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Long-Chain Fatty Acids of *Sporothrix* (*Sporotrichum*) *schenckii*

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A number of strains purporting to belong to the species *Sporothrix schenckii* were examined for their fatty acid content. The majority of the strains were isolated from cases of sporotrichosis. Two strains were reputedly saprophytic. In all cases except the two saprophytic ones the major fatty acid was a C_{18} diene. Considerable amounts of palmitic acid and C_{18} monoene were found in all strains.

The taxonomic position of the species *Sporothrix schenckii* is subject to a certain amount of controversy (1). Several authors have suggested that it may be the imperfect form of the genus *Ceratocystis* (4, 6), and there seems to be a certain amount of confusion about whether or not various strains of *S. schenckii* do in fact belong to this species. This paper considers a number of strains of *S. schenckii*, both pathogenic and saprophytic, that were obtained from a variety of different sources and examines their fatty acid patterns for similarities to each other.

Eleven strains of *S. schenckii* were used in these studies. Three strains (labeled C in Table 1) isolated from skin lesions were supplied by F. Staib of the Robert Koch Institute, Berlin. Six strains (those labeled G in Table 1) isolated from cases of human sporotrichosis were supplied by G. D. Roberts of the Mayo Clinic, Rochester, Minn., and two strains (labeled S in Table 1) isolated from soil were supplied by A. von Klopotek, Institut für landwirtschaftliche Microbiologie, Giessen, W. Germany.

The organisms were grown on an extensively defatted medium according to the method of Dart et al. (2). Growth was on a rotary shaker operating at 150 rpm and 30 C.

The cultures were harvested after 40 h, washed well with distilled water, and dried thoroughly. The methyl esters of the fatty acids were prepared by treating the cultures with anhydrous methanol containing 2% concentrated sulfuric acid at 55 C for 24 h.

Identification of the methyl esters was carried out on a Pye 104 using a hydrogen flame detector system. Both polar and nonpolar columns were used, and the peaks were identified by their retention times and co-chromatography with authentic methyl esters. The polar column used was 10% diethylene glycol adipate on acid-washed celite, and the nonpolar column was 10% Apiazon L on chromasorb W. Both columns were 130-cm long with an internal diameter of 3 mm. The polar column was operated at 170 C and the nonpolar one at 180 C. The carrier gas was nitrogen, and the flow rate was 60 ml/min.

The area of each peak on the trace was determined by triangulation, and the amount of each methyl ester was determined as a percentage of the total for each species being considered.

The results are shown in Table 1. The positions of the double bonds in the methyl esters of the unsaturated fatty acids were not determined, but they co-chromatographed with authentic samples of the methyl esters of oleic, linoleic, and linolenic acids.

The medium used had been extensively defatted before use, which would suggest that all the fatty acids present had been synthesized de novo and that the percentage of fatty acids present in each strain should be a true reflection of the biosynthetic ability of that strain.

Examination of Table 1 shows that there are no unusual fatty acids present in the strains isolated from cases of sporotrichosis and that in all of these organisms the major fatty acid is a C_{18} diene.

However, when the two strains isolated from soil are examined, trace amounts of branched shorter chain fatty acids are found, and in both cases the major fatty acid is palmitic acid and the amount of C_{18} diene is considerably reduced.

Although pathogenic strains of *S. schenckii* can be differentiated from nonpathogenic strains on the basis of cultural and biochemical criteria (3, 5), these techniques are somewhat

TABLE 1. *Percentages of fatty acids occurring in S. schenckii*

Strain	Fatty acid														
	C_{14}	C_{15}	C_{16}	$C_{16:1}$	C_{17}	$C_{17:1}$	C_{18}	$C_{18:1}$	$C_{18:2}$	$C_{18:3}$	C_{20}	$C_{20:1}$	$C_{20:2}$	C_{22}	$C_{22:1}$
C52	0.4	Trace	22.2	0.7	Trace	–[a]	1.9	20.4	53.0	1.3	–	–	–	–	–
C59	0.4	Trace	22.4	0.7	Trace	–	1.4	18.1	55.8	1.2	Trace	–	–	–	–
C32	0.5	0.3	20.7	0.8	0.3	Trace	1.7	11.3	63.8	0.3	0.4	Trace	–	–	–
G32	0.4	0.1	23.6	1.6	0.4	Trace	0.9	20.6	51.4	1.0	–	–	–	–	–
G35	Trace	Trace	22.9	1.0	0.3	Trace	0.9	15.0	59.8	Trace	Trace	–	–	–	–
G30	0.3	0.2	24.5	1.3	0.3	Trace	0.8	20.7	51.1	0.7	–	–	–	–	–
G33	0.4	0.3	22.7	2.7	1.4	Trace	5.2	27.4	39.3	0.5	–	–	–	–	–
G29	0.2	Trace	22.1	0.9	0.4	Trace	4.1	32.5	39.6	Trace	0.3	–	–	–	–
G31	0.4	0.2	28.3	1.0	0.6	Trace	1.0	11.1	57.0	0.3	–	–	–	–	–
S44[b]	3.1	1.0	36.2	2.5	Trace	Trace	3.6	25.4	28.3	–	–	–	–	–	–
S32[b]	1.4	0.8	45.8	2.0	0.5	Trace	6.2	26.6	8.6	–	Trace	–	Trace	4.7	3.4

[a] –, Not detectable.

[b] Both of these isolates contained small amounts of branched short-chain fatty acids.

time consuming. The pattern of the fatty acids present in clinical isolates of *Sporotrichosis* from sporotrichosis could aid in the rapid identification of the organism as *S. schenckii*. A study of the fatty acid pattern may also give preliminary information on the potential pathogenicity of isolates from other sources.

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