG-6; 2) ESTs present only in Sr25/9*LMPG (both oil and pathogen inoculated); 3) ESTs present both in the pathogen inoculated LMPG-6 and Sr25/9*LMPG; 4) ESTs present only in oil inoculated Sr25/9*LMPG; 5) ESTs present only in pathogen inoculated Sr25/9*LMPG. The ESTs presented only in pathogen inoculated Sr25/9*LMPG are the most promising and possible ones that are specifically related to stem rust resistance conferred by Sr25. The ESTs of interest will be further identified, cloned and sequenced as well as further verified by Northern and Southern blots.