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RNA content and growth rate

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Abstract

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Alberghina, F. A. M. and E. Sturani. R N A content and growth rate in Neurospora crassa mycelium.

To study the regulation of RNA synthesis in N. crassa, preliminary experiments have been conducted on the relationship between the RNA content and the rate of growth of exponentially growing mycelio (collected in mid-exponential phase).

As shown in Table 1, cultures with quite different growth rate constants are obtained by changing either the composition of the medium or the incubation temperature. At any fixed temperature, the RNA content is greater for the foster growing mycelio: a linear relationship may be found between the log of the RNA content and the rate of growth. When the rate of growth is enhanced by increasing the temperature, the RNA content is not affected, or may even slightly decrease.

Table 1. RNA content of N. crassa mycelio in exponential phase of growth.

Culture medium	Temperature	Growth rote constant	RNA content
complete + sucrose	25°C	0.32 hr^{-1}	137
	30	0.38	130
	37	0.44	112
minimal + sucrose	25	0.27	98
	30	0.32	95
	37	0.35	98
minimal + glycerol	25	0.16	63
	30	0.19	69
	37	0.20	54

Experimental condition*: minimal = Vogel's minimal medium; complete = Vogel's minimal supplemented with 1 g casein hydrolysate (not vitamin-free), 10 mg yeast RNA, 5 mg inositol, 15 mg DL-tryptophan, 15 mg L-asparagine / 100 ml medium. Final conc. of carbon source = 2% (w/v). 200 ml medium /750 ml flask. Inoculum was 10^6/ml 7 day old conidio of wild type ST74A. Flask were shaken in Dubnoff water bath at 100 rpm. Growth rate constant was determined according to Baig and Hopton (1969 J. Bacteriol. 100:552). RNA content was determined on lyophilized mycelio according to Lurk, Williams and Kennedy (1968 J. Biol. Chem. 243:2618). Data are averages of three independent determinations.

There results suggest that the relationship between the rate of RNA synthesis and the rate of growth in N. crassa follows a pattern very similar to the one observed in bacteria. - - - Institute of Plant Sciences, C. N. R. Unit for Cell and Molecular Biology in Plants, University of Milan, Milan, Italy.