## §7. Environmental Tritium Studies at Toki Site of NIFS (1993)

Ichimasa, Y., Ichimasa, M. (Ibaraki Univ. Sci.)
Okai, T. (Kyushu Univ. Eng.)
Hisamatu, T. (Akita Univ. Med.)
Momoshima, N. (Kyushu Univ. Sci.)
Obayashi, H., Sakuma, Y., Yamanishi, H.

Tritium monitoring method around nuclear fusion plant is under developing as a model case at Toki area where fusion research installations are constructed by NIFS. Background tritium concentrations and their variations in air, pine needles, litter and underlying humus at pine trees were therefore investigated. Three kinds of chemical form of tritium, water vapor (HTO), molecular hydrogen (HT) and hydrocarbons (primarily methane, $CH_3T$), were also collected successively from air by specially developed sampling system and tritium concentration was determined. Further measurements should be necessary to clarify the background levels of environmental tritium and their variations at Toki area.

Otherwhile, we have been studing seasonal changes in tritium gas oxidation activity in surface soil, various plant leaves, mosses and lichens in *in vitro* experiments, in order to obtain basic data to estimate their contribution to oxidation of tritium gas released in the environment from a nuclear fusion facility and to evaruate the absorption dose. To investigate whether tritium gas is biologically oxidized in the air, isolation of airbone bacteria with tritium gas oxidation activity was intended. The numbers of airbone bacteria in the air at Toki and Higashiyama area was small, but tritium gas oxidizing airbone bacteria were obtained. Table 1 shows tritium gas oxidation activity ( hydro - genase) of these airbone bacteria compared with those obtained from Ibaraki prefecture. Identification of these bacteria was undertaken using morphological and biochemichal analyses. The scanning electron microscopic pictures of some typical bacteria collected from NIFS were showen in Figure 1.

Table 1 Isolated airbone bacteria with hydrogenase

| No. | Strain※ | HT Oxidation (%/min/vial) | No. | Strain※ | HT Oxidation (%/min/vial) |
|---|---|---|---|---|---|
| 1 | #W. W. -1-2-4 | 1. 32 | 23 | #Coop-1-1-6 | 0. 11 |
| 2 | D-1-3-1 | 1. 20 | 24 | D-1-4-3 | 0. 10 |
| 3 | D-1-3-3 | 0. 84 | 25 | B-1-2-6 | 0. 067 |
| 4 | D-1-3-6 | 0. 84 | 26 | #T. -1-1-7 | 0. 061 |
| 5 | F. S. -1-1-3 | 0. 82 | 27 | D-1-2-7 | 0. 060 |
| 6 | A-1-2-4 | 0. 71 | 28 | #G. -1-4-7 | 0. 053 |
| 7 | D-1-3-2 | 0. 61 | 29 | F. S. -1-5-8 | 0. 050 |
| 8 | D-1-1-1 | 0. 59 | 30 | O. -1-1-7 | 0. 044 |
| 9 | #Coop-1-1-8 | 0. 58 | 31 | F. S. -1-5-1 | 0. 042 |
| 10 | O. -1-1-6 | 0. 57 | 32 | D-1-4-8 | 0. 039 |
| 11 | C-1-1-2 | 0. 53 | 33 | B-1-5-7 | 0. 029 |
| 12 | D-1-1-5 | 0. 52 | 34 | #Coop-1-4-2 | 0. 026 |
| 13 | D-1-3-4 | 0. 43 | 35 | O. -1-1-1 | 0. 025 |
| 14 | F. S. -1-5-5 | 0. 43 | 36 | D-1-4-1 | 0. 023 |
| 15 | $B' -3-4 | 0. 38 | 37 | O. -1-3-5 | 0. 020 |
| 16 | A-1-2-3 | 0. 29 | 38 | $F' -2-3 | 0. 016 |
| 17 | #Forest-1-2-4 | 0. 29 | 39 | O. -1-2-6 | 0. 016 |
| 18 | B-1-2-4 | 0. 25 | 40 | #W. W. -1-2-6 | 0. 016 |
| 19 | &7-1-1 | 0. 23 | 41 | B-1-1-3 | 0. 015 |
| 20 | O. -1-2-5 | 0. 22 | 42 | O. -1-2-2 | 0. 0093 |
| 21 | B-1-2-7 | 0. 21 | 43 | &7-1-6 | 0. 0081 |
| 22 | #T. -1-2-2 | 0. 19 | 44 | O. -1-1-8 | 0. 0044 |

$ Nagoya-shi (Higashiyama)(NIFS)
& Toki-shi (NIFS)

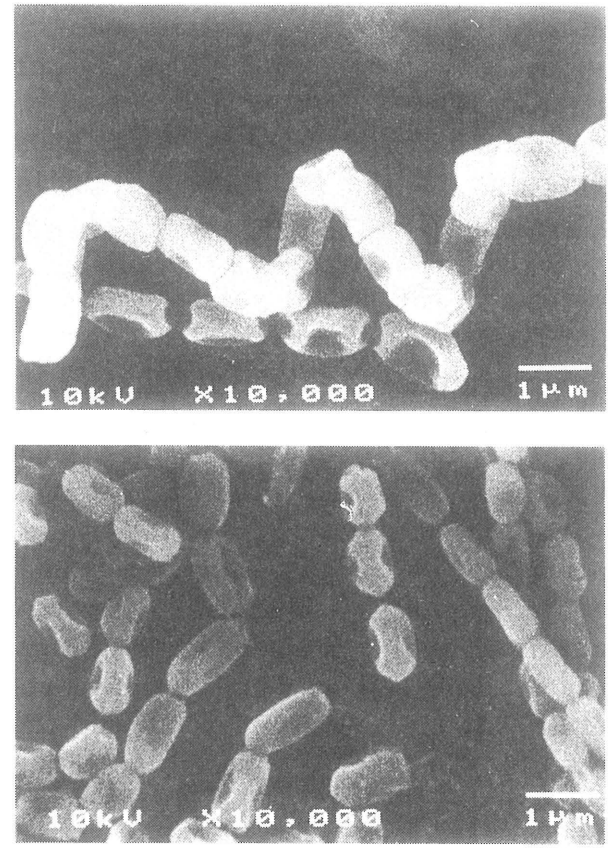


Fig. 1.