Rapeseed(Brassic napus)Oil Extraction and Glucosinolates Removal Using Alkaline/Alkanol/Water/Hexane System on A Kuhni C

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ABSTRACT

Rapeseed contains 45% edible oil and 35% high quality Protein However,the utilization of the protein in the defatted rapeseed meal was limited by the presence of toxic compound (i.e. glucosinolates). This research studied the solvent system that can effectively remove the toxins in the rapeseed meal, and applied it on a pilot scale Kuhni extraction column. Various operational conditions were studied and compared, such as, batch operation, slurry feed countercurrent extraction and dry feed countercurrent extraction, were also studied. Other operational mode in the extraction of rapeseed oil and detoxification were also carried out, such as simultaneous oil extraction and detoxification, using CH3OH/H2O/NaOH-Hexane solvent system. Batch effects of temperature, and solvent composition on oil extraction and glucosinolates (toxin) removal, over temperature range of 15°C to 36°C, were studied. Hexane to methanol ratio of 3:2(v/v) and water concentration of 5% (v/v) (final NaOH concentration was 0.08% W/V)was used. Time courses of extraction at different temperatures were taken. It was found that the effect of detoxification and oil extraction increased with increasing temperature. However, above 30°C, the improvement was less significant than that below 30°C. Oil recovery was 16% at 15°C (solid:liquid=1:4)which increased to 82% at 36°C. Residual glucosinolates(toxin)content in the rapeseed meal (after 16 min of batch extraction) was 1.4mg/g at 15°C and 0.9mg/g at 36°C. This research demonstrated that simutaneous oil extraction and detoxification under controlled temperature is of important potential application in the better utilization of rapeseeds as a source of oil and protein for human and animal.

Keywords : rapeseed ; oil extraction ; detoxification ; kuhni column

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