A New Crystalline Germination Promotor for Plant Seeds, Produced by *Streptomyces* sp. S-580

Sir:

It has been already reported by Y. Koaze, H. Sakai and K. Arima\(^1\) that culture broth filtrates and/or mycelial extracts of several microorganisms had promoting effects on the germination of some plant seeds in the filtrate and has succeeded to obtain a crystalline substance which could promote the germination of rice plant seed in such concentrations, as low as 0.1μg/ml. This crystalline substance did not show any antibiotic activity.

![Figure 1](image-url)

**FIG. 1.** Effect of the Culture Broth Filtrate of *Streptomyces* sp. S-580 on the Germination of the Rice Plant Seed.

Ten days after start of experiment under the dark condition, incubated at 18°C. Seeds at the middle row treated with the culture broth filtrate of *St. sp. S-580* diluted to one hundredth. Seeds at the lower row treated with the culture medium of *Streptomyces* in the same dilution and seeds at the upper row in distilled water, these both being for controls.

A heavy oily syrup with high activity was obtained by extracting the culture broth filtrate of *St. sp. S-580* with ethyl acetate. By the chromatographic technique using aluminium oxide, an active factor was obtained from the above syrup in crystalline form. (In the above syrup, there were some other active factors which were also isolated.) Repeated crystallizations from absolute ethyl

---

\(^1\) Presented at the Annual Meeting of The Agricultural Chemical Society of Japan held in Tokyo, April 1, 1956.
alcohol gave colorless needles (Fig. 2), m.p. 180-184° (dec.). This active crystalline substance is a neutral material, soluble in alcohol, benzene, chloroform and water, but insoluble in ethyl ether and petroleum ether. Analytical data of this crystalline substance is as follows:

**Anal.** Calcd. for C₁₀H₁₉O₂N₂: C, 61.20; H, 8.22; N, 14.28; mol wt., 196.24, Found: C, 61.06, 61.18; H, 8.20 8.22; N, 14.05; mol wt.

The UV-spectrum of this crystalline substance in methyl alcohol showed no significant absorption in the wavelength range of 221 to 400 mμ but showed a strong end absorption.

The infra-red spectrum in Nujol mull is shown in Fig. 3.

Ninhydrin reaction and biuret reaction were both negative. However, hydrolysis in hydrochloric acid gave the two amino acids, proline and valine (with regard to their optical configuration studies are now in progress). From above evidences this crys-

**FIG. 2.** Crystalline Form of this Active Substance. (magnification, x300).

**FIG. 3.** Infra-red Spectrum of this Active Crystalline Substance in Nujol Mull.
talline substance is presumed to be prolyl-valine anhydride

The author wishes to express his sincere thanks to Professor Kin-ichiro Sakaguchi, Univ. of Tokyo for his guidance throughout this work. Thanks are also due to Professor Yusuke Sumiki, Univ. of Tokyo for his kind advice and suggestions. Infra-red analysis was carried out through the courtesy of the Tobacco Research Department, Central Research Institute, Japan Monopoly Corporation.

Yoshihisa Koaze

Department of Agricultural Chemistry,
Faculty of Agriculture, University of Tokyo
Received March 4, 1957