

Differential metabolomic profiles of dormancy release in gladiolus corms stored for different durations at different temperatures

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Received 04 October 2024; revised 24 July 2025

Dormancy is a perplexing phenomenon that remains to be thoroughly explored. Corm dormancy in gladiolus poses hindrance to year around production and adds to the cost of production. The present investigation of differential response of dormant corms to storage temperature and duration describes the macromolecular changes in corms as reflected by carbohydrates, protein content and protein profiling patterns under different storage temperatures and durations. The four varieties of gladiolus (Punjab Dawn, Punjab Glad 3, Punjab Lemon Delight and Punjab Glance) with different developmental cycles revealed significant differences between varieties in response to storage conditions (temperature and duration) and release of dormancy/ sprouting. The interconversion of carbohydrates namely total soluble sugars (TSS), sucrose, starch and alterations in total soluble protein content clout the dormancy release in corms of all varieties. Punjab Glance and Punjab Lemon Delight had greater mobilisation of starch and proteins to energy sources (TSS and sucrose) during storage as compared to Punjab Dawn and Punjab Glad 3 that was concomitant to their early sprouting. The results of SDS-PAGE analysis affirmed that different polypeptides are involved in various varieties, as some polypeptides appeared, some disappeared, or others increased or decreased in intensity. High molecular weight polypeptides ranging from 90-105 kDa were expressed in Punjab Glad 3 and Punjab Dawn whereas in corms of Punjab Lemon Delight and Punjab Glance, low molecular weight ranging from 15-25 and 30-50 kDa were expressed that could account for less storage duration requirement for dormancy release by Punjab Lemon Delight and Punjab Glance. Thus, it can be concluded that different varieties exhibit variation in their innate metabolic status, and storage temperature and duration differentially impact this innate metabolic cascade in corms for dormancy release.

Keywords: Gladiolus, Dormancy, Storage temperature, SDS-PAGE, Metabolic profiling