UNIVERSITY of GUELPH

ONTARIO AGRICULTURAL COLLEGE

DEPARTMENT OF ANIMAL BIOSCIENCES

MSc Defence

Anti-inflammatory and Cartilage-Sparing Effects of Hemp Polyphenol Extracts in In Vitro Models of Cartilage Inflammation

Kailey Vanderboom

Date: Friday May 29, 2026 at 9:00am

The MSc Defence for Kailey Vanderboom has been scheduled for Friday May 29, 2026 at 9:00am. The defence will be held online via Teams and in ANNU141:

Examining Chair: Dr. Dominique Bureau

Advisor: Dr. Wendy Pearson

Advisory Committee Member: Dr. William Bettger

Additional Member: Dr. Tariq Akhtar

Abstract:

Cartilage has a limited capacity for self-repair due to its avascular nature, increasing interest in nutraceutical strategies that support joint health and limit inflammation. Hemp-derived polyphenol extracts contain bioactive compounds, including cannabidiol (CBD) and cannflavins, which may possess anti-inflammatory and chondroprotective properties. Therefore, the objective of this thesis was to investigate the effects of hemp polyphenol extract (HPE) and a cannflavin A-enriched fraction (CFA-FR) in porcine cartilage explants challenged with lipopolysaccharide (LPS). Across two in vitro studies, cartilage explants were conditioned with simulated digests of HPE or CFA-FR prior to inflammatory stimulation. Both extracts reduced inflammatory biomarkers, including prostaglandin E_2 and nitric oxide, while maintaining chondrocyte viability. HPE additionally increased resolvin D1 concentrations and improved glycosaminoglycan retention within cartilage tissue. Overall, these findings demonstrate that hemp-derived polyphenols exhibit anti-inflammatory and chondroprotective effects, supporting their potential use as functional nutraceutical ingredients for joint health.