Biochemical insights into sustainable plantbased food products: the buckwheat case

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This study explores the micro- and macro-molecular features of food products enriched with sprouted buckwheat. Interest in buckwheat is driven by its value in the food chain and by its adaptability to drought and poor soil conditions, that make it a resilient and sustainable crop. Buckwheat's biochemical traits, including its high protein content – with no coeliac-toxic sequences – and its richness in functional and nutraceutical components make it a versatile and health-promoting staple. However, the presence of various anti-nutritional factors in buckwheat may hamper nutrient bioavailability. Sprouting, a sustainable and easily scalable process, holds the potential to address these limitations. Buckwheat couscous, already available on the market, was chosen in this study as prototype of a natural and sustainable food. Molecular characterization of sprouted buckwheat reveals changes induced by endogenous enzymes during the sprouting process. Sprouting for a short period (48–72h) modifies the protein profile and the protein-protein interactions, changes the ratio between soluble and insoluble polyphenols, and lowers the content of anti-nutritional factors. Adding 50% sprouted grains flour did not impair couscous production processes, and the product retained strong similarities with the non-enriched one. The molecular impact of the couscous-making process involves changes in the overall protein organization and in the interactions among micro- and macro-molecules. However, these modifications did not affect the improvement in nutritional traits brought forward by sprouting-related enzymes. These results offer valuable insights into ways of exploiting the potential of buckwheat as a sustainable functional food through simple and environment-friendly processes.

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