The Biosynthesis and Medicinal Properties of Taraxerol

ABSTRACT

Taraxerol is a pentacyclic triterpenoid that is actively produced by some higher plants as part of a defense mechanism. The biosynthesis of taraxerol in plants occurs through the mevalonate pathway in the cytosol, in which dimethylallyl diphosphate (DMAPP) and isopentyl pyrophosphate (IPP) are first produced, followed by squalene. Squalene is the primary precursor for the synthesis of triterpenoids, including taraxerol, β-amyrin, and lupeol, which are catalyzed by taraxerol synthase. Taraxerol has been extensively investigated for its medicinal and pharmacological properties, and various biotechnological approaches have been established to produce this compound using in vitro techniques. This review provides an in-depth summary of the hypothesized taraxerol biosynthetic pathway, the medicinal properties of taraxerol, and recent developments on tissue culture for the in vitro production of taraxerol.