



Origin of methylhopanes

Triterpanoids from the hopane family isolated from living organisms ("biohopanoids") are typically derived from the C₃₀ 17 β ,21 β framework. They are the precursors of the many hopanoids encountered in sediments ("geohopanoids") which often possesses the thermodynamically more stable 17 α ,21 β configuration and to a lesser extent 17 β ,21 α . Methylhopanes are typically present at between 2 and 10% of the abundance of hopanes in oils and rock sources.^{1,2,3}

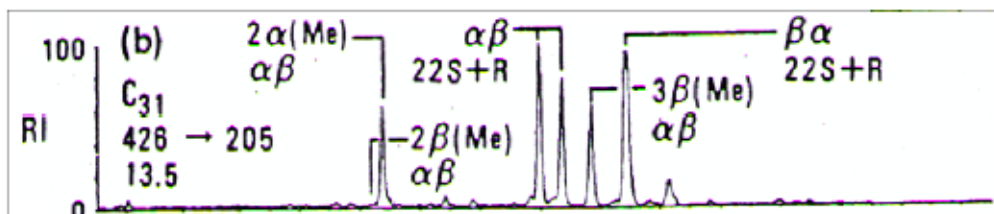
Minor members possessing an additional methyl group attached at position 2 β (axial position) or 3 β (equatorial position) of the 17 β ,21 β skeleton have also been isolated from a few bacteria. These are the assumed precursors of the 2-methyl and 3-methyl hopanoids. Because the equatorial alkyl groups are thermodynamically most stable, the fossil hopanes are mixtures dominated by 2 α (Me) and 3 β (Me).

In the case of 3-methylhopanoids, only 3 β (Me) have been encountered, whereas a mix of 2 α (Me) and 2 β (Me) appeared in younger sediments. In more mature sediments, only the 2 α (Me) isomers

Chromatographic behavior of methylhopanes

Both of the 2-methylhopanes elutes with similar retention time on a non-polar Ultra-1 column. The 2 β -methylhopane virtually coelutes with hopane, while 2 α -methylhopane elutes on the trailing side and is incompletely resolved from hopane.

The 3 β -methylhopane elutes with a significantly longer retention time and at a point midway between (22R)-17 α (H),21 β (H)-homohopane and (22R+22S)-17 β (H),21 α (H)-homohopanes. On a moderately polar BP-10 column, the 2 β -methylhopane just preceded 2 α -methylhopane and both eluted before 17 α (H),21 β (H)-hopane. This observation of a reversal in relative elution positions of hopanes and methylhopanes on columns of different polarities reduces the chance of error in compound identification.⁴



Literature:

- 1) P Stampf *et al*: 2 α -Methylhopanoids: First recognition in the Bacterium *Methylobacterium organophilum* and obtention via sulphur induced isomerization of 2 β -methylhopanoids; *Tetrahedron*, Vol 47, No 34, pp 7081-7090, 1991
- 2) R.E. Summons and L.L. Jahnke: Identification of the methylhopanes in sediments and petroleum; *Geochimica et Cosmochimica Acta*, vol 54, pp 247-251, 1990
- 3) Farrimond, P. *et al*: Methylhopanes as source markers and a novel petroleum correlation tool; 23rd Int. Meeting on Organic Geochemistry, 2007.
- 4) Biological markers in sediments and petroleum, J.M. Moldowan *et al* (editors), p. 182-200, Englewood Cliffs, New Jersey (1992), Prentice Hall