

Neumann, W., H. Aurich and H.-P. Kleber.

Changes in chemical composition of N.

sitophila during the active growth phase.

DNA, RNA, protein, cell wall, lipid and ash in dried mycelia of N. sitophila 259 (FGSC#348) in relation to incubation time. The results are presented here.

Changer in metabolism of nucleic acids, proteins, carbohydrates and lipids in Neurospora dependent on incubation time are described frequently. On the other hand, changes in chemical composition of the mycelium during the active growth phase of this fungus have not been analyzed systematically. We studied the relative content of DNA, RNA, protein, cell wall, lipid and ash in dried mycelia of N. sitophila 259 (FGSC#348) in relation to incubation time. The results are presented here.

N. sitophila was cultured at 30°C in 300 ml Erlenmeyer flasks on the minimal medium of Ryan *et al.* 1943 Am J. Botany 30: 784, containing pyridoxine in a concentration of 150 µg/l. Ammonium tartrate was used as the sole nitrogen source (5 g/l) and glucose as the sole carbon source (20 g/l). A very dilute suspension of conidia was used as inoculum. Growth was determined by measuring the weights of mycelial Pods after drying at 80°C.

After incubation the mycelia were washed, dried at 80°C in small portions and ground to a powder. The nucleic acids were separated by the method of Schneider and determined by spectrophotometry (Aurich *et al.* 1967 Acta Biol. Med. Germ 19: 221). The protein was extracted from the powder with 1 N KOH and estimated by the method of Lowry *et al.* (1951 J. Biol. Chem. 193: 265). The content of cell wall substances was determined with the method of Owens *et al.* (1958 Contrib. Boyce Thompson inst. 19: 355), but the separated cell walls were extracted additionally with 0.5N KOH. The lipids were determined with the method of Heide (1929 Arch. Mikrobiol. 10: 355).

Table 1. Changes in the relative composition of dried mycelio of *N. sitophila* in relation to incubation time (in % dry weight)

Age of culture (days)	Mycelial dry wt. (mg/flask)	DNA	RNA	Protein		Cell wall		Lipids	Ash	Difference from 100%
				total	extracted from cell wall	without KOH	with extraction			
1	2	0.19	3.7	41	18	42	22	6.4	7.6	21
2	30	0.16	2.6	36	16	42	23	6.7	7.1	24
3	61	0.13	1.9	30	13	43	26	6.8	6.0	29
4	111	0.12	1.7	27	10	44	30	6.6	5.6	29
5	136	0.12	1.5	24	9	44	31	6.6	5.1	32
6	159	0.11	1.4	23	9	46	32	7.5	4.6	31
9	175	0.10	1.2	21	8	48	37	8.8	3.7	29

Table 1 shows the changes in relative composition of *N. sitophila* during growth. The content of nucleic acids, proteins and ash decreases continuously. The amount of cell wall substances (especially after KOH extraction) and the lipid content increase. After drying, young mycelia contain more protein bound to the cell wall than do old mycelio. As can be seen from these figures, proteins and DNA decrease to the some extent, whereas RNA decreases proportionally more than do DNA and protein. Between the sum of measured compounds and 100%, there is a difference corresponding mainly to the reserve carbohydrates, if the substances of the cell pool have been subtracted. These reserve carbohydrates increase with incubation time but decrease, however, in the phase of decreasing velocity of growth. The results correspond to the known morphological changer of hyphoe during active growth phase. ■ ■ ■ Institute of Physiological Chemistry, Karl Marx University, Leipzig, Germany.