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## Biodegradation of Geosmin and 2-methylisoborneol by novel, native, Gram negative bacteria in Sri Lanka

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*Trans*-1, 10-dimethyl-*trans*-9-decalol (Geosmin) and 2-methylisoborneol (2-MIB) are key compounds which cause taste and odour (T and O) issues in drinking water. Despite no recorded health hazards, consumers reject the water if these odorants are present, due to their unpleasant earthy and musty T and O. Hence, removing Geosmin and 2-MIB from drinking water is a necessity for worldwide water authorities and consumers. Biodegradation has been widely recognized as effective for the removal of these compounds. Biodegradation of Geosmin and 2-MIB was investigated using native bacteria isolated from water and soil from 12 raw water bodies where the drinking water T and O issues are prevailing. Accordingly, five districts: Anuradhapura, Pollonnaruwa, Ampara, Batticaloa and Trincomalee were selected. Isolation of Geosmin and 2-MIB degrading bacteria in water and in sediment were carried out using standard microbiological procedures following enrichment, isolation and screening of potential degraders using Biolog MT2 plate assay. Potential Geosmin and 2-MIB degraders were subjected to degradation kinetics study and identification was carried out using 16S rRNA sequencing. Morphologically different 150 bacteria colonies from Geosmin treated samples and 75 colonies from 2-MIB treated water samples were isolated. Among them, 23 and 9 bacteria were identified as positive Geosmin and 2-MIB degraders respectively using the Biolog MT2 plate assay. Five bacteria showed complete degradation of Geosmin (initial level 20 ppt) at 7 days of incubation and they were identified as *Myroides odoratimimus*, *Providencia rettgeri*, and *Proteus mirabilis*. *P. mirabilis* isolated from Tissa wewa water, showed 100% degradation of Geosmin (initial level 20 ppt) at 5 days with a half-life time of 3 days when compared to control and other bacteria species. *P. rettgeri* isolated from Nuwara wewa soil, showed 100% degradation of 2-MIB (initial level 20 ppt) at 4 days incubation having 2 days of half-life time. *P. mirabilis* and *P. rettgeri* were previously reported antibiotic and xenobiotic degraders, and this is the first report of them, regarding degradation of Geosmin and 2-MIB.

**Keywords:** 2-methylisoborneol, biodegradation, Geosmin, *Proteus mirabilis*, *Providencia rettgeri*

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