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Effect of pyridoxal deficiency on biotin content of N. sitophila

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Abstract
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Interrelationships behveen pyridoxine deficiency and biotin uptake in microorganisms hove not yet been described. Therefore, we studied the biotin and pyridoxine content in mycelia of N. sitophila 299 (FGSC# 348), a pyridoxine and biotin requirer, in relation to the pyridaxine concentration of the culture medium. The results are presented here.

The fungus war cultured at 30°C for 6 days in 300 ml Erlenmeyer flasks on the medium of Ryan et al. (1943 Am. J. Botany 30: 784), containing different concentrations of pyridoxine hydrochloride. Ammonium tartrate was used as the sole nitrogen source (5 g/l) and glucose as the role carbon source (20 g/l). The biotin concentration of the culture medium was held at 5.0 µg/l in all experiments. A very dilute suspension of conidia was used as inoculum. After incubation, we followed the growth of the fungus by measuring the weights of the mycelial pads after drying at 80°C. For biotin and pyridaxine determinations, the mycelial pads were washed, dried, homogenized by grinding in a mortar and then hydrolyzed in 1 N HCl (100 mg dry weight/ 10 ml HCl) at 120°C for 2 hours. After neutralization, the extracts were filtered and brought to on adequate volume. The biotin concentrations in there extracts were determined by the method of Horowitz and Beadle (1943 J. Biol. Chem. 150:325) as modified by Hodson (1945 J. Biol. Chem. 157:383) using N. crassa 3a6A (FGSC# 955) as test organism. The pyridoxine concentrations of the extracts were determined by the method of Stokes et al. (1943 J. Biol. Chem. 150: 17) using N. sitophila 299 as test organism.

Table 1 shows the changer in biotin and pyridoxine content of dried mycelio in relation to the pyridoxine concentrations of the medium. The standard errors of the vitamin assays are ± 10% for pyridoxine determination and about ± 13% far biotin determination. With increasing amounts of external pyridoxine the pyridoxine content of the mycelio increaser, too, while the biotin concentrations exponentially decrease. At a concentration of 5 µg pyridoxine/l culture medium, the pyridoxine/biotin quotient is 4.4; with 75 µg pyridoxine/l medium, the quotient is 82.0. We propose two possible causes of these effects and interrelationships. First, in pyridoxine deficiency the cell membranes of the fungus may be damaged and allow a high influx of biotin. Second, pyridoxine may inhibit the permeation of biotin through the cell membrane. * * * Section of Biological Sciences, Department of Biochemistry, Karl Marx University, Leipzig, D.D. R., Germany.

Table 1. Changer in biotin and pyridoxine content of dried mycelia in relation to pyridoxine concentration of the culture medium.

Pyridoxine· HCl (µg/l)	Mycelial dry wt. (mg/flask)	Pyridoxine (µg/g dry weigh+)	Biotin
5	15	5.1	1.17
15	27	7.4	0.62
30	42	9.0	0.36
50	55	11.2	0.25
75	64	12.3	0.15