

Zusammenfassung. Quantitative histochemische Methoden für Milchsäuredehydrogenase und DPN-Diaphorase wurden zum Studium von Plaques von multipler Sklerose in menschlichem *post-mortem*-Material angewendet. Im Vergleich mit myelinisierter weisser Substanz zeigten die Plaques eine um 28% vermehrte Fermentaktivität in der Randzone und eine Abnahme von 64% innerhalb des demyelinisierten Gewebes, was mit Veränderungen der

intrazellulären Fermentverteilung in Beziehung gebracht werden kann.

R. L. FRIEDE and M. KNOLLER

Mental Health Research Institute and Department of Pathology, The University of Michigan, Ann Arbor (U.S.A.), December 23, 1963.

Inhibition of Respiration of *Aspergillus oryzae* by Adsorption of the Mycelium on Cellulose Acetate Fibres

During a study of the respiration of *Aspergillus oryzae*, when the mycelium was freed from its substrate by a fine-mesh filter of nylon or cellulose acetate, occasional small irregularities suggested that the filter might interfere with the respiration activity. The experiments reported here were designed to determine whether adsorption of the mycelium on cellulose acetate could have such an influence.

The mould was grown in substrate A₄ at 25°C in deep culture with forced aeration and agitation^{1,2}; the size of inoculum was 2×10^7 washed conidia/100 ml substrate; homogenous filamentous growth was obtained. After 23.5 h when the content of mycelium was 4.9 mg dry weight/100 ml, the respiration activity (rate of O₂ uptake determined at 25°C by the direct method of Warburg) of the mycelium was tested under a variety of conditions as shown in the Table. Linear reaction curves were obtained over the test periods of 2.5 to 3 h. In the following an untreated filter refers to cellulose acetate fabric which has been used many times for the recovery of mycelium and which has been rinsed in tap water and distilled water. A detergent-treated filter is the same fabric treated with detergent ('Pyronex' – Deosan Ltd., London) then rinsed thoroughly in hot and cold tap water and cold distilled water.

When the culture was examined without treatment, i.e. the mycelium not freed from its substrate and with no change in concentration of mycelium, or when 50 ml of the culture were filtered through an 'untreated' filter of cellulose acetate fabric followed by suspending the mycelium quantitatively in 5 ml of its culture filtrate, the specific rate of respiration (QO₂) in several tests over 2.3 to 3 h was between 158 and 184 μ l O₂ per mg dry weight

mycelium and h. If, however, the culture was filtered over the same piece of fabric previously treated with detergent and the mycelium suspended in 1/10 of its culture filtrate as before, QO₂ values of only 10 to 33 were obtained. This marked decrease in respiration activity when the filter was washed with detergent is likely to be due mainly to an adsorption of the mycelium on the filter, probably accompanied by a removal from the mycelium of surface-located substances. It is less likely to be due to a removal of components of the fermented substrate because in other experiments³ the influence on the respiration activity of the mycelium by its culture filtrate as compared with its original unfermented substrate was relatively small. Furthermore, when the mycelium was repeatedly washed on the filter with the original (non-inoculated) sterilized substrate and suspended in the same (non-filtered) substrate, a QO₂ of 168 was obtained when the filter had not been treated with detergent, compared with 31 when cleaned in detergent.

Most reports on cell-surface phenomena (transport and metabolism) in fungi and bacteria refer to processes taking place on the cytoplasmic membrane, the layer underneath the cell wall. The latter is generally regarded as an inert frame with the sole function of giving rigidity and protection to the cell. Very recently it has now been shown that the cell wall can act as a 'primary reservoir' for vitamin B₁₂ in a B₁₂-requiring *Lactobacillus*⁴. In the presently described adsorption phenomenon it would appear likely that it was also the outermost surface of the cell which was involved, thus suggesting that the organization of the metabolic processes can start in the cell wall, which used to be referred to as permeable and non-selective⁵.

Résumé. L'intensité de respiration d'*Aspergillus oryzae* est fortement diminuée par adsorption du mycélium à un filtre d'acétate de cellulose soigneusement nettoyé. Cet effet suggère que certaines substances d'une importance capitale dans le métabolisme sont éliminées de la surface des hyphes.

J. MEYRATH and A. F. McINTOSH

Department of Applied Microbiology and Biology, The Royal College of Science and Technology, Glasgow (Scotland), November 26, 1963.

Specific rate of respiration (μ l O₂/mg h) of unwashed mycelium and of mycelium washed on a strongly adsorbing (detergent-treated) and less adsorbing (water-rinsed) filter. 0.5 ml of a 1% glucose solution was added from the side arm to 2 ml of mycelial suspension contained in the main compartment of the Warburg vessel; 0.2 ml 20% KOH was present in the centre well

Medium for suspending mycelium	Filter washed in water only	Filter treated with detergent	Mycelium not filtered
Filtrate (fermented substrate)	184	10–33	158–184
Substrate	168	31	–

¹ J. MEYRATH, *Antonie van Leeuwenhoek* 29, 57 (1963).

² J. MEYRATH and A. F. McINTOSH, *J. gen. Microbiol.* 33, 47 (1963).

³ J. MEYRATH and A. F. McINTOSH, *J. gen. Microbiol.* 33, VIII (1963).

⁴ T. SASAKI and K. KITAHARA, *Biochim. biophys. Acta* 74, 170 (1963).

⁵ The authors appreciate the technical assistance provided by Mr. J. McELROY.