



**Project Title:** Development of an Antioxidant-rich Functional Food Additive from Orange-processing By-products

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**Abstract:** Orange pomace (containing peel, seeds, and pulp) is a by-product of the juice processing industry, accounting for over half the weight of the whole orange. While, traditionally, orange pomace has been used as animal feed, it is a source of high-value polyphenols and dietary fiber. Nevertheless, several of these polyphenols (polymethoxylated flavones, limonoids, and naringin) may contribute to the bitter taste of orange pomace extracts. The current study focuses on utilizing the protein-binding capacity of polyphenols to create complexes which mitigate interactions with bitter taste receptors. Whey protein, micellar casein, and potassium caseinate were blended with the extract during the ultrasonic extraction of orange pomace in concentrations ranging from 1.7% to 5%, freeze dried, and ranked, qualitatively, in terms of bitterness and solubility. Furthermore, both the supernatant and the precipitated protein fraction were tested. The results indicated that, of the proteins tested, the precipitated fraction of potassium caseinate, at a concentration of 5% was sufficient to reduce bitterness while maintaining solubility in water. In addition, a calibration curve was developed for the Folin-Ciocalteu assay for total phenolic content. The calibration curve is currently being used to develop procedures to assess the affinity of orange polyphenols for various proteins and individual amino acids. Future research will utilize this calibration curve to identify proteins that will achieve higher binding constants and to assess the stability of orange polyphenols and orange polyphenol-protein complexes.