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Sorbose resistant mutants in Neurospora crassa

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Abstract

Sorbose resistant mutants in *Neurospora crassa*

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Growth of Neurospora on filter-sterilized sucrose media is blocked by sorbose (De Serres, Kølmark and Brockman, Nature 193, 556, 1962). By treating conidia with nitrous acid, mutants have been produced that are not blocked (Klingmüller, Erwin-Baur-Gedachtnisvorlesungen III, 1963, Akademie-Verlag-Berlin, in press).

Such sorbose resistant mutants (S^-) have been induced in strain F68, which is adenine-deficient (4 S^- mutants isolated so far), as well as in strain 74-OR 23- 1A de Serres, from which F 68 originated (10 S^- mutants isolated so far). By crossing the S^- mutants to tester strains, they could be shown to be of chromosomal origin. The 4 mutants induced in strain F 68 map in the left arm of linkage group VI, close to the yellow marker. One of the mutants induced in the wild type maps in linkage group I. The latter is intermediate in sorbose resistance between the wild type and the 4 former S^- mutants. There are also mutants induced in an S^- strain by further treatment with nitrous acid, which are more resistant than the four S^- mutants.

By germinating wild type conidia in liquid medium free of sorbose for up to 9 hours, and then pouring in sorbose-containing agar medium it could be shown that sorbose blocks germination as well as early stages of growth. Thus there is no preferential phase of development at which the sorbose block seems to act.

General growth characteristics of the mutants as compared to wild type are: The mutants germinate and grow (colonial) on solid fructose, sucrose, and glucose media in spite of added sorbose. The wild type does not germinate and grow on fructose/sorbose media, grows only very weakly on sucrose/sorbose media, but grows well on glucose/sorbose media (all sugars filter-sterilized). Germination of the wild type and of two S^- mutants on media containing different sugars as carbon source is given in table 1.

Table 1: Germination percentage of wild type and 2 sorbose-resistant mutants of Neurospora on agar media with different carbohydrates. All media containing 0.1% sorbose, Fries' minimal plus 1.5% agar. Cultures were checked after 5 days; glucose cultures after 3 days.

Carbohydrate added	Strains		
	74 A	$S_1/25$	$S_2/1$
	0	34.0	41.4
sucrose, 0.01%	15.0	49.7	67.5
maltose, 0.01%	22.9	69.0	86.6
glucose, 0.01%	86.5	99.0	64.7
fructose, 0.01%	0.7	89.5	68.4
mannose, 0.01%	87.4	100.0	85.0
galactose, 0.01%	16.1	80.0	84.5
xylose, 0.01%	95.0	96.5	74.5
glycerol, 0.5%	2.8	100.0	64.5

A search for the step(s) in sugar metabolism at which sorbose acts in the wild type is under way.--

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