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Root exudates of *Brachiaria humidicola*, a tropical pasture grass, and its effect on nitrification and soil microorganisms

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Nitrification is an important biological process in global nitrogen cycling whereby ammonia is converted to nitrite and nitrate by nitrifying bacteria (species of Nitrosomonas, Nitrospira and Nitrobacter). The nitrification products are vulnerable to leaching and denitrification: an estimated 45% of applied fertilizer is lost by leaching and 10% to 30% by denitrification. If the nitrification process is inhibited or slowed, then plants have adequate time to take up fertilizer N; N recovery and uptake are substantially improved and NO3– pollution problems are reduced. JIRCAS in collaboration with International Center for Tropical Agriculture, Columbia reported lower levels of NO3-N in fields of B. humidicola than in fields of other forage grasses and the compounds released from the roots of B. humidicola are mainly responsible for its inhibitory effect on soil nitrification. The present investigation is aimed at determining the influence of BNI (biologically produced nitrification inhibitors) compounds released from B. humidicola roots on nitrification, natural soil micro flora and plant growth promoting soil microorganisms.
Several soil incubation/pure culture studies were conducted to test the influence of root exudates on nitrification, soil micro flora and plant growth promoting microorganisms. Two soil types of contrasting total nitrogen, carbon and pH characteristics, Andosol and Terrace yellow soil, were used in the soil incubation studies. Root exudates were collected in distilled water, after the plants were exposed to 1mM NH4Cl, and concentrated before incorporated into the soil/pure culture studies. Microbial counts (ammonium oxidising bacteria, nitrite oxidising bacteria, total cultivable bacteria, aerobic spore former, fluorescent pseudomonas, gram-negative bacteria, actinomycetes, fungi and plant growth promoting microorganisms) were done by MPN method; NH4 and NO3 analysis were done at regular intervals in an auto analyser as per the standard procedure. The results and discussion of the experiments will be detailed in the talk.

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