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Co-product utilization-the case of soybeans

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Statement of the Problem: Soybean production accounts for ~90% of oilseeds production in the U.S. Oil from soybeans is conventionally extracted mechanically using screw press or by using organic solvent. While former process denatures the proteins, the later has potential health and environmental hazards. The drawbacks of these processes can be overcome by sustainable use of enzymes, which allows recovery of both oil and proteins. Enzyme assisted aqueous extraction process (EAEP) uses water as extracting medium and can achieve ~97% oil recovery from soybeans. However, one limitation of the EAEP process is production of surplus amounts of skim and insoluble fiber.

Aim: The purpose of this study was to determine how to best utilize co-products, skim and insoluble fiber, produced from the EAEP of soybeans.

Methodology: The effect of addition of skim and insoluble fiber on ethanol production, oil recovery and quality of dried distillers grains (DDG) in corn fermentation was investigated. Enzyme cocktail (fiber hydrolyzing enzymes and/or protease) and surfactant were used to maximize efficiency of the process.

Findings: Addition of soy co-products to corn fermentation increased ethanol yield and decreased fermentation time by 38 h compared to corn-only fermentation. Maximum oil recovery was achieved from [corn only] and [corn+insoluble fiber] slurries when pectinase, cellulase and Fermgen were added to corn-soy slurry during fermentation and when Tween80 was used as a surfactant.

Significance: This research has demonstrated potential of soy co-products from EAEP of soybeans in maximizing ethanol and oil recovery from corn fermentation.

Biography

J K Sekhon is an Assistant Professor in the Department of Culinary Arts and Food Science at Drexel University. Her research addresses utilization of co-products from the food industry, with specific focus on developing processes to utilize these co-products, study the effect of processing on the quality of the product and determining nutritional value of the developed product.

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