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# A STUDY OF RAW MATERIAL VARIABILITY: LITERATURE REVIEW AND DEVELOPMENT OF METHODS TO CHARACTERIZE GRAINS

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## Highlights

- The grains were studied at different step process: dry form, hydrated and cooked.
- Several physical aspects of the grains were studied: color, texture, and shape.
- For each analytical method, statistical analysis was carried in order to have representative results of the whole population.

## Abstract

The transition to local and organic agriculture in the face of climate change is leading to significant variability in agricultural products and a major challenge in managing industrial processing. Plant grains, particularly cereals and legumes, are the focus of many approaches to support the transition to plant-based proteins. Before being consumed, these seeds normally undergo soaking and cooking operations that are still poorly studied, especially by integrating the factor of physical variability of the material. Plant grains characteristics, with their dense episperm and rigid tissues, make water absorption difficult. As a granular material, the impact of morphological diversity of grains (size, shape, color, texture...) in one population on processing behavior has to be investigated. The objective of the present study is to develop several specific analytical methods to describe the dispersion of characteristics of different plant grains, in the dry native form, after hydration and after cooking. The specific analytical methods concern the measurement of color (CIELAB colorimeter), shape (caliper), and texture (texturometer) characteristics. The proposed methods have been tested to be discriminating, with statistical analysis to define the minimum number of grains needed to describe the diversity of the whole population. Results are discussed in relation to the literature on grain variability.

## Key words

Vegetable grains, morphological diversity, variability, analytical method development, discriminatory methods.

## Bibliography

Clémence Cornut, 24, graduated from AgroSup Dijon (France) in 2021 with a degree in food science engineering. Since February 2022, she has been working as a contract research engineer in the UMR IATE (INRAE, University of Montpellier, Institut Agro Montpellier). In September 2022, she will start a PhD in the UMR CSGA (INRAe, CNRS, Agro Dijon Institute, Burgundy University, UBFC) about umami taste and sensory sciences.