Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

Supplemental Material for:

Optimization of constitutive laccase production, and characterization of lignin degradation products by *Fusarium oxysporum* JUMAD-053

Table S1: Geographic coordinates and collection sites of the forty-seven fungal isolates.

Fungal isolates	Geographic coordinates		Collection sites
	Latitude (S)	Longitude (W)	
JUMAD-001	23°20’29.3’’	51°10’04.4’	South region, Londrina
JUMAD-002	25°51’00.1’’	48°33’28.3’’	Atlantic Forest, Caiobá
JUMAD-005	23°23’06.2’’	51°04’39.5’’	Daisaku Ikeda Park, Londrina
JUMAD-006	23°18’45.1’’	51°10’09.2’’	Downtown, Londrina
JUMAD-007	23°19’67,5’’	51°11’67.3’’	UEL, Londrina
JUMAD-015	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-026a	23°25’46.1’’	51°55’77.4’’	Ingá Park, Maringá
JUMAD-026b	23°25’46.1’’	51°55’77.4’’	Ingá Park, Maringá
JUMAD-032	23°25’51.1’’	51°55’75,8’’	Ingá Park, Maringá
JUMAD-033	23°25’55.2’’	51°55’70.8’’	Ingá Park, Maringá
JUMAD-034	23°25’52.6’’	51°55’88.0’’	Ingá Park, Maringá
JUMAD-036	23°19’16.9’’	51°20’40.7’’	River Cafezal and Cambé
JUMAD-037b	23°19’16.7’’	51°20’40.4’’	River Cafezal and Cambé
JUMAD-038b	23°19’16.9’’	51°20’40.3’’	River Cafezal and Cambé
JUMAD-039	23°19’58.7’’	51°19’37.1’’	River Cafezal and Cambé
JUMAD-040	23°17’42.9’’	51°13’36.3’’	River Cafezal and Cambé

Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

JUMAD-041a	23°36’47.3’’	51°16’23.1’’	River Taquara
JUMAD-042a	23°36’47.3’’	51°16’23.1’’	River Taquara
JUMAD-042b	23°36’47.3’’	51°16’23.1’’	River Taquara
JUMAD-043a	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-043b	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-045a	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-047b	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-050a	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-050b	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-051a	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-051b	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-051c	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-052a	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-052b	23°19’68.9’’	51°11’75.1’’	UEL, Londrina
JUMAD-053	23°24’28.5’’	51°56’08.7’’	UEM, Maringá
JUMAD-054	23°24’28.5’’	51°56’08.7’’	UEM, Maringá
JUMAD-056	23°24’13.9’’	51°56’23.7’’	UEM, Maringá
JUMAD-057a	23°25’34.6’’	51°55’56.7’’	Ingá Park, Maringá
JUMAD-057b	23°25’34.6’’	51°55’56.7’’	Ingá Park, Maringá
JUMAD-057c	23°25’34.6’’	51°55’56.7’’	Ingá Park, Maringá
JUMAD-058b	23°25’36.6’’	51°55’55.6’’	Ingá Park, Maringá
JUMAD-059a	23°25’37.6’’	51°55’56.1’’	Ingá Park, Maringá
JUMAD-059b	23°25’37.6’’	51°55’56.1’’	Ingá Park, Maringá
JUMAD-061	23°25’38.9’’	51°55’55.0’’	Ingá Park, Maringá
JUMAD-062	23°25’41.0’’	51°55’54.7’’	Ingá Park, Maringá

