

## Quantification of almond skin polyphenols by liquid chromatography-mass spectrometry.

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### Abstract:

ABSTRACT: Reverse phase HPLC coupled to negative mode electrospray ionization (ESI) mass spectrometry (MS) was used to quantify 16 flavonoids and 2 phenolic acids from almond skin extracts. Calibration curves of standard compounds were run daily and daidzein was used as an internal standard. The inter-day relative standard deviation (RSD) of standard curve slopes ranged from 13% to 25% of the mean. On column (OC) limits of detection (LOD) for polyphenols ranged from 0.013 to 1.4 pmol, and flavonoid glycosides had a 7-fold greater sensitivity than aglycones. Limits of quantification were 0.043 to 2.7 pmol OC, with a mean of 0.58 pmol flavonoid OC. Mean inter-day RSD of polyphenols in almond skin extract was 6.8% with a range of 4% to 11%, and intra-day RSD was 2.4%. Liquid nitrogen (LN2) or hot water (HW) blanching was used to facilitate removal of the almond skins prior to extraction using assisted solvent extraction (ASE) or steeping with acidified aqueous methanol. Recovery of polyphenols was greatest in HW blanched almond extracts with a mean value of 2.1 mg/g skin. ASE and steeping extracted equivalent polyphenols, although ASE of LN2 blanched skins yielded 52% more aglycones and 23% less flavonoid glycosides. However, the extraction methods did not alter flavonoid profile of HW blanched almond skins. The recovery of polyphenolic components that were spiked into almond skins before the steeping extraction was 97% on a mass basis. This LC-MS method presents a reliable means of quantifying almond polyphenols.