

Lipid Droplet: A one-stop shop for fragrance biosynthesis and transport

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Abstract

Plant-derived terpenoids are widely used in perfume or food as a bioflavour. To solve the unsustainability of natural production, lot of efforts have been put into the metabolic engineering approach to produce terpenoids in heterologous system. For volatile compounds, however, the compounds tend to escape the system and sometimes show toxicity to the host, thus a special need for a place to produce and store such compounds rises. In this study, a novel approach to direct the sesquiterpene patchoulol production into the lipid bodies (LBs) was taken, by physically attaching the synthase (PTS) to LB-associated proteins in *Physcomitrella patens*. We confirmed that the LB-associated protein expression increased the number or the size of LBs and retained more patchoulol inside the cell compared to the control when physically attached with PTS. Furthermore, the approach to alter the trafficking of the LBs and vesicles are being made by stress treatment and bioengineering. In this way, the downstream processing becomes easier and simpler, and the biomass can be recycled for additional extraction that will definitely improve the green cell factory.

Keywords: Moss, *Physcomitrella patens*, Lipid body, Terpenoid, Biosynthesis, Vesicle trafficking, Stress

Biography

Hansol Bae studied plant molecular biology in crop plants during his PhD programme, especially stress response in molecular level. HB moved to Denmark and changed the topic to metabolic engineering in green cells. While studying the fragrance production, HB co-founded Mosspiration Biotech, aiming to commercialise the fragrant moss in US market and sell the purified fragrances to perfume/cosmetic industry.