

## Impact of insect pollinators on the definition of the nutritional composition of *Vigna unguiculata* L. Walp. seeds

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**Abstract:** Pollinators are a key component of global biodiversity, providing vital ecosystem services to crops and wild plants. Agriculture is increasing and intensifying in many regions of the world to satisfy the growing demand of the human population. This trend threatens the biodiversity and ecosystem services on which agriculture depends, including crop pollination. Indeed, recent studies have highlighted how multiple anthropogenic pressures lead to the decline of wild pollinators such as bees, flies, beetles, and butterflies. Many studies have already highlighted the importance of insect pollinators for crop yield but the putative role of entomogamous pollination in the definition of nutritional features of agronomic products has never been investigated. To address the importance of pollinators in shaping the nutritional features of crops, we conducted an experimental study on *Vigna unguiculata* L. Walp, a crop that plays an important role in the livelihoods of millions of people of the semi-arid regions of the world and not only. In detail, flowers have been subjected to two different pollination systems: open pollination (the plants have been pollinated naturally) and self-pollination (the pollen has been transferred from the anthers to the stigma of the same flower to avoid cross-pollination). We analyzed proteins and starch content as major macronutrients of the seeds and through hydro-alcoholic extraction techniques, and by means of analytical chemistry (HPLC-UV-MS), qualitative and quantitative comparative analyses of the phytochemical composition occurring in seeds have been carried out. This allowed us to assess whether pollination had an influence on the chemical composition of *V. unguiculata* seeds, and consequently the possible effects on human nutrition and well-being. The results showed how pollination mechanisms can trigger differences not in the primary but in the secondary metabolic profiles of *V. unguiculata* seeds. This provides further evidence of the importance of insects pollination to plants and thus to the ecosystems. Surprisingly these differences are still maintained if seeds are boiled following traditional preparation procedures, thus suggesting the functionality of the impact of the above mentioned effects. The next step will be to evaluate the possible effects of the pollination-dependent metabolome on humans.