**Biochemistry of tertiary alcohol degradation**

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Substantial accumulation of tertiary alcohols as a dead end product in contaminated aquifers is observed worldwide. Their origin mainly stem from microbial attack of fuel oxygenate ethers, possibly from mother compounds such as nonylphenols and naphthenic acids, but also from other compounds possessing a tertiary alcohol group or an aliphatic side chain which could be converted to it in the course of degradation, e.g., the s-triazine herbicides terbutylazine and terbutryn. Only for the first representatives of the homologous series of tertiary alcohols catabolic pathways have

recently been elucidated. The smallest tertiary alcohol, tert-butyl alcohol (2-methyl-2-propanol, TBA, C4), can be aerobically degraded via an initial hydroxylation and subsequent dehydrogenations to 2-hydroxyisobutyric acid. The latter is CoA-activated and then isomerized to the common metabolite 3-hydroxybutyryl-CoA. Tert-amyl alcohol (2-methyl-2-butanol, TAA, C5), on the other hand, is initially desaturated to the hemiterpene 2-methyl-3-buten-2-ol. Thus far, the corresponding enzymatic steps have been partially identified in a couple of bacterial strains, e.g. in Methylibium, petroleiphilum PM1 and Aquincola tertiaricarbonis L108. In the latter strains, both the hydroxylation and desaturation of C4 to C6 tertiary alcohols are catalyzed by the unique Rieske nonheme mononuclear iron enzyme MdpJ. The work presented will show further degradation, from the unsaturated tertiary alcohol (TAA) isomerized to the corresponding primary one (3-methyl-2-buten-2-ol), which is oxidized to 3-methyl-2-buten-1-ol and later transformed into the common metabolite 3-methylcrotonyl-CoA, and the possible enzymes involved in this pathway.