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NADase levels in various strains of N. crassa

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Abstract

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Table 1. NADase activity in various strains of N. crassa.

Strain	FGSC#	Units of activity
74-OR8-1a	988	68.0
bd	1859	164.0
cot (R1006)	1512	102.0
cot (R1006)	1512	0 at 35°C
sk (B106)	276	0
amyc (K422)	306	0
slime [a]	1118	0
fl (C-1835)	818	0
fl [b]	818	6.0
fl [c]	818	11.0

1 unit activity = 10^{-2} μmoles of NAD cleaved/min/mg dry wt mycelium

a) fz;sg;os-1 (B110;27947;B135)

b) grown in liquid bubble culture

c) grown for 7 hrs. inverted in petri dish to produce aerial hyphae.

High concentrations of NADase have been reported to be associated with conidia and conidiogenesis (Zalokar and Cochrane 1956 Am. J. Botany 43: 107; Stine 1969 Can. J. Microbiol. 15: 1249; Urey 1971 Devel. Biol. 26: 17). Strains tested in this laboratory for NADase activity have enzyme levels which correspond to their ability to form conidia.

Cultures were grown at 25°C on dialysis tubing overlaying a solid medium of Vogel's salts, 1.5% sucrose, and 1.5% agar in petri dishes (15 cm diameter). After two days of growth, the wild type, band and cot strains had produced conidia while cot grown at 35°C had not. Mycelia and conidia were scraped off the dialysis tubing with a spatula and immediately lyophilyzed. Fluffy was harvested after aerial hyphae were formed (2 days), while skin, amycelial and slime, which do not produce aerial hyphae or conidia, were harvested after 6 days of growth. NADase assays were performed on extracts (0.5 mg mycelial powder per ml of 0.1 M KH_2PO_4, pH 7.4) by the method of Kaplan et al. (1951 J. Biol. Chem. 191: 473).

The data in Table 1 show that the level of NADase activity in a given strain is proportional to its ability to produce conidia. The band strain, which produces the most conidia under these growth conditions (data unpublished), had the highest levels of NADase, while the strains which do not form conidia (skin, slime, amycelial and cot grown at 35°C) had no detectable enzyme.

Fluffy has been reported by Stine (1968 J. Cell Biol. 37: 81) to have high levels of NADase in all morphological stages of growth. Since we detected no enzyme activity in fluffy on cultures grown on solid medium, fluffy was grown in aerated liquid cultures and under conditions which enhance the production of aerial hyphae (partially dried mycelial pads inverted in petri dishes with 2 ml phosphate buffer pH 6.1 (Stine and Clark 1967 Can. J. Microbiol. 13: 447)). Under the latter conditions, Stine reported fluffy to have NADase levels many times that of the wild-type strain. However, we detected only low levels of NADase in fluffy when grown under these conditions, which is consistent with its inability to form conidia. The levels of activity we obtained for the wild-type strain are comparable to those reported by Stine. The factors responsible for the difference between our results and those of Stine have not been identified.

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