Serine-induced formation of aerial hyphae and conidia

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Serine-induced formation of aerial hyphae and conidia

Abstract

Serine-induced formation of aerial hyphae and conidia

Louie, S., A. Chan and G. Sojka. Serine-induced formation of oeriol hyphae and conidia by a *Neurospora* mutant.

in the **serine** biosynthetic **pathway**, can substitute for **serine**. The **addition** of swine to cultures growing on solid **media** causes the mutant to **form aeral** hyphoe and pigmented conidio **at approximately** the some **rate** as do wild type **strains** on minimal medio. This property **was** examined by comparing growth **rates** of **ssr-2** and a wild type **strain** (**STA4**), employing **a variety** of growth **para-** meters.

Figure 1 shows the results of on experiment designed to compare the **rate** of hyphal elongation on solid Vogel's minimal medium (2% sucrose **as** carbon source). This method ignores **penetration** of hyphae into the **agar** and oeriol hypha **formation** (Zolokar 1959 Am. J. Botany **46:555**). Under these conditions **STA4** and **ser-2** show identical growth **rates** in the **absence** of **serine**.

When these strains ore grown in Vogel's **minimal** liquid medium with vigorous **agitation**, dry weight **increases logarithmically** for **at** least 24 hours (luck 1963 J. Cell Biol. **16:483**). **Formation** of oeriol hyphoe and conidio is minimized in submerged culture, yet Figure 2 (which is **representative** of many such experiments) **indicates** that **ser-2** grows more slowly than **does** STA4 under these conditions.

Growth in **stationary** liquid culture is **essentially** unrestricted and **3-dimensional** (Marshall and Alexander 1960 J. Bacteriol. **80:412**) and can best be expressed **as** the cube root of the increase in dry weight (Emerson 1950 J. Bacteriol. **60:221**). After approximately **two** doys of incubation, wild type organisms begin to form oeriol hyphoe **above** the **mycelial** mot. The **appearance** of these **structures** is **delayed** at **least** one week in **ser-2**. The defect can be completely overcome by addition of **0.1 ML-serine** to the growth medium. From Figure 3 it can be seen that **ser-2** and STA4 on minimal and serine-supplemented msdio hove-- lo, growth **rates** for **approximately** 2 doys, while the **mycelial** mot is being formed across the surface of the liquid. The **failure** of **ser-2** cultures on minimal medium to form **aerial** hyphae results

Figure 1. Hyphal elongation in solid medium. Growth tube culture at 30°C in constant darkness on Vogel's minimal medium. (STA4 open circles; ser-2 darkened circles).

ser-2 (isolate #65004) is a very "leaky" **serine** brodytroph. It grows rapidly on **minimal** medium but does not form **abundant** oeriol hyphoe or pigmented conidio unless supplemented with L-swine. It **also** responds to glycine, but no other **amino acid**, or intermediate

Figure 2. Logarithmic growth in minimal liquid medium. Cultures grown at 30°C in constant darkness. 30 ml. Vogel's minimal medium in 125 ml. Erlenmeyer flasks agitated at 150 rpm.

in a premature cessation of "cube root growth".

We feel that these data suggest that rer-2 is a biochemical-developmental mutant which requires additional serine only for the production of aerial hyphae and pigmented conidia. This mutant is obviously able to synthesize sufficient serine to support normal growth of the basal mycelial mat. The conidia formed on ser-2 (either by supplementation with serine or prolonged incubation) appear to be similar to those of the wild typ in size, shape and carotenoid pigment content. --- Department of Microbiology, Indiana University, Bloomington, Indiana. 47401.

Figure 3. "Cube root growth" in stationary liquid cultures. 125 ml Ehrtenmeyer flasks containing 25 ml of liquid medium were incubated at 30°C. The results of the experiment were not affected qualitatively by a wide range of inoculum sizes of filtered conidia. (STA4 on minimal medium, open circles; ser-2 on minimal medium, darkened circles; ser-2 on 0.1M L-serine-supplemented medium, half-darkened circles).