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Objectives: Ulcerative colitis (UC), a major form of inflammatory bowel disease (IBD), is on the rise worldwide. Approximately 3 million people suffer from IBD in the US alone, but the current therapeutic options (e.g., corticosteroids) come with adverse side effects including reduced ability to fight infections. Thus, there is a critical need for developing effective, safe and evidence-based food products with anti-inflammatory activity. This study aimed to evaluate the anti-inflammatory potential of purple-fleshed potato anthocyanins using a dextran sodium sulfate (DSS) murine model of colitis.

Methods: Four weeks old male C57BL/6 mice were randomly assigned to control (AIN-93 G diet), P15 (15% purple-fleshed potato) and P25 (25% purple-fleshed potato) diets for eight weeks. Colitis was induced by 2% DSS administration in drinking water for six days. Intestinal permeability was measured using FITC-dextran. Serum and colonic myeloperoxidase (MPO) levels were measured using ELISA and

hexadecyltrimethylammonium bromide method, respectively. Flagellin was quantified using human embryonic kidney (HEK)-Blue-mTLR5 cells. RT-PCR was used to analyze the relative gene expression levels of cytokines and pathogenic bacteria abundance.

Results: 1) Purple-fleshed potato supplementation suppressed ($P \leq 0.05$) the DSS-induced reduction in body weight and colon length as well as the increase in spleen and liver weight. 2) P25 alone suppressed ($P \leq 0.05$) the elevation in the intestinal permeability and serum MPO levels in DSS-exposed mice. 3) The colonic mRNA expression levels of pro-inflammatory cytokines IL-6, IL-17 and TNF- α were attenuated in mice consuming P25 diet. 4) However, both purple potato diets suppressed the relative abundance of specific pathogenic bacteria such as *Enterobacteriaceae* and *pks + E. coli*. However, flagellin levels were significantly ($P \leq 0.05$) lower in mice consuming the P25 diet alone.

Conclusions: Purple-fleshed potato diet consumption dose-dependently ameliorated the DSS-induced elevation in gut permeability, oxidative stress and inflammation and pathogenic gut bacteria. Collectively, our study results suggest that purple-fleshed potatoes have the potential to be used as a functional food in the amelioration of UC symptoms.

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