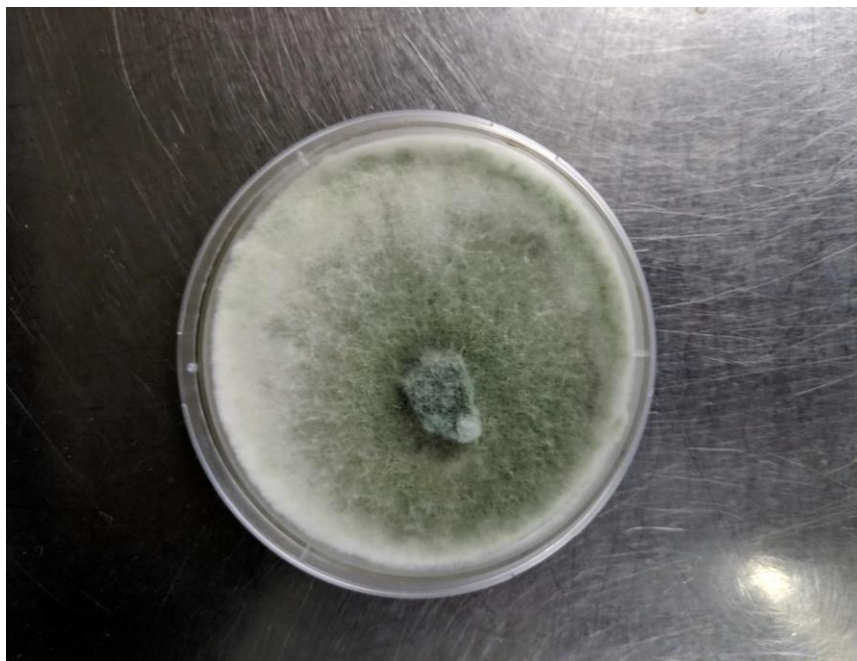


Supplementary Materials

Metabolic Biodegradation of fluoranthene by indigenous *Trichoderma lixii* and *Talaromyces pinophilus* spp.: Deciphering pathway and determining acute toxicity of metabolites

Samson O. Egbewale, Ajit Kumar, Mduduzi P. Mokena and Ademola O. Olaniran

A



B



Figure S1. (A) Morphological characteristics of *TIFLU1* grown on a PDA plate. (B) Microscopic morphology of *TIFLU1*.

A



B



Figure S2. (A) morphological characteristics of *Tp*FLU12 grown on a PDA plate. (B) Microscopic morphology of *Tp*FLU12.

