

Understanding molecular mechanisms of seed dormancy for improved germination in traditional leafy vegetables: an overview

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Abstract

Loss of seed viability, poor and delayed germination and inaccessibility to high-quality seeds are key bottlenecks limiting all year-round production of African Traditional Leafy Vegetables (TLVs). Poor quality seeds are the result of several factors including harvest time, storage and conservation conditions, and seed dormancy. While other factors can be easily controlled, breaking seed dormancy requires a thorough knowledge of the seed intrinsic nature and physiology. Here, we synthesized the scattered knowledge on seed dormancy constraints in TLVs, highlighted seed dormancy regulation factors, and developed a conceptual approach for molecular genetic analysis of seed dormancy in TLVs. Several hormones, proteins, changes in chromatin structures, ribosomes, and quantitative trait loci (QTL) are involved in seed dormancy regulation. However, the bulk of knowledge was based on cereals and *Arabidopsis* and there is little awareness about seed dormancy facts and mechanisms in TLVs. To successfully decipher seed dormancy in TLVs, we used *Gynandropsis gynandra* to illustrate possible research avenues and highlighted the potential of this species as a model plant for seed dormancy analysis. This will serve as a guideline to provide prospective producers with high quality seeds.

Keywords: seed dormancy; seed germination; molecular biology; genetics; traditional leafy vegetables; *Gynandropsis gynandra*.