Enhancement of the hydrolysis of geranyl pyrophosphate by bivalent metal ions.

A model for enzymic biosynthesis of cyclic monoterpenes

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Hydrolysis of geranyl pyrophosphate is catalyzed by salts of Mn2+ and involves C-O bond cleavage. The first order rate constants reach limiting values with [Mn2+] > 10^{-2} M, and the most reactive species is GPP(Mn2+)2 at the optimum pH of 6.5-7. The products are similar to those from acid hydrolysis except that more cyclic hydrocarbons are formed in the presence of metal ions.

Hydrolysis of geranyl phosphate is inhibited, and that of citronnellyl pyrophosphate is weakly catalyzed by Mn2+. Other divalent metal cations catalyze the hydrolysis of geranyl pyrophosphate and the sequence of effectiveness is Cu2+ > Mn2+ > Zn2+ > Co2+ < Mg2+ ~ Ca2+. © 1981.