

Optimization of Oil Extraction of Soy Flour Using Mini Extrusion Technology

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Mini extrusion technology is a relatively new technology that offers fast timing and processing of food products. This technology paired with the advantageous properties and growing demand for soybeans can lead to a larger span of uses for the extruder that have not yet been explored, including NASA space missions and incorporation of soybeans into developing countries. During past research on parameters of operation, it was discovered that a significant amount of oil was being separated from the soy meal at the die of the mini extruder. Maximum removal of this oil allows use of the soy meal and soy oil to be maximized, and further, may allow reduction in chemical methods of oil removal being currently used in industry.

This study was aimed to maximize oil extraction from soy flour using mini extrusion technology by varying moisture content, which has been observed at lower levels to increase temperature at the die and shear within the system. Soy flour dried to 6% and soy flour at a level of 8.5% were extruded, and oil content before and after extrusion were tested using the Soxhlet extraction method. An original die was used to physically improve separation of oil using a cylindrical shape, with use of three rows of small holes to remove oil before extrudate is pushed out the end of the cylinder. Temperature at the die was taken using a thermocouple. Past studies have shown that oil removal in dehulled soybeans neared 60% at a temperature of 165°C. Further studies should observe different die configurations, including one that increases the porosity of the die to allow more oil to separate naturally from the product. More variations of moisture content should be looked into as well.