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Photodynamic effects of acridine orange an Neurospora sitaphila

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Abstract

Photodynamic effects of acridine orange

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Photodynamic action of acridine orange (AO) has been shown in bacteria, yeast and viruses. Two experiments that demonstrate photodynamic effects on linear growth rate and dry weight of mycelia in N. sitophila are reported her;.

Conidia from an albino strain (, nl sit 2-6A). obtained from the laboratory of A.M. Srb, were inoculated onto solid minimal medium (Beadle and Tatum). After 12 hours at 35°C, pieces of hyphal frontier in lmm.^{2} blacks of medium were inoculated into growth tubes and incubated at 37°. The growth tubes contained minimal medium with different concentrations of AO (Eastman Chemical): 0 mgm/1, 50 mgm/1, 500 mgm/1. Darkness was provided for one set of tubes by placing them in a heavy padded envelope with black cotton material aver the ends. Another set of tubes was exposed to a 15 watt GE fluorescent lamp with an illumination of 230-280 ft-c at the surface of the medium. Tubes were marked under orange light after the first 5 hours incubation and subsequently at 12 hour intervals.

The data in Figure 1 show that AO in the dark has little effect an growth rate. In the light, growth rate is inversely related to concentration of AO.

In the second experiment conidia were allowed to germinate in liquid minimal medium far 5 hours and then inoculated into 250 ml Erlenmeyer flasks containing 20 ml medium with different concentrations of AO: 0, 5, IO, 23, 50, 500 mgm /1. "Dark" flasks were wrapped in aluminum foil except for the cotton plugs. "Light" flasks were illuminated from below with 490 ft-c at the surface of the medium, incubated at 25°C, and shaken every 4 hours during the day. After 120 hours, dry weights of mycelia were determined.

Comparison of cultures (Fig. 2) indicates that light tends to increase growth. Law concentrations of AO slightly enhance growth. A definite photodynamic effect is observed an 23 mgm AO/1; growth is slowed in the dark, but almost stopped in the light. Although AO is altered in the light, this does not cause the observed effect. In another experiment, cultures grown in the dark an 50 mgm AO/1 were less inhibited by light-denatured AO than by fresh dye.

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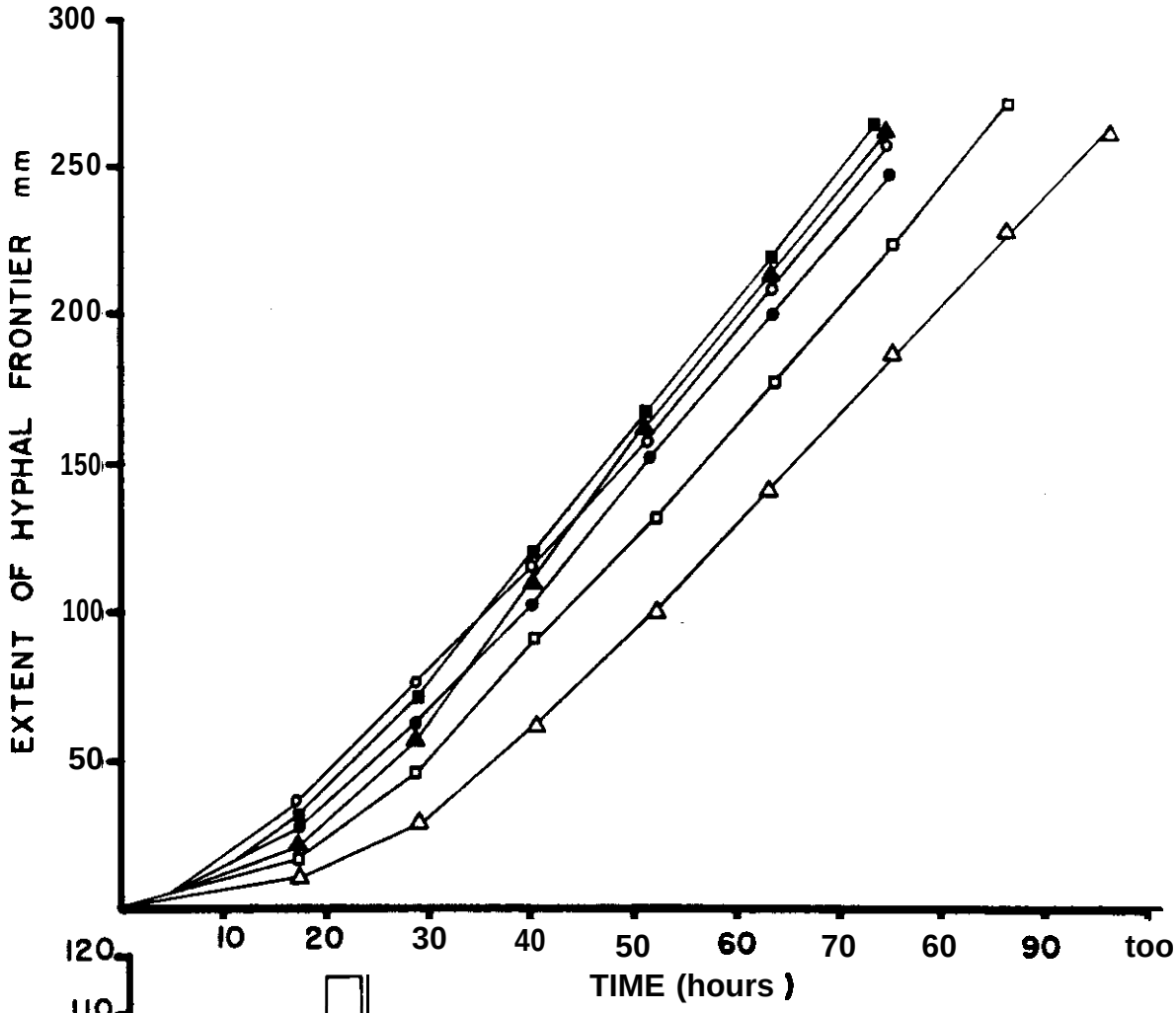

