

Ultrasound-assisted extraction of Lupin seeds: influence on phenolic content and antioxidant capacity.

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Lupin seeds represent a potential source of plant-based proteins. However, the nutritional value of the protein extracted from lupin is considerably affected by the presence of polyphenols due to its high ability to associate with proteins during its isolation, which reduces the further digestibility of the protein isolated. This work explores how high power ultrasound-assisted (HPU) extraction of lupine flour could affect the polyphenol content compared to a conventional extraction. Conventional and ultrasonically-assisted extraction experiments (electric power of 180 W) were carried out at 3 and 9 min, two different temperatures (30 and 60 °C) and using both water and an ethanol-water mixture (20:80 v/v) as solvents. Treated flours were freeze-dried for 48 h to reach a final moisture content of $\pm 7\%$. Finally, phenolic content and antioxidant capacity were determined in the treated flour using Total Phenolic Content (TPC) and Ferric Reducing Antioxidant Power (FRAP) methods respectively. HPU application improved the extraction of phenolic compounds compared to conventional process. In general terms, compared to conventional extraction, HPU reduced the phenolic content and antioxidant capacity of the treated flour by 44 and 47%, respectively. This result represents a decrease of approximately 70% of the phenolic content and antioxidant activity of initial lupin flour. The effects of solvent, extraction time and temperature were not significant ($p > 0.05$) in HPU experiments.

Further works should elucidate the impact of the ultrasound-assisted extraction not only on the flour but also on the protein solubilization.