Biosynthesis of monoterpene hydrocarbons from [1-3H]neryl pyrophosphate and [1-3H]geranyl pyrophosphate by soluble enzymes from Citrus limonum

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A soluble enzyme preparation from the flavedo of Citrus limonum transforms [1-3H1]neryl pyrophosphate or [1-3H1]geranyl pyrophosphate into ?-pinene, sabinene, ?-pinene, and limonene. The enzyme has been partially purified and stabilized by precipitation with polyethyleneglycol. The enzymic cyclization requires the presence of Mn2+, which cannot be replaced with Mg2+. The addition of reagents containing sulfhydryl groups is essential for optimal activity. Allylic C10 monophosphates do not act as substrates, but they inhibit hydrocarbon formation. Inorganic pyrophosphate has a similar inhibitory effect. No interconversion of neryl and geranyl pyrophosphate has been observed. Possible pathways for the enzymic cyclization reactions are proposed. © 1977.