**Chickpea grain composition for future markets**

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Chickpea is a key agricultural crop which has been consumed by humans for millennia, and is currently ranked third among pulses in global production. There is an increased focus on its use as a source of plant-based protein due to its nutritional value and potential applications to functional ingredients. Chickpeas are categorized into two market classes, desi and kabuli according to grain size and colour. Despite its potential application as a nutritious ingredient, variation in grain composition within and between classes remains largely unexplored. In this study, we characterise the variation in seed content for several key macronutrients (sugar, starch, protein, lipid classes, fibre) in a global chickpea diversity panel, to identify drivers of grain composition changes and relationships between the different nutritional traits. Assays performed on equal quantities of ground chickpea flour revealed extensive variation in almost every seed composition trait, with no relation to market class or geographic origin. Correlations between macronutrient content also ranged from moderate to absent, suggesting independent genetic control amenable to breeding. To gain insight into this genetic control, we genotyped the panel using a SNP chip and conducted a Genome Wide Association Study, which identified several loci of interest and provided promising avenues for future work. Taken together, these results highlight important opportunities for developing breeding strategies aimed at creating chickpea varieties with enhanced nutritional profiles and better suitability for emerging markets in the food industry.