



Organic compounds of different extractability in total solvent extracts from soils of contrasting water repellency

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Previous studies examining organic compounds that may cause water-repellent behaviour of soils have typically focussed on analysing only the lipophilic fraction of extracted material.

This study aimed to provide a more comprehensive examination by applying single- and sequential-accelerated solvent extraction (ASE), separation and analysis by GC/MS of the total solvent extracts of three soils taken from under eucalypt vegetation with different levels of water repellency.

Water repellency increased in all the soils after extraction with DCM:MeOH (95:5), but was eliminated with iso-propanol/ammonia (95:5). Quantities of major lipid compound classes varied between solvents and soils. Iso-propanol/ammonia (95:5) solvent released saccharides, glycerol, aromatic acids and other polar organic compounds, which were more abundant in fractionated extracts from the single extraction and the third step sequential ASE extraction, than in the extracts from the DCM:MeOH ASE solvent. Dominant compounds extracted from all soils were long-chain alkanols (>C22), palmitic acid, C29 alkane, β -sitosterol, terpenes, terpenoids and other polar compounds. The soil with smallest repellency lacked >C18 fatty acids and had smallest concentrations of alkanols (C26, C28 and C30) and alkanes (C29, C31), but a greater abundance of more complex polar compounds than the more repellent soils.

We therefore speculate that the above compounds play an important role in determining the water repellency of the soils tested. The results suggest that one-stage and sequential ASE extractions with iso-propanol:ammonia and subsequent fractionation of extracts are a useful approach in providing a comprehensive assessment of the potential compounds involved in causing soil water repellency.