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Screening of biosurfactants from cloud microorganisms

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The formation of cloud droplets from aerosol particles in the atmosphere is still not well understood and a main source of uncertainties in the climate budget today. One of the principal parameters in these processes is the surface tension of atmospheric particles, which can be strongly affected by trace compounds called surfactants. Within a project devoted to bring information on atmospheric surfactants and their effects on cloud droplet formation, we focused on surfactants produced by microorganisms present in atmospheric waters.

From our unique collection of microorganisms, isolated from cloud water collected at the Puy-de-Dôme (France),1 we undertook a screening of this bank for biosurfactant producers. After extraction of the supernatants of the pure cultures, surface tension of crude extracts was determined by the hanging drop technique. Results showed that a wide variety of microorganisms are able to produce biosurfactants, some of them exhibiting strong surfactant properties as the resulting tension surface decreases to values less then 35 mN.m-1.

Preliminary analytical characterization of biosurfactants, obtained after isolation from overproducing cultures of Rhodococcus sp. and Pseudomonas sp., allowed us to identify them as belonging to two main classes, namely glycolipids and glycopeptides.

1. Vaïtilingom, M.; Attard, E.; Gaiani, N.; Sancelme, M.; Deguillaume, L.; Flossmann, A. I.; Amato, P.; Delort, A. M. Long-term features of cloud microbiology at the puy de Dôme (France). Atmos. Environ. 2012, 56, 88-100.
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