Abstract

Table olives require a thorough process of debittering in order to achieve the organoleptic quality of olives before consumption. Several chromatographic analytical methods have been used in order to ascertain the debittering process. Capillary electrophoresis (CE) offers several advantages to the determination of the bitter responsible compound oleuropein in table olives, such as speed, reduced amount of solvents and reagents (green chemistry), small amount of sample, high efficiency and lower costs. Despite the evident advantages of CE, this technique has not been used so far for the verification of the debittering of table olives.

Objective

To extract oleuropein from table olives and optimize the analysis via CE using a design of experiments (DoE).

Material & Methods

Soluble biophenols, oleuropein among them, were extracted using sequential liquid partition methods with methanol:acetone and hexane from table olives as described before (1). Finally, the samples in methanol were transferred to vials.

CE was run in a P/ACE System 2200 (Beckman Coulter  Inc.) using an uncoated fused-silica capillary (50 µm 10 x 375 µm OD, 50 cm length). UV detection was performed at 214 nm in cationic mode with pressure injection for 7s.

Method optimization

A preliminary screening experiment fixed the parameters for further optimization.

A central composite design was used considering the following factors:

- Buffer pH
- Voltage
- Tetraborate concentration

Resolution between oleuropein and its nearest peak

Conclusions

- The obtained model explained 97.0% of the data variance (R²).
- A good separation was achieved and the method partially validated (repeatability, reproducibility, linear range).
- The best separation was achieved at 21ºC; voltage 10 kV; and 20 mM tetraborate in 20 mM phosphate buffer at pH 10.0.

Reference