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## **On the fate of lipids and proteins during Chia (*Salvia hispanica*) germination and seedlings growth.**

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Chia (*Salvia hispanica*) is an annual plant of the Labiatae family native to Central America. The French chia industry is organized around the Oruro variety, grown in the southwest of the country. Chia seeds are interesting for human food and nutrition primarily because of their high oil (>30%) and protein (19%) content. It is rich in  $\omega 3$  and  $\omega 6$  fatty acids, with a high  $\omega 3/ \omega 6$  ratio, making it a valuable source of nutrients. Seeds store their reserves in various specialized organelles, namely lipid droplets (LD) and protein bodies. During the germination process, dry seed goes from a resting state to a metabolically active state, which enables the seedlings to develop. We, therefore, examined the biochemical and metabolic changes that occur during germination, leading to the degradation and mobilization of seed reserves. Using proteomics, the different forms of storage proteins accumulated in mature seeds were identified and we monitored their evolution during germination. Secondly, we studied the fate of reserve lipids in chia seeds using lipidomics during germination and seedling establishment. The seed major lipid classes were identified upon separation using planar chromatography. Using LC-MS, we identified numerous molecules within the different classes. By using both statistical and clustering methods, we demonstrate the remodeling of lipids during germination. Finally, LDs were purified from mature and germinating chia seeds, and their lipid and protein composition was determined. Our contribution highlights the germination process and accompanying molecular mechanisms, to valorize Chia seeds in human food and nutrition.

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