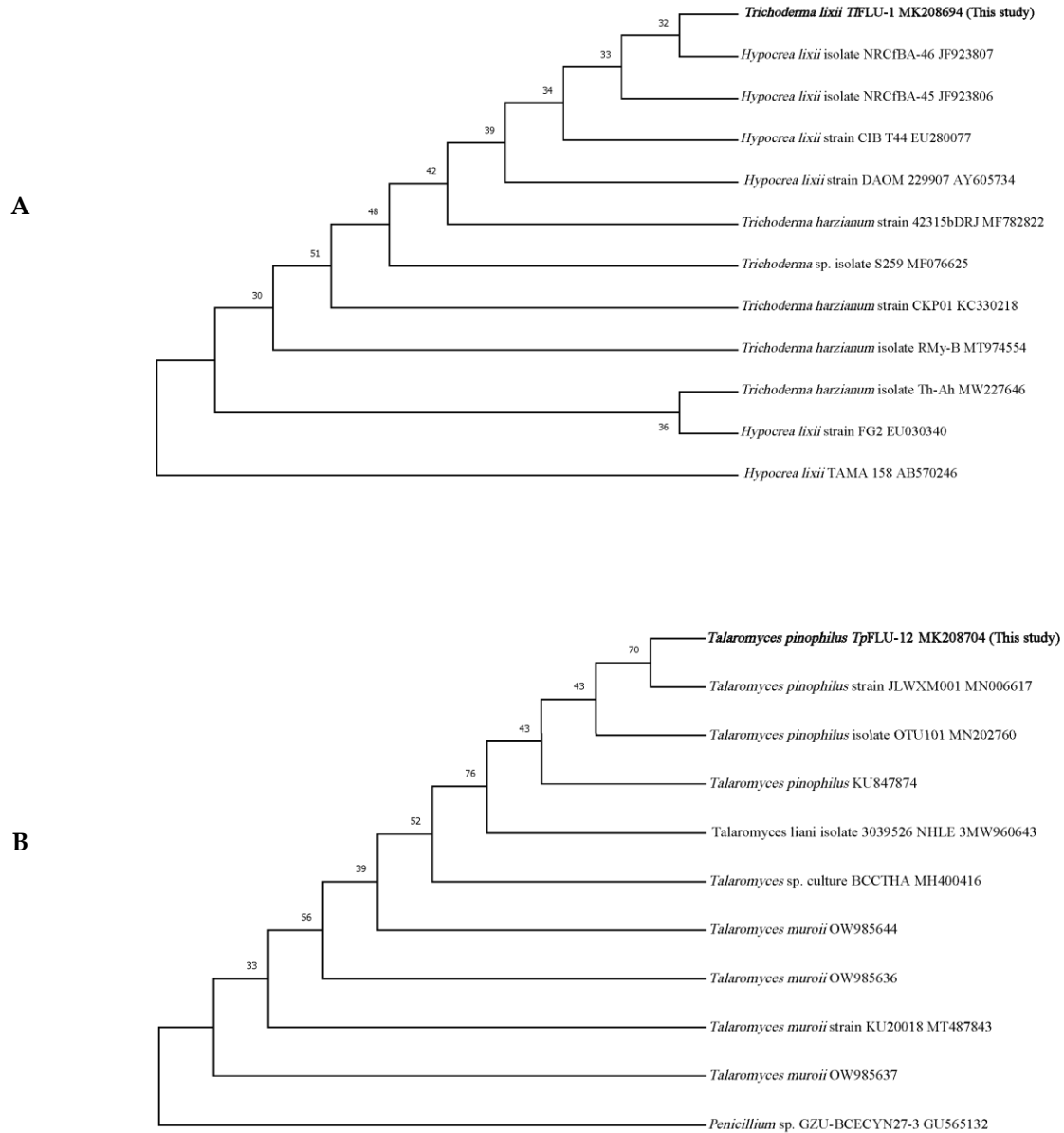


Figure S3. (A) Neighbor-joining phylogenetic tree for *TIFLU1*. (B) Neighbor-joining phylogenetic tree for *Tp*FLU12.

