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### INFLUENCE OF MOISTURE CONTENT, TEMPERATURE AND INOCULUM SIZE ON LIPASE PRODUCTION BY FILAMENTOUS FUNGI UNDER SOLID-STATE FERMENTATION OF OLIVE POMACE

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Pollution by olive mill wastes is a crucial problem in the Mediterranean area and proper management is necessary. Olive pomace, a solid by-product generated by the olive oil two phase extraction process, is an acidic and very humid material, rich in organic matter, potassium, nitrogen, carbohydrates, phenols and also contains residual fats, which make an interesting substrate for lipase production under solid-state fermentation.

The aim of this work was to optimise moisture content (MC), temperature and inoculum size, in order to improve lipase production by *Aspergillus ibericus* MUM 03.49, *Aspergillus niger* MUM 03.58 and *Aspergillus tubingensis* MUM 06.152, under solid-state fermentation (SSF) of olive pomace mixed with wheat bran. Firstly, a full factorial design of experiments was implemented in order to investigate the effect of MC (70%, 75% and 80% wet basis) and temperature (25 °C, 30 °C and 35 °C) on its production. SSF was carried out in 500 mL Erlenmeyer flasks, containing 30 g solid dry substrate. Lipase activity was measured by colorimetric assay, using *p*-nitrophenyl butyrate as substrate.

In general, MC presented a significant effect ( $p < 0.05$ ) on lipase production. Temperature presented a significant effect only for *A. ibericus*. Maximum lipase production was obtained at 70% of MC for all microorganisms, showing the need to investigate lower values of moisture. Thus, MC values from 35% to 70% were investigated at 30 °C for *A. ibericus* and *A. niger*, and at 25 °C for *A. tubingensis*.

Results showed an increase in lipase production with lower MC: 3-fold for *A. ibericus* with 60% MC, 7-fold for *A. niger* with 50% MC, and 4-fold for *A. tubingensis* with 35% MC.

Finally, the effect of inoculum size from  $10^5$  to  $10^8$  spores/mL was also investigated, and it was found that this condition did not present a significant effect on lipase production. *A. ibericus* was the best lipase producer, leading to 117.33 U/gds. *A. niger* and *A. tubingensis* produced 80.86 and 8.60 U/gds, respectively.

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