Title: **Authentication of organic and non-organic chicken eggs by HPLC fingerprint profiling with ultraviolet and fluorescence detection, and chemometric methods.**

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The market for organic products is a sector in exponential growth. Due to the lack of techniques that are able to detect food fraud, consumers' confidence in the authenticity of this type of products is endangered. Following the pathway of the work previously carried out by the research group for the authentication of ecological hen eggs by using high performance liquid chromatography and ultraviolet-visible (HPLC-UV), in this work it has been attempted to improve the results previously obtained with the use of different matrices, both the whole egg and the egg yolk, and a new analytical technique such as fluorescence detection (HPLC-FLD). Chemometric methods, including principal component analysis (PCA) and partial least squares regression of discriminant analysis (PLS-DA), were able to evaluate the eggs classification by the different employed approaches. The main objective of this work was to test whether the chromatographic profiles using a new matrix were better chemical descriptors for the classification of eggs by classes. The second objective consisted of the use of a more specific and selective detection based on fluorescence (HPLC-FLD) for the classification of samples. For the classification of the egg samples a total of 96 samples were studied. They were divided into two groups, 48 eggs where used to evaluate chromatographic profiles using the whole egg as matrix and the 48 eggs left for the chromatographic profiles of egg yolks. Each group included 12 samples of organic eggs (O), 12 samples of free-range hen eggs (C), 12 samples of barn hen eggs (T) and 12 caged hen eggs (G).

The method of HPLC-FLD using the egg yolk as matrix in combination with PLS-DA is what has presented the best results, providing a better classification of samples by the class they belong to. Having made a comparison between the different possible strategies, chromatographic fingerprints obtained through HPLC-FLD have proved to be the best chemical descriptors to achieve the classification of analyzed samples.

Keywords: Food fraud, HPLC-UV, HPLC-FLD, chemometric methods, egg, egg classification.