Microwave-assisted extraction at atmospheric pressure coupled to different clean-up methods for the determination of organophosphorus pesticides in olive and avocado oil

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An effective extraction method was devised for the determination of organophosphorus pesticides (OPPs) in olive and avocado oil samples, using atmospheric pressure microwave-assisted liquid-liquid extraction (APMAE) and solid-phase extraction or low-temperature precipitation as clean-up step. A simple glass system equipped with an air-cooled condenser was designed as an extraction vessel. The pesticides were partitioned between acetonitrile and oil solution in hexane. Analytical determinations were carried out by gas chromatography-flame photometric detection and gas chromatography-tandem mass spectrometry, using a triple quadrupole mass analyzer, for confirmation purposes. Several factors influencing the extraction efficiency were investigated and optimized through fractional factorial design and Doehlert design. Under optimal conditions the recovery of pesticides from oil at 0.025 ?g g-1 ranged from 71% to 103%, except for fenthion in avocado oil, with RSDs ?13% (n = 5). The LOQ for