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Integrating proteomics and enzymatic profiling to decipher seed metabolism affected by temperature in seed dormancy and germination

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Highlights :

- Proteome characterization in temperature-induced seed germination showed the importance of metabolism and energy components
- TCA cycle- and glycolysis- related enzyme activities was shown to be lowered in germinating seeds compared to non-germinating ones during the phase I of germination *sensu stricto*
- The regulation of central metabolism activity is important in the control of germination

Abstract

Temperature is an important environmental factor affecting seed dormancy and germination. The mechanism by which temperature induces germination in dormant seeds is however still unclear. Proteomic study has been performed in dormant sunflower seeds during imbibition at permissive and non-permissive temperatures for germination, 20 and 10°C, respectively. Proteome analysis showed an increase of proteins belonging to metabolism and energy from the first hours of imbibition followed by a decrease of proteins involved in protein metabolism and seed storage in germinating compared to non-germinating seeds. Proteomic study was completed by polysome and proteasome activity assessment and enzymatic profiling on several altered proteins involved in metabolism and energy. Results showed that 20°C treatment induced the activation of both protein synthesis and degradation processes, the latter being related to proteasome activity during

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