**Biochemical perspectives on agrobiodiversity: unlocking minor crops potentials**

Davide Emide & Alessio Scarafoni

Department of Food, Environmental and Nutritional Sciences, University of Milan, via G. Celoria 2, 20133 Milan, Italy

Safeguarding agrobiodiversity is crucial for reducing food and nutritional waste. Strengthening the connection between producers and consumers through small-scale, ecological, local, and solidarity-based supply chains promotes the valorization of traditionally recovered crop varieties, reducing financial losses. Additionally, crop diversification enhances soil health, as different species contribute unique nutrient profiles. A diverse diet rich in vegetables, cereals, and legumes further supports consumer health and well-being.

As part of the CROPDIVA project, our research focuses on developing biochemical techniques to assess grain quality and identify the best-performing cultivars for various applications. We also aim to promote agricultural diversity and establish new supply networks by developing a high-throughput molecular screening pipeline for CROPDIVA cultivars, integrating bromatological and phytochemical characterizations.

To achieve this, we analyzed both the macromolecular composition of the seeds and their bioactive and nutritional properties, with a focus on consumer health and feed applications. Protein concentration was determined using the Kjeldahl method, while total, digestible, and resistant starch, along with anti-nutritional factors such as phytates and anti-tryptic activity, were assessed through enzymatic assays. Total lipid content and moisture were measured via gravimetric analysis, while the overall antioxidant capacity was quantified. The technological suitability of the grains was assessed to determine their potential for pasta and bakery production. Additionally, an in vitro digestion model was used to investigate the dry matter and protein digestibility of specific CROPDIVA grain varieties as well as the nutrient bioavailability of specific nutrient components. Based on the results obtained, we are currently investigating the potential use of different crops in food and feed applications, particularly assessing the impact of technological processing on the molecular characteristics of the original crops.

Additionally, we are exploring the elicitor potential of various molecules present in CROPDIVA crops. The rationale behind these experiments is to maximize the valorization of minor crops by testing the elicitor properties of molecules extracted from them, following enzymatic digestion treatments. The goal is to utilize extraction residues from minor crops to stimulate plant defense responses and enhance the accumulation of bioactive compounds in different vegetable species, contributing to improved agronomic production.

Our findings support the selection of high-value cultivars and promote sustainable agricultural practices by reducing dependence on synthetic inputs. Furthermore, they underscore the importance of agrobiodiversity in developing resilient agricultural systems capable of addressing global food security challenges.