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Three different fractions of soil microbial biomass activated by glucose input

Sergey Blagodatskiy (1), Aliia Gilmullina (2,3,4), Polina Galitskaya (4), Svetlana Selivanovskaya (4), Evgenia Blagodatskaya (5,6)

(1) Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), University of Hohenheim, Stuttgart 70593, Germany, (2) UMR P3F, INRA, Lusignan, France, (3) UMR ECOSYS, INRA, Thiverval-Grignon, France, (4) Institute of Environmental Sciences, Kazan Federal University, Russia, (5) Agro-Technology Institute, RUDN University, Moscow, Russia, (6) Dept. of Agricultural Soil Science, University of Goettingen, Germany

The microbial population in soil is heterogeneous: majority of microorganisms are dormant, while a small fraction maintains active status being alert or potentially active waiting for substrate input. We stimulated microbial activation by a range glucose concentration (5 to 400% of the total microbial biomass) in order to estimate the three fractions of active microbial population and determine the threshold concentrations of labile C necessary for activation of each fraction.
Using substrate-induced growth response method, we determined that in soil amended solely with water, 2% of total microbial biomass (TMB) maintained alert status. This fraction was characterized as r-strategists with high maximal specific rates (μmax), while the potentially active microorganisms activated by glucose had lower μmax. The dependency of active microbial biomass (AMB) fraction from amount of added C was non-linear and tended to saturation at glucose rate greater than 200% of TMB indicating glucose oversaturation and possible limitation by other nutrients. Analysis of relationship between applied substrate amount and activated microbial fraction revealed two potentially active groups (in total 24% of TMB) that differed by their glucose transport systems. The first group was activated when glucose was applied at a rate equal to 10% of TMB and comprised 6% of TMB having high substrate affinity to glucose. And the second group with 18% of TMB was activated when glucose was applied at higher rate ($\sim$66% of TMB) and was characterised by low affinity to glucose.
To sum up, despite the fact that C is the most important limiting factor, it's removal is not able to activate microbial biomass up to 100%. An input of labile substrate at low rates activates approximately 6% of the microbial community whereas another 18% is activated only when glucose application rate is higher than the half of microbial biomass amount.