

MINERAL PROFILING OF A PORTUGUESE COLLECTION OF COMMON BEAN (*PHASEOLUS VULGARIS* L.) GERMPLASM

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INTRODUCTION

Common bean (*Phaseolus vulgaris* L.) is the most produced and consumed legume in Portugal. Recent data show an average national production of common bean of about 2397 tons, spread over about 3547 hectares of production area (FAOSTAT, 2017). As a rustic crop, beans are known to have great morphological variability and adapt to different environments and landraces and varieties vary morphologically and nutritionally. The nutritional composition of the grains can be conditioned by factors such as genotype, origin, environmental and cultivation conditions, influencing the quality of the seeds. Crop selection is generally based on seed agronomic performance and the nutritional value has oftentimes been overlooked. The objective of this study was to evaluate 236 Portuguese common bean accessions from different Portuguese regions conserved in the National germplasm bank for their mineral composition. Given the large diversity found in this local bean collection, understanding the intraspecific variability of mineral concentration may help in the identification of best performing accessions that can be adapted to different environmental conditions and improve the nutritional value of the seeds from farm to fork.

METHODS

Seed samples were pulverized and analyzed for six minerals [potassium (K), phosphorus (P), magnesium (Mg), calcium (Ca), iron (Fe) and zinc (Zn)] using ICP-OES, following the procedure described by Santos et al. (2020). Principal Component Analysis was performed using GraphPad Prism version 9.

RESULTS and discussion

One principal component analyses (PCA) was computed with the mineral composition measured in the 236 accessions of common bean (Figure 1). The first two principal components explained 67% of the total variability, with the first principal component explaining most of the variability (49%). These accessions are provenient from different regions of the Portuguese country, and it was possible to divide these accessions according to their origin in Northern, South, Centre and Madeira. The majority of accessions analysed have origin in the North of Portugal and shows more intraspecific diversity and outstanding lines when compared to seeds from other regions of the country.

This PCA showed that accessions BPGV12327, BPGV00983, BPGV11615 were among the accessions with the highest Zn and Ca concentration, while BPGV12385, BPGV05839, BPGV07580 and BPGV06771 had highest K, P, Mg and Fe.

The outstanding lines with highest Zn and Ca had origin from the Northern (accession BPGV12327) and Central Region of Portugal (accessions BPGV00983 and BPGV11615), whilst the outstanding accessions with highest K, P, Mg and Fe had origin from the Northern (accessions BPGV12385, BPGV07580 and BPGV06771) and Central Region of Portugal (accession BPGV05839).

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