

STUDIES ON THE OXALIC ACID SYNTHESIS BY *SCLEROTIUM* *ROLFSII*, SACC.

NUMBER of fungi are known to produce oxalic acid.¹ Earlier studies on *Sclerotium rolfsii* Sacc., the causal organism of root rot of many host plants, have shown this fungus to be a potent synthesizer of oxalic acid.² With a view to obtain the optimum conditions for oxalic acid synthesis, the influence of certain media on the production of the acid, the partition of the acid between the mycelium and the culture filtrate and the interrelationship of growth to the acid synthesis, have been studied and the results are reported in this communication.

An isolate of *Sclerotium rolfsii* from diseased bean plant, *Phaseolus vulgaris*, maintained on potato glucose agar, was grown on various solid and liquid media, prepared according to standard formulæ.³ A single sclerotium was always used as the standard inoculum. The pH of the media was adjusted to 6.0, the optimum for the growth of the fungus. The growth rate on solid media was determined by the diameter of the colony and on liquid media by the dry weight of the mycelium. Oxalic acid in the culture filtrate was estimated by KMnO_4 titration method.⁴ Estimation of oxalic acid in the mycelium was done as follows: The mycelium was ground with acid washed powdered glass and the oxalic acid extracted with 75 ml. of distilled water. The solution was allowed to stand for one hour at room temperature and centrifuged at 9,000 R.P.M. for 15 minutes. The clear supernatant was used for determining the oxalic acid.

The complex organic media used and their effect on mycelial growth are shown in Table I.

TABLE I

Effect of different solid media on growth of *Sclerotium rolfsii**

Medium	Radial growth in mm. after				
	2 days	3 days	4 days	5 days	6 days
Oat-meal agar	14.0	36.5	59.0	85.0	covered the plate (90 mm.)
Potato glucose agar	38.9	covered the plate
Bean extract agar	23.3	56.3	82.7	covered the plate	..
Carrot extract agar	15.0	73.7	87.3	do.	..

* Average of three replicates.

Since the isolate was from a bean plant, bean agar media was also included in the study.

Maximum growth was observed after 3 days in potato glucose agar followed in order by carrot extract agar, bean extract agar and oat-meal agar.

The mycelial yield and oxalic acid production after 20 days incubation at room temperature in different liquid media are shown in Table II.

TABLE II

Mycelial yield and oxalic acid production by *S. rolfsii*

Medium	pH of the culture filtrate	Dry weight of the mycelium in mgm.	Oxalic acid in the culture filtrate expressed in mg.	Oxalic acid in the culture filtrate expressed in mg. per gm. dry weight of the mycelium
Czapek's solution	5.7	360	2.5	6.94
Richard's solution	4.4	400	32.7	81.8
Asparagin glucose solution	4.6	270	12.6	46.7
Glucose-peptone solution	3.1	700	247.6	353.7

Glucose peptone medium was found to be the best both for the growth of the fungus and the synthesis of oxalic acid. This was selected for further studies relating to the production and distribution of oxalic acid between the mycelia and culture filtrate, during the growth of the fungus. The results are presented in Table III.

TABLE III

Mycelial growth and oxalic acid synthesis by *S. rolfsii*

Days of incubation	pH of the culture filtrate	Dry weight of the mycelium in mg.	Oxalic acid in the culture filtrate expressed in mg.	Oxalic acid in the mycelium expressed in mg.
4	5.7	10	8.4	..
6	3.2	364	210.0	6.4
8	1.9	1168	319.2	12.6
10	2.3	1167	260.4	12.6
12	2.5	868	244	12.6
16	2.8	708	228	9.6
20	3.2	676	236	6.4
24	3.9	516	296	6.4
28	4.0	412	286	6.4
32	4.1	376	276	3.2

It is seen that the maximum growth of the fungus on glucose peptone medium is reached in about 8-10 days after which time the phase of autolysis sets in. With this onset of autolysis, as indicated by the diminished mycelial mat, there is a corresponding reduction in the oxalic

acid content of the culture filtrate and the mycelium.

The major portion of the oxalic acid synthesized diffuses out into the media and only a small amount of oxalic acid is retained in the mycelium. The metabolic fate of the oxalic acid with the onset of autolysis and the factors involved in the alterations observed in the pH of the media need elucidation.

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PALMOXYLON SCOTTII : REVISED NAME FOR PALMOXYLON SAHNII MENON

IN 1933, Rode² described a new species of petrified palm stems from the Deccan Intertrappean beds of Mohgaonkalan and named it as *Palmoxylon sahnii*. This was later shown to belong to the family Cyclanthaceae and was referred to a new genus *Cyclanthodendron* as *Cyclanthodendron sahnii* (Rode) Sahni and Surange (1944).³

Recently one of us, Menon¹ (1964) described another palm wood from the same locality and designated it *Palmoxylon sahnii*. This was done under the impression that *P. sahnii* Rode having lapsed into synonymy was no longer valid, particularly as the species has been referred to a new genus. But it is now realized that there is always the possibility of little confusion in the literature, more so if the original name by Rode is revived for some reason or other. In view of this it was thought best that the specimen should be given a new specific name. It is therefore hereby proposed that the specimen, described as *Palmoxylon sahnii* Menon (1964), be henceforth known as *Palmoxylon scottii* nom. nov. The specific name is after D. H. Scott, the great palaeobotanist, who has inspired several generations of students for the study of petrified plant fossils.

For ready reference the diagnosis of the species is reproduced below under the new name :

Palmoxylon scottii (MENON) NOM. NOV.

Cortex present, with fibrous bundles and compact ground tissue. *Dermal zone*—Fibrovascular bundles regularly orientated; 245–320 per cm.²; mostly elongated in form; diameter 0.2–0.5 mm.; f/v ratio 0.5/1–1.4/1; median sinus concave and auricular lobes rounded; xylem vessels usually one, sometimes two or a group of vessels together. *Stigmata*, fibrous bundles, radiating and tabular parenchyma absent. Ground tissue compact with thin-walled parenchyma cells. *Sub-dermal zone*—Bundles more or less regular; 150–170 per cm.²; f/v ratio 0.4/1–1/1; bundles with different sizes and shapes; diameter 0.3–0.6 mm. Median sinus concave to flat and auricular lobes round; metaxylem vessels usually two; excluded, sometimes a number of xylem vessels grouped together; protoxylem present; no fibrous bundles, *stigmata*, radiating or tabular parenchyma and posterior sclerenchyma. Leaf-trace bundles bigger in size, fused bundles present. Ground parenchyma compact with thin-walled round to oval cells. *Central zone*—Irregularly orientated bundles; 80–125 per cm.²; different sizes and shapes; f/v ratio 0.3/1–0.8/1; diameter 0.5–0.8 mm. Median sinus concave to flat, auricular lobes round, metaxylem vessels mostly two, protoxylem present; phloem preserved. *Stigmata* and fibrous bundles absent. Leaf-trace bundles seen clearly. Ground parenchyma same as in the dermal and sub-dermal zones.

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MICROFLORA FROM THE DICROIDIUM-BEARING BEDS OF SIDHI DISTRICT, MADHYA PRADESH *

THE note embodies the results of palynological study of the samples recovered from the *Dicroidium*-bearing beds recently reported from the Sidhi District, Madhya Pradesh.¹ The record of the microflora from these beds is of considerable interest as no microflora is