

Determination of (*E*)-10-hydroxy-2-decenoic acid content in Italian and extra-European royal jelly: a comparison between Capillary Zone Electrophoresis (CZE) and HPLC

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In this study a new, fast and straightforward CZE method was developed and compared with HPLC for the quantification of (*E*)-10-hydroxy-2-decenoic acid (10-HDA) content in royal jelly (RJ) samples of different geographical origin. No other beehive product contains 10-HDA that may be seen as a useful marker to assess RJ authenticity and the quality of those products that claim to contain royal jelly.

The CZE method employed minimal amount of a water 50 mM tetraborate buffer (\approx 50 ml for 100 electrophoretic runs) as background electrolyte without the addition of any organic, electroosmotic flow or pH modifier. A wide linear response range (0.006-0.808 mg 10-HDA/ml), a good sensitivity (LOD and LOQ were 0.002 and 0.004 mg/ml, respectively), a satisfactory instrumental repeatability with respect to migration time and peak area (RSD% less than 1.0 and 2.0% on migration time for intra and interday assay, respectively and less than 2.0 and for 4.0% on peak area for intra and interday assay, respectively) and a short analysis time (13 minutes for each run including washing steps) were the main analytical features shown by the electrophoretic method here optimized. The results obtained with CZE were highly correlated with those of HPLC ($p < 0.01$).

10-HDA content ranged from 0.8 to 3.2 g/100 g of RJ in Italian samples (2.5 g/100 g of RJ on average according to CZE) and from 1.2 to 1.9 g/100 g of RJ in extra-European samples (1.5 g/100 g of RJ on average according to CZE). A significant difference ($p < 0.05$) was accessed between the two set of data. Further investigations should be carried out to evaluate how environmental and primarily technological factors may affect the 10-HDA content in RJ.

The possibility to employ CZE as an effective alternative to HPLC for accessing the quality of RJ and RJ based preparations in routine analyses was highlighted.