

Use of Near Infrared Spectroscopy (FT-NIR) to assess seed viability and varietal discrimination – *Pisum sativum* as a case study

Problems

Quality and viability of pea seeds is significant from the aspects of both sustainable crop production and nutritional efficiency. The ordinary methods of seed quality evaluation are usually laborious, take a long time and can destroy the seed.

Solutions

Near Infrared Spectroscopy (FT-NIR), as fast, non destructive and easy handle technique could be a promising tool on seed phenotyping. FT-NIR spectrometers can detect with high accuracy specific molecules in which the principal chemical bonds are CH, OH, NH, SH or C = O. It was hypothesized that i) different genotypes could be composed by different molecules or different content on specific molecules, ii) during germination new molecules are synthesized and some differences could differentiate phenotypes.

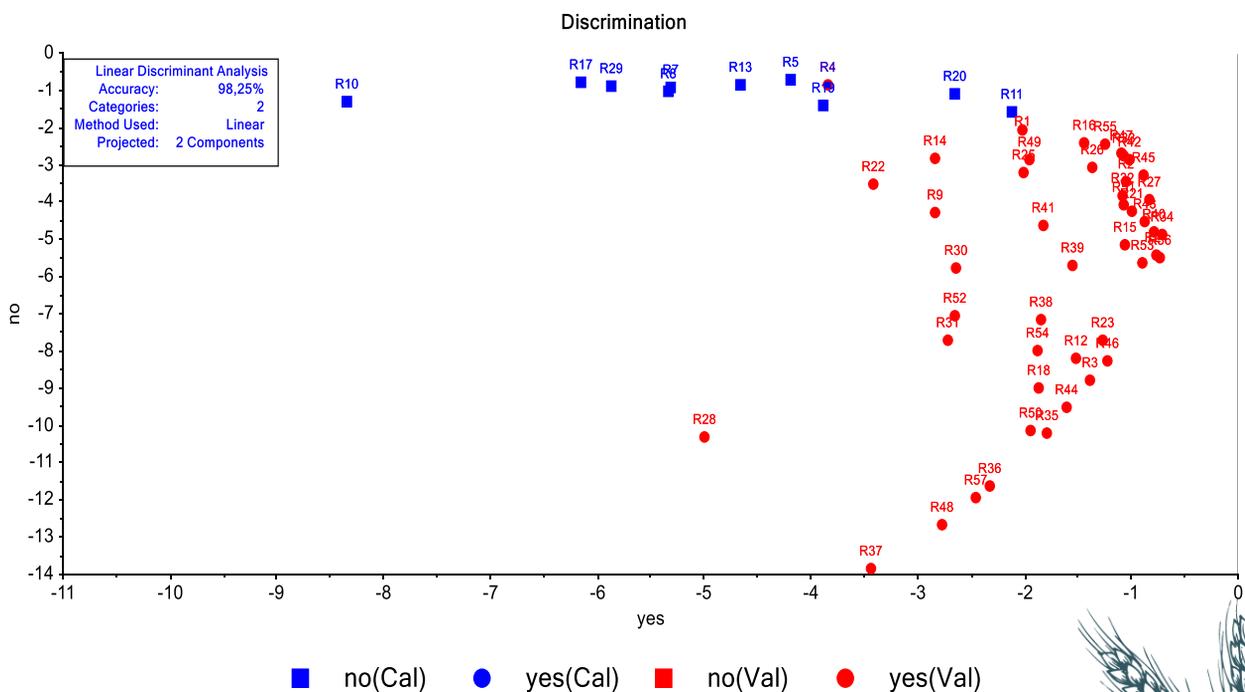


Figure 1: Results of Linear Discriminant Analysis (LDA) revealing the applicability of FT-NIR on seed viability prediction.

Practical recommendations

- Seeds can directly be used (no imbedding required) for spectral data acquisition;
- Per seed three spectra need to be measured;
- Linear Discriminant Analysis (LDA) in Fig. 1 and Principal Components Analysis (PCA) in Fig. 2 must be performed with a minimum of 50 samples

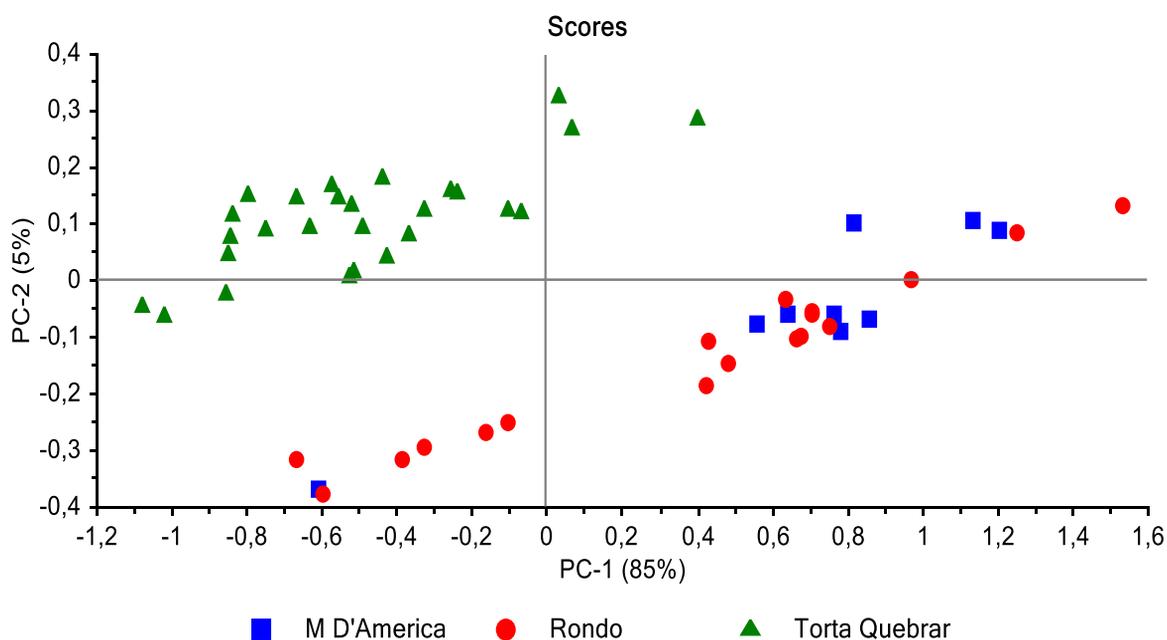


Figure 2: Results of Principal Components Analysis (PCA) revealing the applicability of FT-NIR on cultivars discrimination.

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LIVESEED: Boosting organic seed and plant breeding across Europe. LIVESEED is based on the concept that cultivars adapted to organic systems are key for realising the full potential of organic agriculture in Europe. Research project 2017-2021.

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