



Future Food Systems:  
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# ABSTRACT BOOK POSTERS

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## Comparative physico-chemical characterization of organic flours from wheat, rye and spelt

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### **Aim:**

There is an increasing consumer demand for healthier food products, such as cereal flours, free from pesticides and other contaminants. The production of organic cereals is therefore a solution that can be commercially explored. Moreover, consumers also highly appreciate and value the local production of cereals and flours.

Hence, the aim of the current work was to characterize organic flours obtained from three distinct cereals, namely wheat, rye and spelt. The cereals were selected on the basis that they are able to be grown in Portugal as it presents favourable climatic conditions.

### **Methods:**

Physico-chemical characteristics of each organic cereal flour, crucial for adequate processing, were analysed through distinct methodologies/technologies, such as falling number (enzyme activity), mastersizer (size distribution) and scanning electron microscopy (SEM; morphology), among several others.

### **Results:**

Results showed that, among the three flours, wheat presented the highest falling number (350), which translates the enzymatic activity of  $\alpha$ -amylase (being negatively correlated). Hence, the dough prepared with wheat flour will be harder than those obtained with the flours from the other cereals. Concerning size distribution of the flours' granules, results showed bimodal distribution regarding wheat and rye flours, while spelt flour resembled a normal distribution. A maximum (peak) was observed for all flours between 20-30  $\mu\text{m}$ , and a second peak was registered at 60 and 135  $\mu\text{m}$  for wheat and rye, respectively. Those results, obtained utilizing a mastersizer, were further corroborated *via* SEM analysis. X-ray diffraction analysis provided information concerning crystallographic structure, which allowed to determine that the flour with lower crystallinity was rye. Since this characteristic decreases susceptibility to enzymes, it is inferred that rye flour will be the easiest to digest. Differential scanning calorimetry (DSC) showed similar starch gelatinization temperature between the three flours, although in spelt flour the process was initialized at lower temperature. Fourier-transform infrared spectroscopy (FTIR) analysis revealed similar spectra, disclosing, as expected, the presence of starch and gluten.

### **Conclusion:**

Knowledge on the physico-chemical properties of each particular organic cereal flour is crucial and must be considered when looking to select one to develop a specific food product.