

## SHORT COMMUNICATIONS

### A Soluble Beta-1,3-Glucan Found in Selected Genera of Oomycetes

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The Oomycetes have long been considered as a separate phylogenetic group, differing from other fungi. Zevenhuizen & Bartnicki-Garcia (1970) suggested that the presence of a water soluble beta-1,3-glucan in the cytoplasm of *Phytophthora cinnamomi* may be a characteristic which is common and unique to the Oomycetes. Faro (1972) reported that *Achlya ambisexualis* and *A. heterosexuales* also synthesize and store a beta-1,3-glucan in their cytoplasm. These findings prompted an investigation to determine the nature of the cytoplasmic polysaccharide of selected genera of the Saprolegniales and Peronosporales.

#### METHODS

*Achlya ambisexualis*, strains E87 and 734, *Achlya heterosexuales* 8-6, *Isoachlya* sp. N-59, *Thraustotheca clavata* D-7, *Saprolegnia ferax* F-1, *Dictyuchus* sp. F-2, and *Pythium* sp. A-6 were grown in 2.8 litre Fernbach flasks, each containing 150 ml of nutrient medium (Faro 1971) and incubated at 25 °C in darkness. A 10 ml zoospore suspension ( $2 \times 10^4$  zoospores/ml) was used to inoculate media for growth of *Saprolegnia* and *Achlya* (Barksdale, 1963), whereas all other media were inoculated with plugs (4 plugs/flask) cut out with a no. 5 cork borer from the periphery of colonies growing on solidified nutrient medium. *Phytophthora cinnamomi*, a gift from Dr Bartnicki-Garcia, was grown on defined medium (Bartnicki-Garcia, 1966).

Mycelia of *Saprolegnia ferax* and *Achlya heterosexuales*, both of which were homothallic, were harvested 48 to 50 h after inoculation. The mycelia of all other strains were harvested 5 to 7 days after inoculation. Each strain was grown in a series of 20 flasks and the mycelia harvested by pouring the contents of each flask into a Buchner funnel lined with Whatman no. 1 filter paper. The mycelium was washed with glass distilled water and the excess moisture removed by suction. The glucan was extracted from the pooled mycelium by the phenol extraction procedure of Hodgson, Munro, Singh & Wood (1969) as modified by Faro (1972). The infrared spectra of the glucans were compared with those of the glucans of *Phytophthora cinnamomi* and *Achlya*.

#### RESULTS AND DISCUSSION

*Saprolegnia ferax* and *Achlya heterosexuales* were harvested 48 to 50 h after inoculation instead of 5 to 7 days as were the other strains, because prolonged growth greatly reduced the yield of extractable glucan. This could be because *Saprolegnia*, as *Achlya*, utilizes its cytoplasmic glucan as an endogenous carbon source during morphogenesis of sex organs (Faro, 1972).

The polysaccharide extracted from each organism was water soluble and had an infrared spectrum very similar to the glucan of *Phytophthora* and *Achlya*. The infrared spectra of the glucans of *Phytophthora*, *Saprolegnia*, *Dictyuchus* and *Pythium* are identical (Fig. 1). Infrared

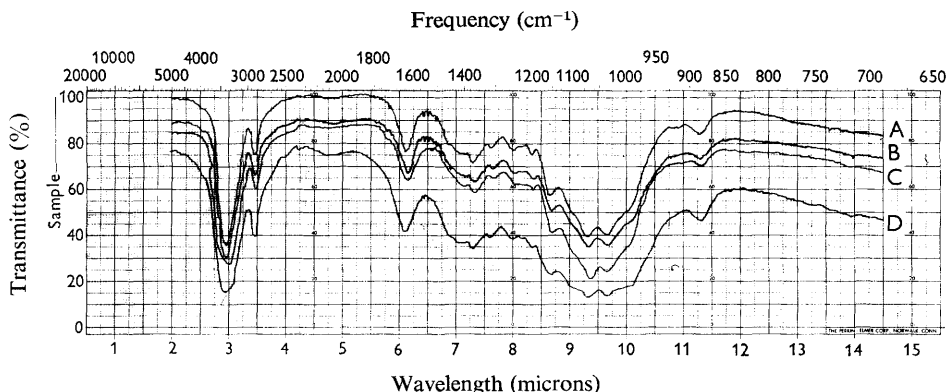


Fig. 1. Infrared spectra of cytoplasmic glucan obtained from: A, *Phytophthora cinnamomi*; B, *Saprolegnia ferax*; C, *Dictyuchus* sp.; and D, *Pythium* sp.

spectra of those fungi not shown in no way differed from those in Fig. 1. Those members of the Saprolegniaceae and Pythiaceae investigated here all synthesize and store in their cytoplasm a water soluble beta-1,3-glucan. Although other members of the Peronosporales, Leptomitales and Lagenidiales were not examined, these fungi probably also contain beta-1,3-glucan in their cytoplasm.

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