TABLE I

*Showing the antiviral activity of 6-MFA against the FMD virus %*

| FMD virus type | Dose of 6MFA/PBS (i.p.) | No. of mice | Virus (i.m.) | Protection S/T (%) | MST (in days) |
|---|---|---|---|---|---|
| 'O' | 1 ml | 9 | 100 $LD_{50}$ | 3/9 (33·3) | 6·5 |
| | 2 ml | 9 | ,, | 5/9 (55·5) | 7·5 |
| | 1 ml PBS (CONTROL) | 10 | ,, | Nil | 4·8 |
| | 1 ml | 10 | 1000 $LD_{50}$ | 4/10 (40·0) | 7·3 |
| | 2 ml | 10 | ,, | 3/10 (30·0) | 6·5 |
| | 2 ml PBS (CONTROL) | 10 | ,, | Nil | 5·1 |
| 'A' | 1 ml | 9 | 100 $LD_{5}$ | 1 9 (11·1) | 5·0 |
| | 2 ml | 9 | ,, | 1/9 (11·1) | 6·6 |
| | 1 ml PBS (CONTROL) | 10 | ,, | Nil | 4·5 |
| | 1 ml | 10 | 1000 $LD_{60}$ | 1/10 (10·0) | 7·5 |
| | 2 ml | 8 | ,, | 3/8 (37·5) | 8·0 |
| | 2 ml PBS (CONTROL) | 10 | ,, | Nil | 4·5 |

S = number of surviving; T = total mice. i.p. = intraperitoneal; i.m. = intramuscular.
PBS = phosphate buffer saline.

increased supply of the antigen apparently accumulating through intracellular antiviral action of IF induced by 6–MFA.

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## *STREPTOMYCES VIJAENSIS*—A NEW STREPTOMYCETE

WHILE carrying out the systematic screening for the isolation of streptomycetes capable of producing new antibiotics, a new streptomycete was isolated from a soil sample collected from Krishna river bed at Vijayawada (A.P.) which was designated as *S. vijaensis*.

The materials and methods used were similar to those of our previous communication[1] and ISP procedures[2]. The sporophores are simple, and occurred as straight to wavy in most cases with a few extended open spirals and occasionally a few open and closed hooks. No verticils were observed. The spores are oval to elliptical with warty surface.

*Cultural characters.*—Glucose-Czapek's agar : Growth excellent ; reverse yellowish brown to brown (14–A–10) ; aerial mycelium abundant, pale dull rose (3–A–8) ; yellowish brown throughout and purple (43–F–7) pigment around co'onies.

Glycerol-asparagine agar ISP : Growth good ; reverse colourless to light yellowish brown (12–G–6) ; aerial mycelium moderate, pale pink (2–B–1).

Inorganic salts-starch agar ISP : Growth excellent ; reverse light dull brownish yellow (11–C–3) ; aerial mycelium abundant, light dull rose (4–A–8).

Oatmeal agar ISP : Growth good ; reserve cream ; aerial mycelium good, pale pink (2–C–1).

Potato plug : Growth excellent, wrinkled ; mycelium pale reddish brown ; aerial mycelium poor, white with pale rose patches ; plug turned to deep blackish brown.

Nutrien agar : Growth good ; reverse yellowish brown to brown (14–F–9) ; aerial mycelium scant white ; deep brown soluble pigment.

Yeast extract-malt extract agar ISP : Growth good ; reverse brown (12–H–10) ; aerial mycelium good, light dull pink (4–D–1) ; light brown soluble pigment.

The following biochemical reactions were positive : melanin, $H_2S$, tyrosinase, amylolytic activity, nitrate reduction, milk coagulation with acidic reaction, acid from glucose, catalase formation, gelatin liquefaction, casein hydrolysis, cellulolytic activity (slight) and sucrose inversion. The following reactions were negative : Indole production from tryptone, Loeffler's serum liquefaction, blood haemolysis and milk peptonization.

Carbon utilisation : *Excellent to good growth* : arabinose, fructose, glucose, galactose, inulin, inositol, maltose, mannitol, mannose, lactose, rhamnose, starch, sorbitol, sucrose, salicin and xylose. *Moderate to poor growth* : cellulose, glycerol, raffinose, sodium acetate, sodium citrate and sodium succinate. *Doubtful growth* : Dulcitol, digitonin and sorbose.

*No growth* : paraffin. Although the isolate broadly possesses poor antibiotic activity, the extracellular metabolite showed good activity on *P. vulgaris* and *S. typhosa* and the intracellular metabolite showed good activity on coagulase positive *Staph. aureus.*

*Discussion*

A detailed survey of the literature indicated that our isolate is related to *S. griscoroseus*[3] and *S. roseochromogenes*[4,5] and authentic cultures of these two were obtained and comparative studies made. The data show that *S. vijaensis* more closely resembles *S. griseoroseus* than *S. roseochromogenes.* However, even *S. griseoroseus,* although similar, differs from our isolate in (1) tyrosinase negative, (2) positive peptonization of milk and (3) no utilisation of raffinose, sorbitol, inositol and inulin.

In view of the above, our isolate is considered a new species and designated *S. vijaensis* sp. nov., as its origin in Vijayawada.

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## NITROGEN FIXATION BY *AZOTOBACTER* OCCURRING IN THE RHIZOSPHERE OF $C_4$ PLANT SPECIES

THE non-symbiotic nitrogen fixing bacterium, *Azotobacter,* is receiving greater recognition among scientists[1,2]. The rank and luxuriant growth of certain tropical grasses like *Paspalum notatum, Digitaria decumbens* Hall., *Cynodon dactylon* Pers. and *Zea mays* L. is believed to be due to the association of active and efficient *Azotobacter* sp. in their root system[3]. Such plant species strangely enough exhibit an alternative but more efficient mechanism of carbon dioxide fixation called "$C_4$ pathway" ($C_4$-dicarboxylic acid pathway)[4] quite distinct from the universally functioning Calvin's pathway. In the present communication the N-fixing efficiency of several isolates of *Azotobacter* obtained from $C_3$ and $C_4$ plant species is compared.

From the rhizosphere of three species of $C_4$ plants (Table I) and from three $C_3$ plant species (Table II) *Azotobacter* cultures were isolated following standard microbiological techniques[5] and they were maintained on Waksman No. 77 agar medium. The N-fixing ability of the isolates was determined following the procedures detailed by Rangaswami and Subba Raja[6]. The total nitrogen in the broth after 10 days of growth of the organism under shake culture conditions was determined in a micro-Kjeldhal unit[7]. The respiratory activity of the isolates was measured in a Warburg respirometer[8]. The growth-promoting efficiency of *Azotobacter* isolates was tested on three rice varieties following the paper roll towel seed germination technique[9]. The results are presented in Tables I to III.