

Statistical optimization of polyunsaturated fatty acids production by *Mucor plumbeus* in submerged fermentation

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Abstract: In the present study, The production of polyunsaturated fatty acids (Linoleic, γ -linolenic and α -linolenic) was experimented in 15 fungal isolates. The results showed that only 6 isolates could produce linoleic, γ -linolenic and α -linolenic together namely, *Mucor plumbeus* (2 isolates), *Aspergillus penicilloides* (2 isolates), *Aspergillus niger*, *Penicillium funiculosum*. *Mucor plumbeus* (isolates No. 4 and 5) produced the highest amount of total PUFA reaching (5.38, 4.19 g/l) respectively proceeded by *Aspergillus sp* produced amount of PUFA vary between (1.21-1.62 g/l) whereas, *P.funiculosum* resulted 1.03 g/l of PUFA. The effect of environmental factors on the production of polyunsaturated fatty acids by *Mucor plumbeus* (isolate No. 4) was studied using the statistics test Response Surface Methodology (RSM). The optimum conditions for the production of polyunsaturated fatty acids by submerged culture were achieved using broth medium containing 60 g/l of glucose as a sole source of carbon and 7 g/l of yeast extract as a sole source of nitrogen. The initial pH was 7 during an incubation period which lasted 5 days at 20°C. Applying the optimum conditions obtained 10.24 g/l PUFA comparing with 5.38 g/l before applying them which indicate that the total PUFA increased about approximately 90%.

Keywords: polyunsaturated fatty acids; Response surface methodology (RSM); *Mucor plumbeus*.