

SOIL MICROBIOLOGY OF TRISULI AREA

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Microbiological analysis presented in this report are carried out in the laboratory of the Division of Soil Science & Agricultural Chemistry, Khumaltar, Lalitpur (Nepal) according to the standard procedure of POCHON & TARDIEUX (1961) (2).

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The soil humus were collected by A. MAIRE in september 1972. Physico-chemical data are given with vegetation data at the beginning of the article.

TABLEAU I - Geographical and ecological data.

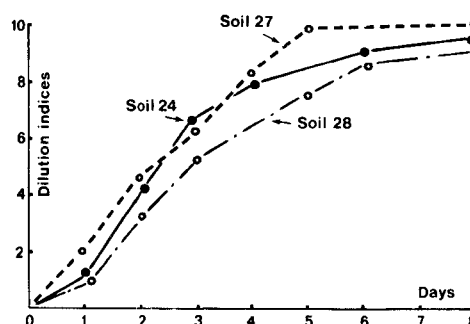
Soil number	Altitude meters	Place	Date	vegetation	Vegetation level
19	800	Betrawati	14. 09.1972	Shorea robusta forest	Upper tropical
20	1750	Bedang	15. 09.1972	Pinus roxburghii - Quercus lanata forest	Upper subtropical
21	3780	Gosainkund	20. 09.1972	Rhododendron campanulatum - Juniperus indica scrub	Upper subalpine
22	3600	Langtang Valley (northern slopes)	24. 09.1972	Betula utilis - Rhododendron campanulatum forest	"
23	3400	"	24. 09.1972	Abies spectabilis - Betula utilis forest	Lower subalpine
24	3200	"	24. 09.1972	Abies spectabilis - Rhododendron barbatum forest	"
25	2950	"	24. 09.1972	Abies spectabilis - Tsuga dumosa forest	"
26	3800	"	25. 09.1972	Betula utilis forest	Upper subalpine
27	3650	"	25. 09.1972	Rhododendron lepidotum - Juniperus squamata scrub	"
28	4050	Langtang Valley (southern slopes)	26. 09.1972	Alpine meadow	Lower alpine
29	4200	"	26. 09.1972	Alpine meadow	"

Microbial flora

The number of soil bacteria in 9 soils out of 11 ranges from 6.6 to 23 millions with an average value of 14.7 millions of bacteria per gram of soil, whereas soil N° 21 and 28 contain 460 and 100 millions of soil microbes, respectively. Considering the microbial population, it is evident that these soils are quite rich in microbial flora.

Ammonifying bacteria

There is not much difference in the population of ammonifying bacteria in these soils. Their number are found to vary from 11000 to 14000 millions except Soil N°23 which contains only 1400 millions bacteria.



Graph 1. - Ammonification activity.

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(2) POCHON, J. & TARDIEUX, P. 1962. Techniques d'analyse en microbiologie du sol. Edition de la Tourelle, Saint-Mandé (France).

Ammonification activity represented by Graph 1 shows that these bacteria are very active after 2 days. Consequently, maximum biological activity is observed between 4 to 5 days' period. Almost all the tubes are positive upto 10th dilution after 8 days' incubation in laboratory.

Nitrification

Higest number of Nitrosomonas are found in Soil 28 (1.8 million). Soil n° 22 contains 600 bacteria. In other soils, their number range from nil to 50.

Regarding Nitrobacter, there are fairely good number in soils. Their number varies from 0 to 1.8 millions. Soil N° 23 is nil in the population of Nitrobacter whereas the maximum number (1.8 millions) are found in Soil N° 20 and 27.

Denitrifying bacteria

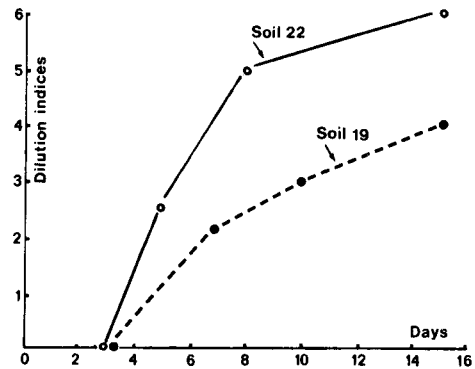
The number of denitrifying bacteria range from 10 to as much as 14 millions in these soils. In general, the soils harbour reasonably fair number of denitrifying bacteria.

Activity curve of denitrifying bacteria is presented in Graph 2. It is clear from this graph that unlike ammonification activity, denitrifying activity is very slow. At the end of 15 days' incubation, the bacteria develop upto 6th dilution in case of Soil N° 22 and ony upto 4 th dilution in Soil n° 19.

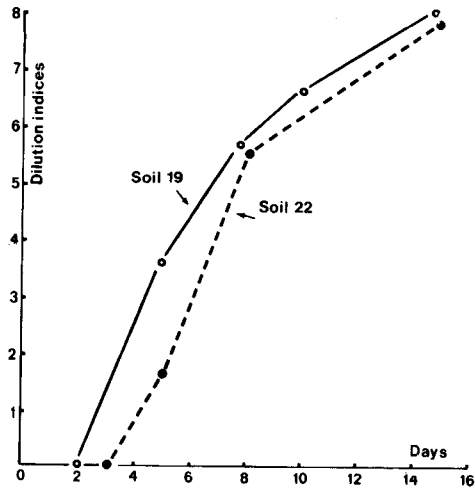
Amylolytic bacteria

These soils are quite rich in starch decomposing bacteria. In 4 soils (Soil N° 19, 20, 22 & 25), their number reach upto 140 millions. Other 3 soils, Soil N° 28, 27 & 24, contain 1.1, 1.4 and 2.0 millions of amylyolytic organisms, respectively.

Amylolytic curve is shown in Graph 3. It is evident from this curve that amylyolytic bacteria begin to develop after 3 to 5 days' incubation in laboratory. At the end of 15 th day, these bacteria multiply upto 8 th dilution.



Graph 2. - Denitrification activity.



Graph 3. - Ammonification activity.

TABLEAU II - Number of microorganisms per gram of dry soil.

Soil N°	Total microflora (millions)	Ammonifying bacteria (millions)	Nitrosomonas	Nitrobacter	Denitrifying bacteria	Amylolytic bacteria
19	10	14000	-	-	14000	140 millions
20	15	-	50	1.8 millions	14 millions	140 millions
21	460	14000	-	900	20	14000
22	14	11000	600	45000	1.4 millions	140 millions
23	14	1400	0	0	10	11000
24	15	11000	20	40	10	2 millions
25	10	11000	0	18000	1400	140 millions
26	15	14000	10	1700	250	100
27	23	14000	10	1.8 millions	4500	1.4 millions
28	100	14000	1.8 millions	160000	4500	1.1 millions
29	6.6	14000	45	130	1100	10