Figure 1. Growth of mycelia in growth tubes containing media with different concentrations of acridinc orange. Circles: no acridine orange; squares: 50 mg/l; triangles: 500 mg/l. Solid symbols: cultures grown in dark; open symbols: cultures grown in light.

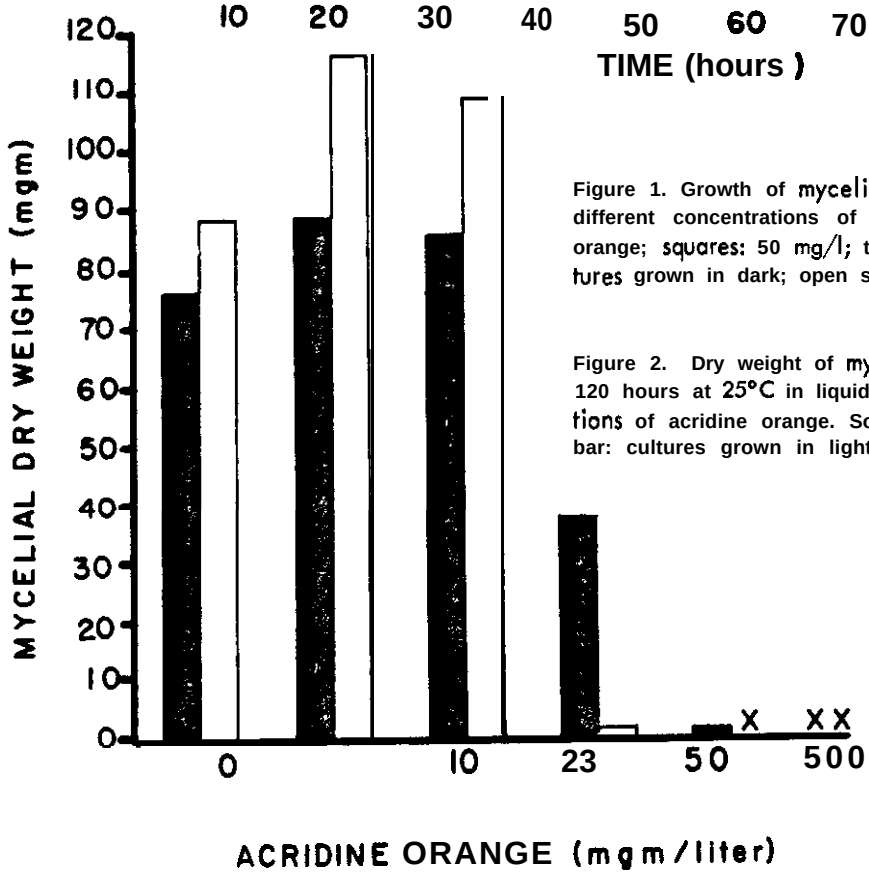

Figure 2. Dry weight of mycelia from conidial germinants cultured 120 hours at 25°C in liquid medium containing different concentrations of acridine orange. Solid bar: cultures grown in dark; open bar: cultures grown in light. X indicates no growth.