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Nutritional characterization of a Portuguese germplasm collection of common beans (*Phaseolus vulgaris* L.)

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The main goal of this study was to nutritionally characterise a collection of portuguese common bean and correlate the nutritional profile with their morphological traits and their geographical origin. Common bean (*Phaseolus vulgaris* L.) is the most widely produced and consumed legume in Portugal, with an average national production of approximately 2397 tons spread across about 3547 hectares of production area, according to FAOSTAT's 2017 data. Although there is a considerable level of genetic diversity in the national germplasm collections, studies of nutritional quality are needed. Consequently, these accessions are not being utilized to their full potential in breeding programs, resulting in their underutilization. The nutritional composition of grains is known to be an important factor in determining their overall quality and value, but it has historically been overlooked in crop selection. Therefore, considering the increasing global population and the need to ensure food and nutrition security, it urges to prioritize the production of high-quality grains that meet nutritional requirements.

Herein, a Portuguese common bean collection of 259 accessions from different country regions, conserved in the National Germplasm Bank, resulting from more than five centuries of natural adaptation and farmers' selection, were screened for their content in minerals, protein, phytic acid, starch, total phenolics and flavonoids, saponins, canavanine, and antioxidant activity.

These results show that this is a highly biodiverse collection. For the mineral analysis, the concentration of the micronutrient Zn ranged from 25.09 to 117.5 µg/g and of Fe from 35.88 to 110.2 µg/g, corresponding to a coefficient of variation (CV) of 29% and 21%, respectively. In regards to the concentration of the macronutrients, P ranged from 2.5 to 7.2 mg/g (CV of 17.5%), K ranged from 8.5 to 20.9 mg/g (CV of 11%), Ca ranged from 0.1 and 8 mg/g (CV of 31%), and Mg ranged from 0.4 to 7.3 mg/g (CV of 40%). Protein percentage ranged from 16.6 to 31.0 % (CV of 13%), phytic acid concentration ranged from 2.25 to 5.90 mg/g (CV of 26%) and starch concentration ranged from 11.5 to 44.0 mg/g (CV of 25%). The parameters that varied the most amongst bean accessions were Zn, Ca and Mg concentration and can help to explain the variation within the collection.

Further nutritional traits are under analysis in order to perform a complete profiling of the collection and contribute with important knowledge for future breeding programs and agro-environmental practices.