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PaperTitle **A Study of the Macroscopic Morphology of Oleaginous Fungi of the Genus Mortierella**

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#### ABSTRACT

##### Introduction:

Oleaginous fungi of the genus *Mortierella* are used for industrial production of valuable highly unsaturated fatty acids (HUFA). The fungal morphology is determined by nutrients in the culture broth as well as culture conditions. Macroscopic morphology can vary from filamentous hyphal elements to pellets, geometric agglomerates of tangled hyphae. Pellets can vary in size, texture and shape. Pellet morphology has a direct impact on the amount of HUFA produced in submerged fermentation. The best production would occur if fungi could be grown in filamentous form, but due to rheology problems, pellet morphology is preferred.

##### Objective:

The effect of culture conditions on pellet morphology of *Mortierella* spp was investigated by electron microscopy.

##### Methods:

*Mortierella* spp were grown in submerged culture. The fungal biomass was harvested by filtration. Fungal pellets and mycelium were studied by electron microscopy (TEM and SEM) after the following treatments:

- a) Actively growing fungal pellets were harvested by filtration and embedded as wet material.
- b) Fungal mycelium was aged to enhance HUFA production by incubating mycelium at 40°C for 14 days and then prepared for microscopy.

##### Results:

Hyphae from freshly harvested culture were smooth while aged hyphae and colonies appeared “hairy” (filamentous).

Pellets displayed the “dough-nut” (biconcave) shape after 10 days growth, due to autolysis of central mycelia resulting from nutrient and oxygen limitations.

##### Conclusion:

Fungal pellets grown in submerged culture vary in size, shape and texture. When the pellet forms, it has a round or ellipsoidal shape. As the pellet size reaches a critical limit, mycelia inside the pellet undergo autolysis causing a biconcave shaped pellet with a central cavity. Only the actively growing outer layer of the pellet produces HUFA. Culture conditions should therefore be manipulated to limit pellet size to prevent autolysis and to optimize HUFA production.