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Bacterial community structure in a fumigated arable soil

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Soil microbial biomass has been determined since the mid 1970's by the chloroform fumigation incubation technique as proposed by Jenkinson and Powlson (1976). The microbial biomass C has been quantified in an easy, quick, unexpensive and effective technique. The question remained which microorganisms recolonized a fumigated soil. An arable soil was fumigated for one day with chloroform or left unfumigated and incubated aerobically after removal of the chloroform for 10 days. The bacterial population structures were determined in the fumigated and unfumigated soil after 0, 1, 5 and 10 days by means of 454 pyrosequencing of the 16S rRNA gene. Fumigating the arable soil reduced significantly the relative abundance of phylotypes belonging to different groups, but increased the relative abundance of only five genera. The relative abundance of phylotypes belonging to the *Micromonospora* increased significantly in the fumigated soil and that of *Bacillus*, *Cohnella*, *Paenibacillus* and *Paenisporosarcina*. The relative percentage of phylotypes belonging to the Acidobacteria, Bacteroidetes, Chloroflexi, Gemmatimonadates, Proteobacteria and Verrucomicrobia were significantly lower in the fumigated than in the unfumigated soil and in most of them the relative abundance of different bacterial groups was reduced strongly ($P < 0.001$). It was found that the relative abundance of a wide range of bacteria was reduced shortly after fumigating an arable soil, but only a limited group of bacteria increased in a fumigated arable soil indicating a capacity to metabolize the killed soil microorganisms or recolonize a fumigated soil.

Biography

Cristina A Domínguez-Mendoza is a PhD Biotechnology student at Cinvestav, Mexico, City. She is author of two papers: "Bacterial community structure in fumigated soil" and "Bacterial colonization of a fumigated alkaline saline soil".

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