

Proteomic analysis of garlic essential oil-treated potato reveals that *StHSP26.5* as a vital gene involving in tuber sprouting

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Abstract

Potato (*Solanum tuberosum* L.) tubers are rich in starch, protein, vitamins, minerals and other nutrients. However, sprouting can produce solanine and reduce the commodity value during periods of storage. Some research has suggested that some essential oils from plants reduce tuber sprouting. Garlic essential oil (GEO) is reported to have antioxidant, anti-inflammatory, and antimicrobial properties. In this study, we first found that GEO reduced tuber sprouting, and the starch content, soluble sugar content and α -amylase activity were altered after 60 d of GEO treatment. Then, comparative proteomic analysis of tuber bud eyes revealed 140 and 180 differentially abundant proteins (DAPs) with increased and decreased levels of abundance respectively after 30 d of GEO treatment. Among them, *StHSP26.5* protein abundance decreased after GEO treatment, however, as the storage time increased, the expression level of this gene increased. Further research suggested that overexpressing *StHSP26.5* tobacco showed increased seed germination and POD activity after GEO treatment. Our results provide new insights into proteomic mechanisms in the sprouting process after GEO treatment and suggest the potentially utility of *StHSP26.5* as a target gene in tuber molecular breeding programs.