

ANTI-INFLAMMATORY EFFECTS OF EXTRACTS FROM A BIOENERGY CROP, SWITCHGRASS, IN ADIPOCYTES

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Oral Presentation

Suggested Session: Feedstock Conversion

Funding Agency: Southeastern Sun Grant and USDA

Obesity is a chronic low grade inflammatory disease that is associated with several metabolic diseases, such as diabetes and heart disease. These obesity-related diseases are at least in part due to adipose tissue expansion, adipocyte hypertrophy and inflammation. Various bioactive compounds from food and botanicals have been used as anti-inflammatory agents in various diseases. We are specifically interested in switchgrass, a bioenergy crop, whose potential anti-inflammatory roles have been up to now, unexplored. Hence, we hypothesize that bioactives from switchgrass may have potential benefits on obesity-related inflammation by reducing proinflammatory adipokines. Bioactives were isolated from switchgrass using ethanol and further fractionated using different organic solvents. To test our hypothesis, 3T3L1 preadipocytes were pretreated with the crude/fractionated switchgrass extracts followed by lipopolysaccharide (LPS) to determine if the extracts reduced LPS-induced inflammation. Our results show that some of these extracts reduced significantly and dose-dependently, secretion of Monocyte Chemoattractant Protein-1 (MCP-1) and Interleukin-6 (IL-6) from 3T3-L1 cells. Furthermore, using MTT assays, some extracts significantly reduced cell viability while others did not. In summary, these findings demonstrate that switchgrass-derived bioactives reduce preadipocyte inflammation and provide the first evidence for an added value of switchgrass in obesity-related inflammation. Additional studies are needed to characterize the specific phytochemicals responsible for the reduction in inflammation and their mechanism of action. In conclusion, bioenergy crops such as switchgrass are economically viable sources of anti-inflammatory dietary supplements.