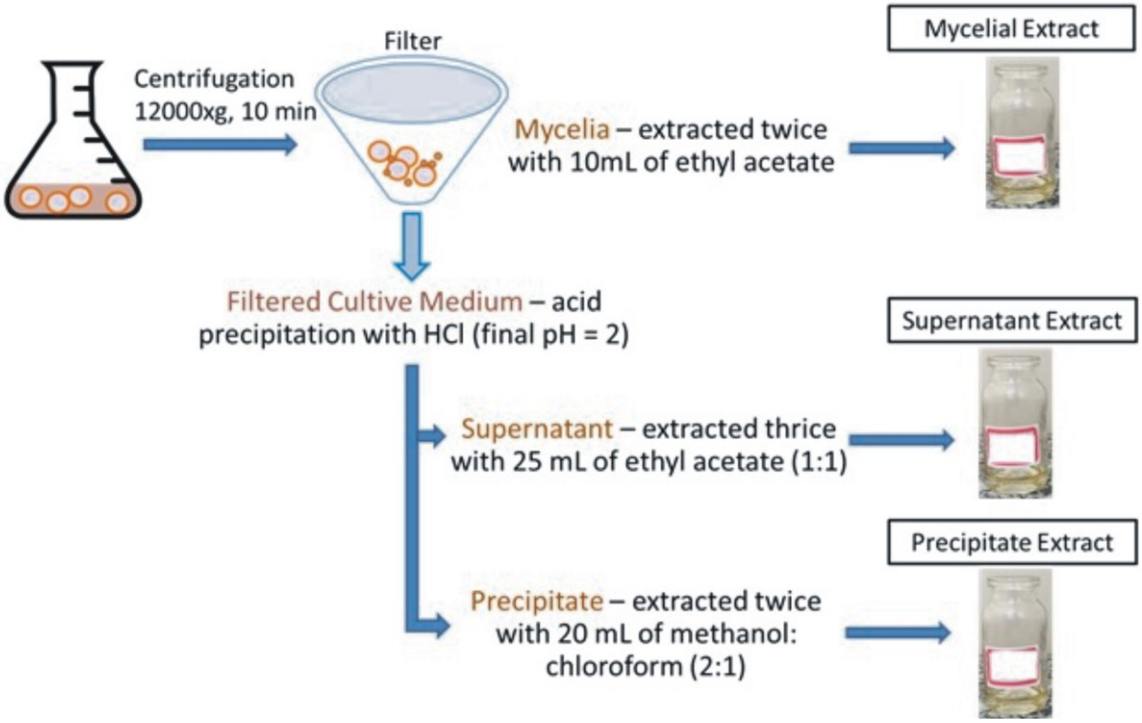
Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

JUMAD-064c	23°25’36.7’’	51°55’51.4’’	Ingá Park, Maringá
JUMAD-066	23°25’35.1’’	51°55’44.8’’	Ingá Park, Maringá
JUMAD-067	23°25’35.1’’	51°55’44.8’’	Ingá Park, Maringá
JUMAD-068a	23°25’35.1’’	51°55’44.8’’	Ingá Park, Maringá
JUMAD-068b	23°25’35.1’’	51°55’44.8’’	Ingá Park, Maringá
JUMAD-069b	23°27’31.1’’	51°15’05.8’’	Mata dos Godoy Park, Londrina
JUMAD-070a	23°27’31.1’’	51°15’05.8’’	Mata dos Godoy Park, Londrina
JUMAD-070b	23°27’31.1’’	51°15’05.8’’	Mata dos Godoy Park, Londrina
JUMAD-072a	23°27’29.7’’	51°15’05.9’’	Mata dos Godoy Park, Londrina
JUMAD-072b	23°27’29.7’’	51°15’05.9’’	Mata dos Godoy Park, Londrina
JUMAD-073	23°27’28.4’’	51°15’05.5’’	Mata dos Godoy Park, Londrina
JUMAD-074	23º19’55.2’’	51º9’59.76’’	Igapó Lake, Londrina
JUMAD-075	23º19’48.0’	51º9’46.8’’	Igapó Lake, Londrina

Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

Fig. S1: Fungal isolate *Fusarium oxysporum* (JUMAD-053) on PDA plates.

Fig. S2: Flowchart of metabolite extraction steps.



Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

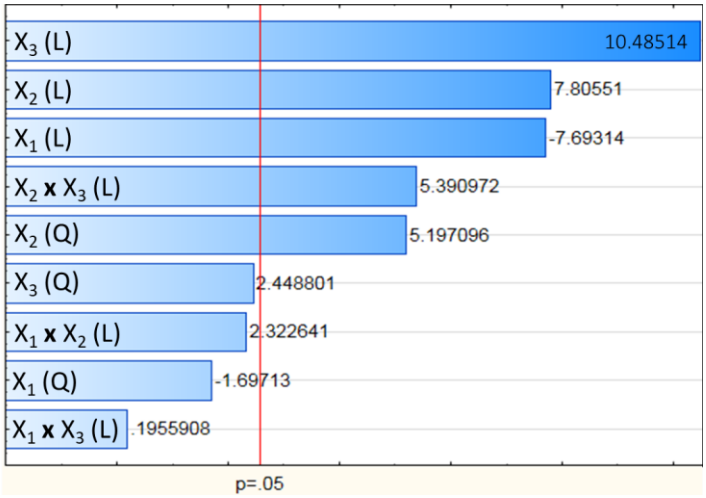
Table S2: Result of laccase activity against the substrates ABTS and DMP for the forty-seven fungal isolates.

Fungal isolates	Laccase activity, U/mL	
	ABTS	DMP
JUMAD-053	5.37	0.01
JUMAD-026B	0.36	0.08
JUMAD-002	0.32	0.03
JUMAD-072B	0.15	0.16
JUMAD-042A	0.06	0.03
JUMAD-054	0.05	0.02
JUMAD-050A	0.03	0.00
JUMAD-068B	0.03	0.00
JUMAD-032	0.03	0.00
JUMAD-062	0.02	0.06
JUMAD-074	0.02	0.03
JUMAD-041A	0.02	0.01
JUMAD-070A	0.02	0.07
JUMAD-045A	0.01	0.00
JUMAD-066	0.01	0.00
JUMAD-068A	0.01	0.00
JUMAD-072A	0.00	0.00
JUMAD-070B	0.00	0.00
JUMAD-032	0.00	0.00
JUMAD-039	0.00	0.00
JUMAD-042B	0.00	0.00
JUMAD-073	0.00	0.00
JUMAD-067	0.00	0.00
JUMAD-075	0.00	0.00
JUMAD-061	0.00	0.00
JUMAD-050B	0.00	0.01
JUMAD-036	0.00	0.00
JUMAD-059B	0.00	0.00
JUMAD-007	0.00	0.00
JUMAD-015	0.00	0.00
JUMAD-057B	0.00	0.00
JUMAD-051B	0.00	0.00
JUMAD-057A	0.00	0.00

Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

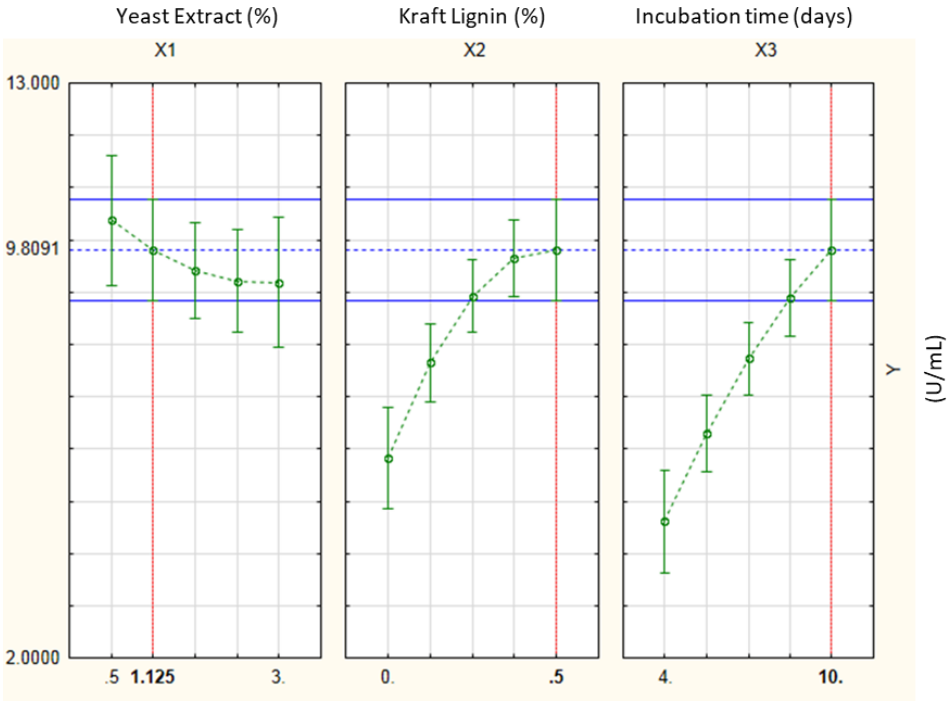
JUMAD-051A	0.00	0.00
JUMAD-052A	0.00	0.00
JUMAD-043B	0.00	0.00
JUMAD-026A	0.00	0.00
JUMAD-056	0.00	0.00
JUMAD-038B	0.00	0.00
JUMAD-037B	0.00	0.00
JUMAD-064C	0.00	0.00
JUMAD-047B	0.00	0.00
JUMAD-040	0.00	0.00
JUMAD-069B	0.00	0.00
JUMAD-052B	0.00	0.00
JUMAD-059A	0.00	0.00
JUMAD-050B	0.00	0.00

Fig. S3: Pareto chart to assess the importance of parameters based on the optimization conditions for laccase activity measured with ABTS.



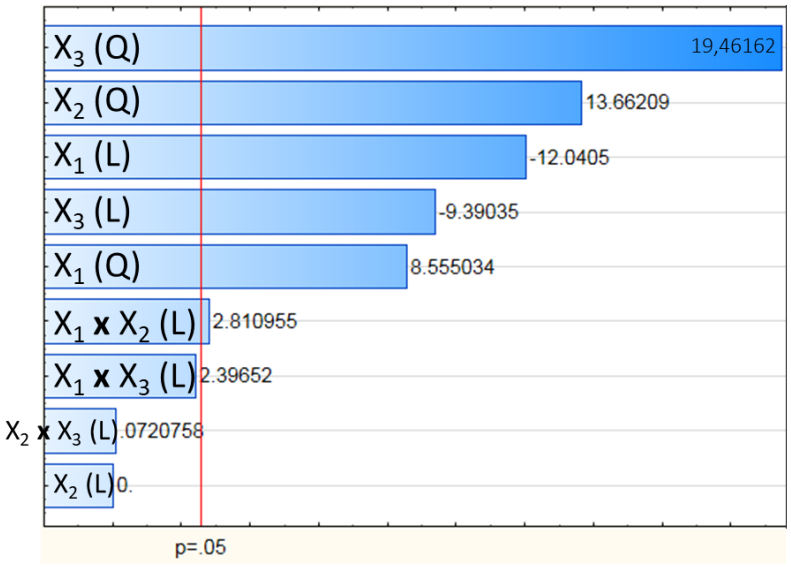
Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

Fig. S4: Response curves for laccase production (Y) measured against ABTS considering the factors: concentrations of yeast extract (X_1) and Kraft lignin (X_2) and fermentation time (X_3).



Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

Fig. S5: Pareto chart to assess the importance of parameters based on the optimization conditions for laccase activity measured against DMP.



Full Paper | http://dx.doi.org/10.17807/orbital.v13i5.1623

Fig. S6: Response curves for laccase production (Y) measured against DMP as substrate, considering the factors: yeast extract (X_1), Kraft lignin (X_2) and incubation time (X_3).