



## Detection of adulteration in honey through near infrared spectroscopy and chemo metrics

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### Abstract:

The National Service of Agri-Food Health and Quality (SENASA), controls honey to detect contamination by synthetic or natural chemical substances and establishes and controls the traceability of the product. The utility of NIR spectroscopy for the detection of adulteration of honey with high fructose corn syrup (HFCS) was investigated. A collection of authentic artisanal Argentinian honeys ( $n=216$ ) and certain of these honeys adulterated by HFCS ( $n=183$ ) was assembled. Official honey samples were obtained directly from beekeepers throughout the country during the years 2015 and 2018. They were stored unrefrigerated from time of production until scanning and were not filtered after receipt in the laboratory. Immediately prior to spectral collection, honeys were incubated at 40°C overnight to dissolve any crystalline material, manually stirred to achieve homogeneity and adjusted to a standard solids content (70° Brix) with distilled water. Adulterant solutions were also adjusted to 70° Brix. Samples were measured by NIR spectroscopy in the range of 650 to 7000  $\text{cm}^{-1}$ . The technique of specular reflectance was used, with a lens aperture range of 150 mm. By use of potential functions (PF) and partial least square linear discriminant analysis (PLS-DA) classification, authentic honey and honey adulterated with HFCS could be identified with a correct classification rates of 97.9%. Thirty-six sensors were selected according to literature. The results showed that NIR in combination with the PT and PLS-DS methods can be a simple, fast and low cost technique for the detection of HFCS in honey with high sensitivity and power of discrimination.

### Biography:

Mercedes Bertotto has completed her graduation from Food Science and Technology, and an advanced student of PhD Engineering, University of Buenos Aires (UBA). She has worked four years in the NIR-chemometrics area of the Evaluation and Development sector, SENASA. She has carried out several developments related to food safety. The last one was published in the Journal of near



Infrared Spectroscopy, and it was related to the prevention of bovine spongiform encephalopathy disease. Other studies were related to the identification of food packaging materials, and the detection of adulterants in honey and in different milk products.

### Publication of speakers:

1. Mercedes Bertotto. Comparison of mathematical models to predict glass transition temperature of rice (cultivar IRGA 424) measured by dynamic mechanical analysis. Published online 2018 Oct 29.
2. Mercedes Bertotto. Microglia and Reactive Oxygen Species Are Required for Behavioral Susceptibility to Chronic Social Defeat Stress 2020 Feb 12.
3. Mercedes Bertotto. Arytenoid Fixation in Laryngeal Cancer: Radiological Pictures and Clinical Correlations with Respect to Conservative Treatments. Published online 2019 Mar 13.
4. Mercedes Bertotto. Obstetrical providers' preferred mode of delivery and attitude towards non-medically indicated caesarean sections: a cross-sectional study Published in final edited form as: BJOG. 2018 September.
5. Mercedes Bertotto. Implementation of the Dependency Law in Spain. The activities-based cost systems as tools that can facilitate decision-making for the implementation of the Law. Published online 2009 Jun 22.

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