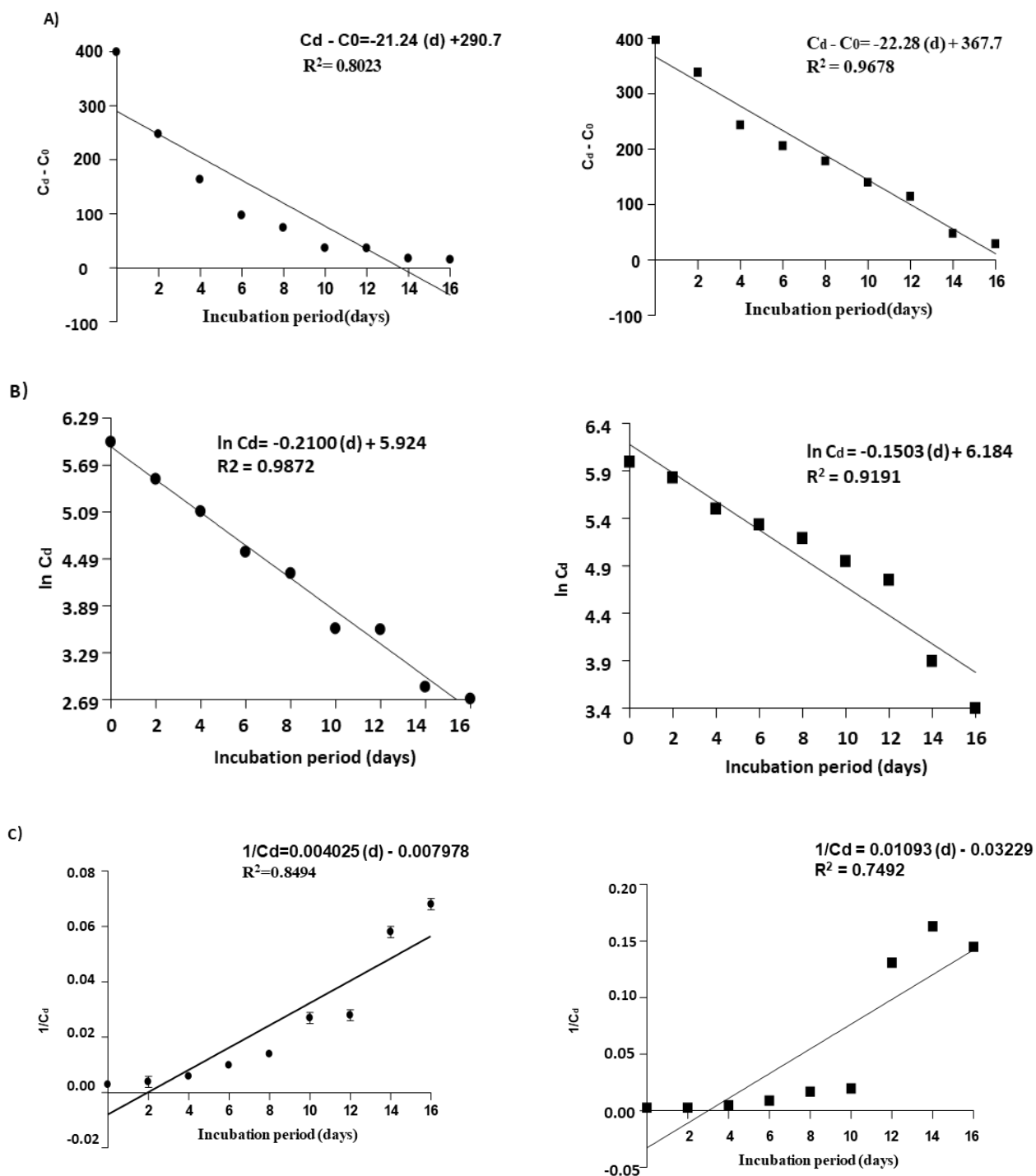


Figure S4. Fluoranthene degradation kinetic modelling (A) Zero Order, (B) First Order, (C) Second Order. *TIFLU1* (●), *TpFLU12* (■), d = days.

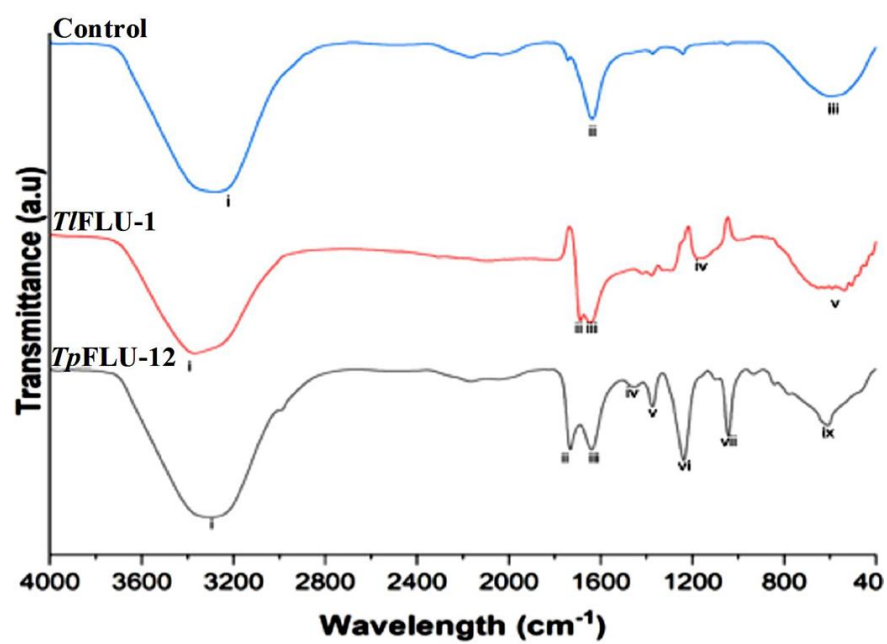


Figure S5. FTIR spectra of fluoranthene biodegradation metabolites.

