Evaluation of Lipase Production Potentials of Oil Contaminated Soil Isolates

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Introduction

- Lipases (triacylglycerol acylhydrolases E.C 3.1.1.3) are enzymes that catalyze the hydrolysis of triacylglycerols to free fatty acids and glycerol (Kamladevi *et al.,* 2014; Ejike *et al.,* 2017).
- There is a high demand for lipases (590.5 million dollars by 2020) (Sahma *et al.,* 2017B).
- There is need to seek for indigenous sources of lipases that will meet the current industrial demands in Nigeria.

Objectives

- To isolate microorganisms from oil contaminated soils;
- To screen for lipase producers from different oil contaminated soils;
- To evaluate the lipase production potentials of oil contaminated soil isolates.

Methodology

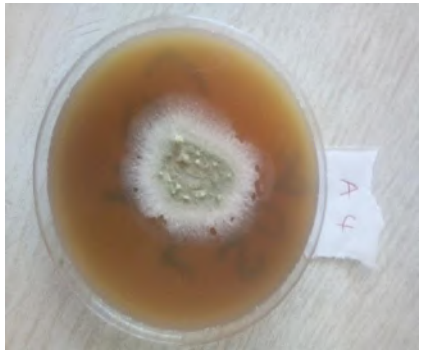
- Chemicals
- Collection of samples
- Isolation of lipolytic microorganisms
- Preliminary screening for lipase activity
- Lipase production from selected strains
- Lipase activity
- Total protein determination

Results and Discussion

- **Preliminary Screening for Lipase Hydrolyzing Efficiency**

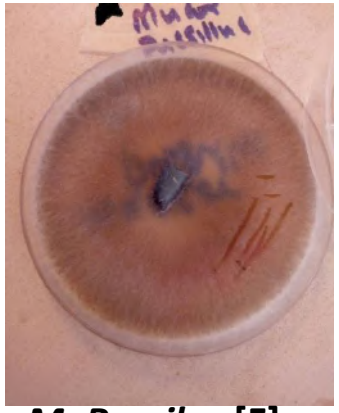
***B. Megaterium* [K]/ *K. pneumoniae* [A]**

***B. Megaterium* [A]**



***A. Fumigatus* [A]**

***Trychophyton spp* [F]**



***M. Pussilus* [F]**

***M. Canis* [F]**

***Yeast* [K]**

S/No.	Microbial Isolate	LHE (%)
1	*B. megaterium* [K]	67.2
2	*B. megaterium* [A]	25
3	*K. pneumoniae* [K]	91.7
4	*M. canis* [F]	41.8
5	*Yeast* [K]	18.2
6	*M. pusillus* [F]	51.6
7	*A. fumigatus* [A]	28.6
8	*Trychophyton spp* [F]	25.5

Results and Discussion

- Table 1: Time Course for Lipase Production from Oil Contaminated Soil Isolates

S/No	Microbial Isolate	Lipase Activity (U/mL)	Protein Concentration (mg/mL)	Time (hr)
1	*B. megaterium* [K]	6.0×10^{-3}	1.63	60
2	*B. megaterium* [A]	5.3×10^{-3}	1.74	48
3	*K. pneumoniae* [K]	4.7×10^{-3}	1.12	36
4	*M. canis* [F]	8.7×10^{-3}	1.51	72
5	*Yeast* [K]	6.7×10^{-3}	1.62	72
6	*M. pusillus* [F]	6.0×10^{-3}	1.64	96
7	*A. fumigatus* [A]	5.3×10^{-3}	1.66	120
8	*Trychophyton spp* [F]	5.0×10^{-3}	1.87	96

Results and Discussion

- Lipase production increases with increase in incubation time reaching maximum at a given time and decreases thereafter with increase in incubation time (Singh *et al.*, 2017).

- This is in congruence with the findings of the present study.

- Reduction in lipase production could be due to proteolytic degradation of the enzyme system (Musa and Adebayo-Tayo, 2012).

Conclusions & Recommendations

- The bacterial Isolates: *Bacillus megaterium* [K], *Bacillus megaterium* [A] and *Klebsiella pneumoneae* [A] and the fungal isolates: *Microsporum canis* [F], yeast [K], *Mucor pusillis* [F], *Aspergillus fumigatus* [A] and *Trychophyton spp* [F] were determined to be efficient lipase producers.

- The results obtained reveal that lipases from these isolates can be efficient biotechnological machineries.

- Further studies may be carried out for industrial production of lipase owing to its diverse industrial applications.

References

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