

# A NEW CELLULOSE—DECOMPOSING MICROORGANISM FROM INDIAN SOILS

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*Anixella reticulata* (Booth and Edden) Cain, which is hitherto unrecorded from soil of India, was recovered from soil of Tinsukia (Assam). The fungus was tested for cellulolytic activity by determining its ability to cause strength loss in cambric cotton strip and by their growth on different cellulosic materials. The isolate proved to be effective cellulose decomposer.

## INTRODUCTION

Cellulolytic activity of micro-organisms has been emphasised in many tropical and sub-tropical areas in the rotting of fibres (Greathouse and Ames, 1945). Ranganathan and Agarwal (1965) considered the problem of biodeterioration of service stores in tropical climate. Assam falls in the hot-humid belt of India, which is very favourable for growth and proliferation of various types of saprophytic fungi. The extent of microbial deterioration depends on the storage or usage conditions, and the chemical nature of basic materials which are utilized as a source of nutrition by pioneers and successors. Service stores made from different materials such as cotton and other vegetable fibres and paper have been found to suffer microbial attack resulting in unserviceability and loss of materials (Agarwal 1970).

Systematic studies are being carried out in our laboratory to investigate the types and distribution of various fungi in soil and their relative capacity of degradation of cellulosic materials. During these studies the fungus *Anixella reticulata* (Booth and Edden) Cain, was obtained and the present paper describes its occurrence and cellulolytic activity.

## MATERIALS AND METHODS

The isolation of fungus *Anixella reticulata* was made on synthetic acid agar medium (Waksman and Fred, 1922) following soil dilution and plate counts method (Johnson *et al.* 1960). The isolated culture was maintained on Cazpek's dox agar slants.

The cellulose-destroying capacity was determined following the method described in technical report (Anon 1947), and the breaking strength of test strips was determined at a Good brand Breaking strength testing machine (Anon, 1959). The average breaking strength of inoculated, uninoculated (control) strips was used for calculating percentage loss in strength of Cotton cambric test strips.

Different cellulosic materials viz. clothing cotton, cordage cotton, cordage sun, bamboo paper, paper liner (Writing paper), cotton fibres and wood were tested by pure culture test (Nigam 1965).

## RESULTS AND DISCUSSION

The soil samples used for isolations showed a pH range of 6.8 to 7.2, and average moisture content of 7.5 to 20.0 per cent and a temperature range of  $30 \pm 3^\circ\text{C}$ . In present studies only one isolate of the fungus could be obtained from the soil of Tinsukia (Assam). The isolate showed the characters similar to those described by Cain (1961). No record of this fungus was found for its occurrence in Indian soils before these studies. The isolate showed the following characters :

Perithecia on C. D. A. scattered, uniformly black at maturity. Perithecia globose, 150–200  $\mu$  in diameter, without ostiole. Asci broadly clavate, 8 spored,  $100\text{--}130 \times 30\text{--}40 \mu$ , broadly rounded above with an indistinct thickened ring in apex, brown in colour. Ascospores biseriata, ellipsoid,  $24\text{--}28 \times 18\text{--}21 \mu$ , smooth and hyaline at first becoming golden brown and finally dark brown. No conidia or spermatia were observed.

The fungus was first described by Booth & Edden (1961) as *Thielavia reticulata* and *Anixella reticulata* name was given by Cain (1961). This species is closely related to and derived from the genus *Gelasinespora* (Cain 1950). The most distinctive feature is the complete lack of an ostiole in the small perithecia. The asci are fewer in number and shorter possessing biseriata ascospores instead of numerous cylindrical ones in *Gelasinespora*. The ascospores in both the genera are identical with respect to the pits, germinal pores, colour and shape.

The cellulolytic activity of *A. reticulata* was determined by the loss in strength of cotton cambric test strips, when the strips were incubated for 7 days, the isolate caused 51.05 per cent loss in fabric strength thereby showing effective cellulolytic activity.

The growth of fungus on various cellulosic materials e.g., cotton clothing, cotton fibres, cordage cotton, cordage sun, bamboo paper, paper liner and wood was studied. The results indicated that the growth was profuse only on cotton clothing, cotton fibre and cordage cotton, whereas cordage sun and wood did not support the growth of fungus. It is therefore indicated that the fungus had effective cellulolytic activity only with the cotton cellulose and was capable of bringing out the degradation of cotton materials.

Studies of soil microflora of Assam with special reference to cellulolytic microorganisms, were carried out by various workers. Sahgal *et al.*, (1965) studied the cellulolytic microorganisms, which were responsible for deterioration of the tentage materials in Assam, but he failed to report this fungus. Similarly Tandon *et al.* (1971) who isolated 146 fungi, did not find the fungus *Anixella reticulata*. During the present investigation the isolation of *Anixella reticulata* is important because the fungus has effective cellulolytic activity against the cotton cellulose.

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