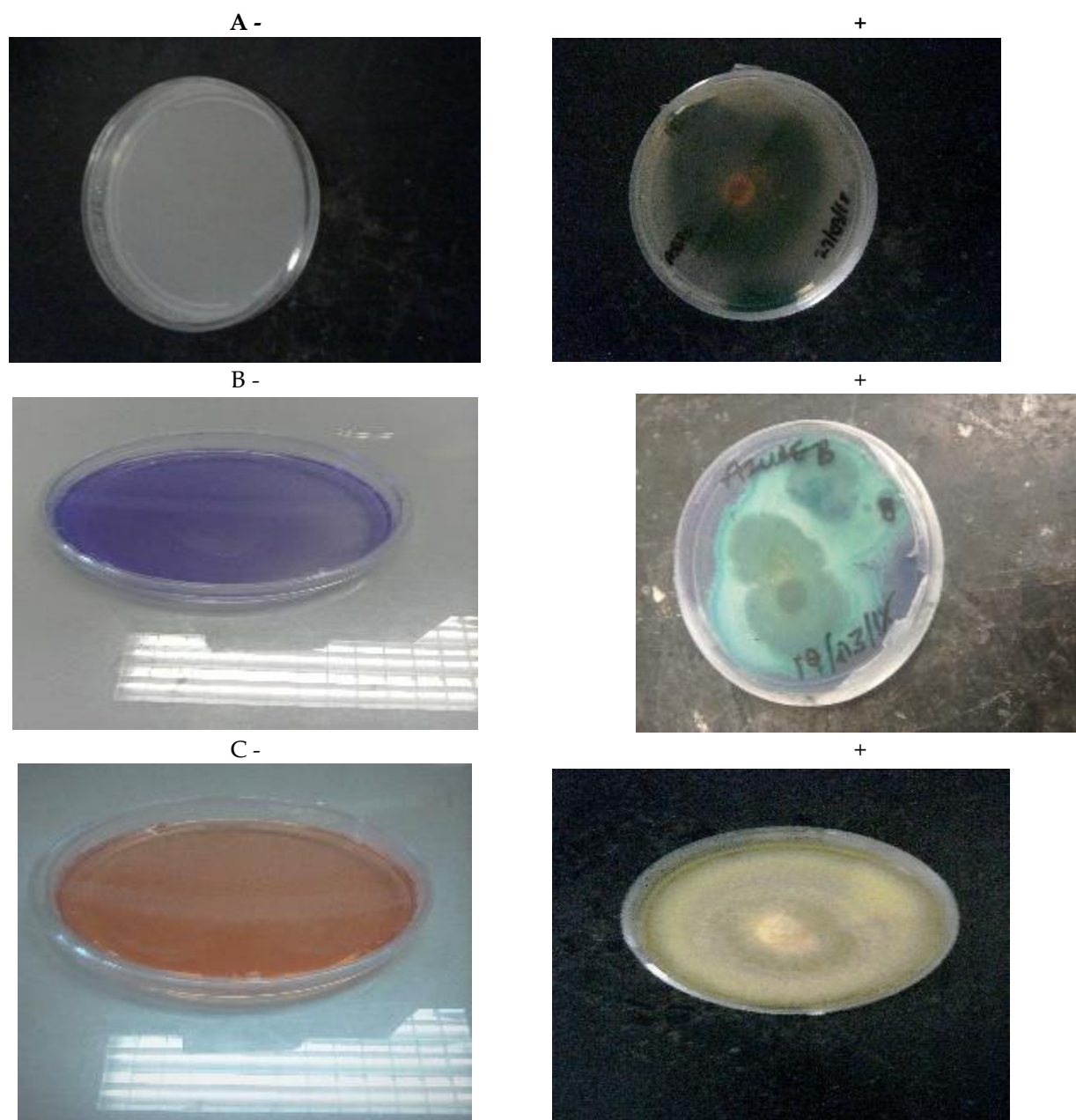
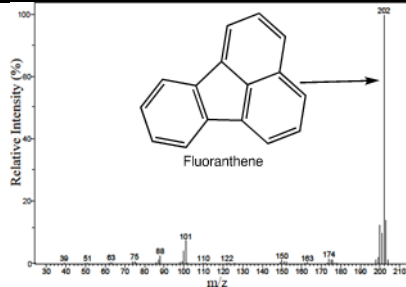
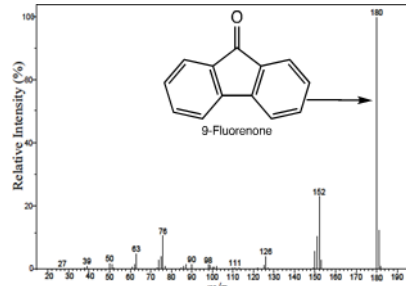
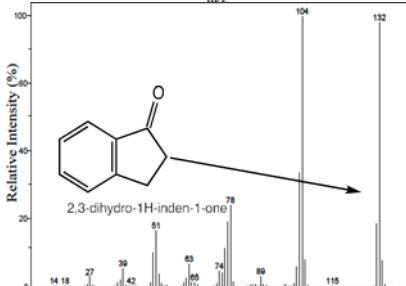
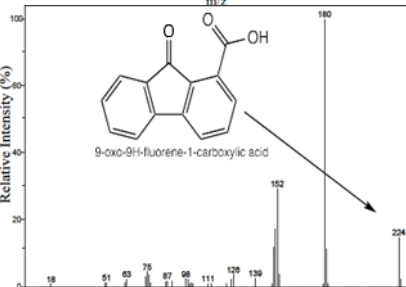


