A STUDY OF NON-SYMBIOTIC NITROGEN-FIXING BACTERIA IN SOME KENYA SOILS

By

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Investigations were carried out on three Kenyan soils for the occurrence, distribution and relative contribution of free-living nitrogen fixing bacteria in these soils. The three soils had a rich flora of N\textsubscript{2}-fixing bacteria which was composed mainly of *Beijerinckia* spp. The Kabete soil had in addition to *Beijerinckia* spp., *Azotobacter chroococum* and *Derxia gummosa*. The isolates showed acetylene reduction rates ranging from 3299.06 to 1.30 nmole of ethylene per hour and fixed between 0.728 to 0.098 mg of N per ml of culture in 21 days.

Several physico-chemical characteristics of the soils were analysed in relation to the viable numbers of N\textsubscript{2}-fixing bacteria present in the soil. In the Kabete and Muguga soils increases in organic carbon resulted in increases in numbers of N\textsubscript{2}-fixing bacteria. However, this was not observed in the Naivasha soil. In the three soils studied, moisture did not have a direct influence on the numbers of non-symbiotic N\textsubscript{2}-fixing bacteria.
Initially none of the soils studied showed any nitrogenase activity (acetylene reduction) when incubated for 48 hours with acetylene, but after amending with 2% sucrose solution acetylene reduction in the Naivasha soil increased from trace amounts to 62.15 nmole of ethylene per gram dry soil in 48 hours.