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# Flavonoid determination in onion, chili and leek by hard cap espresso extraction and liquid chromatography with diode array detection

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**Abstract:** A low cost extraction procedure, based on the use of a hard cap espresso machine, has been developed for the extraction of myricetin, quercetin, luteolin and kaempferol from vegetables by using 50 mL of ethanol in water (80 % v/v) in less than 30 seconds. Direct determination of extracts were carried out by liquid chromatography with diode array detection (LC-DAD), offering limit of detection values from 3 to 8  $\mu\text{g g}^{-1}$ . Intra and inter-day precision ranged from 8 to 16 %, and from 10 to 23 %, respectively. Quantitative recoveries were assessed from leek and habanero, thai, and red chili samples spiked at different flavonoid concentrations with values ranging from 100 to 110 %, from 80 to 108 %, from 74 to 88 %, and from 70 to 115 %, respectively. Efficiency of the proposed extraction procedure was compared with ultrasound-assisted extraction and free quercetin was determined directly in onion samples and after an hydrolysis of extracts and/or fungal fermentation.

**Keywords:** Hard cap espresso extraction; ultrasound-assisted extraction; flavonoids; vegetables; fungal fermentation

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