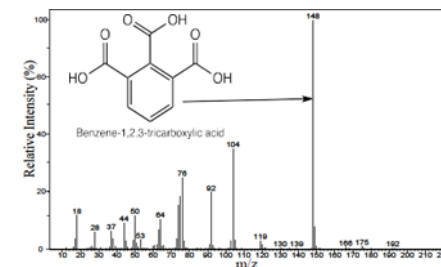
Figure S6. Preliminary assay for Ligninolytic enzyme production on solid media. **Keys:** - flouranthene + no-fungus; + flouranthene + fungus; laccase (oxidation of ABTs to Green colour zones); LiP (Oxidation of Azure B to Green colour zones); MnP (oxidation of phenol red to form yellow colour zones).

Table S1. GC-MS profile of the metabolite formed during fluoranthene degradation.

Metabolites	Retention time (min)		Major m/z of fragment ions (% relative abundance)	Tentative identification	GC-MS spectral
	<i>T</i> /FLU-1	<i>T</i> <i>p</i> /FLU-12			
1	28.4		88 (3, M ⁺), 100 (5), 101 (9), 174 (2), 175 (2), 199 (2), 200 (15), 201 (12), 202 (100), 203 (17)	Fluoranthene	
2	ND	23.9	63 (6, M ⁺), 75 (5), 76 (13), 126 (5), 150 (7), 151 (13), 152 (29), 153 (4), 180 (100), 181 (15)	9-Fluorenone	
3	ND	18.4	50 (12, M ⁺), 51 (21), 76 (14), 77 (24), 78 (30), 103 (42), 104 (100), 105 (10), 131 (23), 132 (98)	2,3-dihydro-1 <i>H</i> -inden-1-one	
4	14.2	ND	75 (6, M ⁺), 76 (5), 126 (5), 150 (15), 151 (22), 152 (37), 153 (5), 180 (100), 181 (14), 224 (18)	9-oxo-9 <i>H</i> -fluorene-1- carboxylic acid	

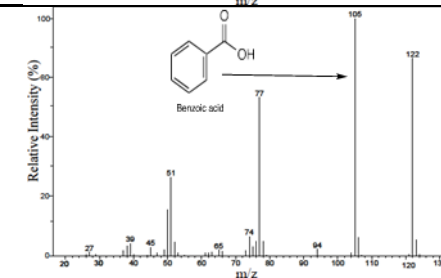
5 12.3 ND 18 (15, **M⁺**), 44 (11), 50 (15), 64 (13), 74 (19), 75 (23), 76 (31), 92 (25), 104 (44), **148** (100)

Benzene-1,2,3-tricarboxylic acid



6 ND 7.9 50(19, **M⁺**), 51 (3), 74 (8), 76 (6), 77 (66), 78(6), **105**(100), 106 (7),122 (83), 123 (7)

Benzoic acid



ND: Not detected

Table S2. The average fungal growth and growth inhibition after 10 days of exposure to varying. fluoranthene concentrations.

Concentration (mg/L)	Fungal growth (mm)		Growth Inhibition (%)	
	<i>TF</i> FLU1	<i>TP</i> FLU12	<i>TF</i> FLU1	<i>TP</i> FLU12
50	9.0 ^a	9.0 ^a	0.0	0.0
100	9.0 ^a	9.0 ^a	0.0	0.0
200	9.0 ^a	9.0 ^a	0.0	0.0
400	9.0 ^a	9.0 ^a	0.0	0.0
600	8.6 ^a	7.9 ^b	4.4 ^b	12.2 ^a
800	7.7 ^a	6.6 ^b	14.4 ^b	26.7 ^a
1000	6.8 ^a	6.1 ^b	24.4 ^b	32.2 ^a

Values with the same superscript alphabet in the same row under the same parameter are statistically non-significant ($p \leq 0.05$).

Table S3. Preliminary assay for extracellular enzyme production on solid media.

Extracellular enzyme	Fungal Colony Diameter (mm)		Colour diameter (mm)		Oxidation Scale at Day 10	
	FLU1	FLU12	FLU1	FLU12	FLU1	FLU12
Laccase	90	80	60	80	+++	++++
LiP	90	68	70	65	++++	++++
MnP	89	87	90	90	+++++	+++++

+ diameter of the oxidized zone 0-20mm, ++ zone diameter 21-40mm, +++ zone diameter 41-60mm, ++++ 61-80 mm,+++++ 81- 100mm