SOYBEAN RESEARCH AND PROMOTION BOARD

Progress Report

TITLE: **Protein, Amino Acid Composition, and Bioactive Peptides (Protein Fragments) in Meals of High Oleic Acid Soybean Lines Developed By Dr. Pengyin Chen (Soybean Breeder)**

INVESTIGATORS: Principal Investigator: Navam Hettiarachchy
Co-Principal Investigator: Pengyin Chen

Priority Area: Improving Soybean Nutritional Quality, Nutraceutial Properties and Profitability

Introduction: The University of Arkansas soybean breeding program has identified a line (N98-4445A) with high (65%) oleic acid content. In addition, Dr. Chen has developed 32 new breeding lines with good yield potential and mid to high oleic acid.

Research progress: 34 new lines of soybean seeds were provided by Dr. Chen. Of these 5 were high oleic acid, 7 were low linolenic acid, 3 were low saturated fat, 7 were high protein and high fatty acid, 8 were high fatty acid, and the remaining 4 were check. Protein content of the 34 new lines ranged from 41 to 46%. High (65%) oleic acid content lines N98-4445A and S03-543 CR also had highest protein content (46%) among the lines investigated. The defatted meals produced after oil extraction from 34 lines are being subjected to protein hydrolysis to characterize and quantify the 20 amino acids in each line. Standards to identify the amino acids have been run in the amino acid analyzer. Lines with high sulfur amino acids (soybean is deficient in one of the eight essential amino acids, namely methionine) will be identified for their use for high quality protein. Selected soybean lines with high oleic acid and high sulfur amino acids will be hydrolyzed using proteolytic enzymes to obtain protein fragments. These protein fragments will be investigated for health benefits.

Significance, Impact and value to the Grower: Identifying soybean lines with high methionine content will enhance the nutritional and nutraceutical quality of soybean. Identifying protein fragments that are active against hypertension; and colon, lung, breast, and prostate cancer can have a great impact on the health of consumers and will add value to the soybean crop when selling the seeds at a higher price than the regular commercial lines. With more than 70 million baby boomers in the U.S. poised to join the ranks of those aged 65 or over, the prevention of diseases by natural means is one of the few tools available to reduce the expected growth of health care and long-term care costs. Soy protein peptides with antihypertensive and anticancer activities can find wider applications in numerous food products, dietary supplement, and therapeutic diet categories, and a significant place in the market, and will be in great demand by the consumer, and benefit the growers in Arkansas.