

Canola meal valorization via hydrolysis for amino acid generation

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Abstract

This study investigated an alternative approach to valorizing canola proteins by hydrolyzing them to generate amino acids (AAs). Pre-treatment of cold-pressed (CP) cake and desolventized-toasted (DT) meal with ethanol (99%, v/v) followed by protein separation was studied as process optimizations to maximize protein recovery with higher purity. The optimum ethanol pre-treatment conditions to achieve a meal containing less than 1% oil was reached at a meal-to-ethanol ratio of 1:4 (w:w) and 50°C for 30 min extraction. The protein recovery reached the maximum at pH 12 and a meal-to-solvent ratio of 1:10 (w:v), yielding 73% and 33% recovery from ethanol pre-treated CP and DT meals, respectively, in a single extraction. Untreated and ethanol pre-treated meals were hydrolyzed with 6 M HCl (protein-to-acid ratio of 5 mg:2 mL) for 24 h at 110°C. The ethanol pre-treatment improved AA recovery and released 373 mg AA/g dry CP meal biomass (dbm) compared to 279 mg AA/g untreated CP cake dbm. However, no improvement in AA recovery upon ethanol pre-treatment of DT meal. H₂SO₄ was examined as an alternative acid. More than 80% of the total AAs of CP proteins were released with 3 M H₂SO₄, while for DT meal proteins, a 5 M concentration was needed to achieve the same. Commercial canola meals can be utilized for generating free AAs; however, the meal processing history may affect the yield.

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