GROWTH OF VEGETATIVE PHASE OF WHITE ROT FUNGI GROWN ON DI (2-ETHYL-HEXYL) PHTHALATE

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Introduction. White-rot fungi have two growth phases. Vegetative phase (hyphae) and reproductive phase (fruiting body)[1]. These fungi produce ligninolytic enzymes capable of oxiding lignin and some xenobiotics such as phthalates[2]. Phthalates are aromatic esters used as plasticizers[3]. Di (2-ethyl-hexyl) phthalate (DEHP) provide flexibility and malleability to polyvinyl chloride (PVC)[4]. The objective of this work was to evaluate the growth in the vegetative phase of white rot fungi on different concentrations of DEHP.

Methods. Radial growth (u_r)[5] and biomass (Bm)[6] of *Pleurotus ostreatus* ATCC26, *P. ostreatus* ATCC37 and *Lentinula edodes* were evaluated in media containing mineral salts (MS) and different concentrations of DEHP (mg/l): 1) medium containing MS (without DEHP), 2) 750 of DEHP+MS, 3) 1200 of DEHP+MS and 4) 1500 of DEHP+MS. Diameter of hyphae (DH) and thickness from the cell wall (TCW) from the young zone (YZ) and mature zone (MZ) were evaluated using image analysis on (Image Pro-Plus program).

Results. *P. ostreatus* 26 had higher u_r and DH on the medium containing 1200 of DEHP+MS compared with the other two fungi. *P. ostreatus* 37 had higher Bm on the medium containing 1200 of DEHP+MS compared with the other strains **(Table 1)**. *L. edodes* had higher TCW on the medium containing 1200 of DEHP +SM compared with other fungi. *L. edodes* presented the highest DH in 1500 mg/l of DEHP **(Tables 1,2).**

Table 1. Radial growth rate and biomass of different strains of white rot fungi grown on different concentrations of DEHP.

Strain	Culture media							
	u_r (mm/h)				Bm (g/cm^2)			
	MS	MS+750 mg/l DEHP	MS+1200 mg/l DEHP	MS+1500 mg/l DEHP	MS	MS+750 mg/l DEHP	MS+1200 mg/l DEHP	MS+1500 mg/l DEHP
P. ostreatus 37	0.09^{d} (0.004)	0.07^{e} (0.008)	0.09^{d} (0.017)	0.02^{f} (0.010)	0.004^{c} (0)	0.008^{a} (0.001)	0.008^{a} (0.001)	0.005^{b} (0.0005)
L. edodes	0.14^{c} (0.002)	0.15^{b} (0.005)	0.16^{b} (0.003)	0.20^{a} (0.009)	0.002^{d} (0.0005)	0.005^{b} (0.001)	0.004^{c} (0.001)	0.007^{a} (0.001)
P. ostreatus 26	0.14^{c} (0.008)	0.25^{a} (0.006)	0.24^{a} (0.013)	0.20^{b} (0.036)	0.005^{b} (0.0005)	0.007^{a} (0.001)	0.003^{c} (0.003)	0.007^{a} (0.001)

Means with the same letter within a row are not significantly different. Data were evaluated using ANOVA and Tukey test. (P<0.01). Numbers in parenthesis correspond to SD of three separate experiments.

Table 2. Thickness from the cell wall of different strains of white rot fungi grown on different concentrations of DEHP.

Strain	TCW (µm)							
	Culture media							
	MS		MS+750 mg/l DEHP		MS+1200 mg/l DEHP		MS+1500 mg/l DEHP	
	YZ	MZ	YZ	MZ	YZ	MZ	YZ	MZ
P. ostreatus 37	0.49^{d} (0.030)	0.47^{d} (0.032)	0.61^{b} (0.016)	0.61^{b} (0.034)	0.57^{c} (0.026)	0.72^{a} (0.041)	0.63^{b} (0.044)	0.50^{d} (0.034)
L. edodes	0.59^{c} (0.028)	0.66^{b} (0.097)	0.68^{b} (0.016)	0.66^{b} (0.012)	0.60^{c} (0.031)	0.73^{a} (0.078)	0.64^{b} (0.009)	0.65^{b} (0.029)
P. ostreatus 26	0.65^{a} (0.029)	0.65^{a} (0.012)	0.64^{a} (0.036)	0.66^{a} (0.017)	0.60^{b} (0.014)	0.64^{a} (0.024)	0.60^{b} (0.030)	0.62^{a} (0.018)

Means with the same letter within a row are not significantly different. Data were evaluated using ANOVA and Tukey test. (P<0.01). Numbers in parenthesis correspond to SD of three separate experiments.

Table 3. Diameter of hyphae of different strains of white rot fungi grown on different concentrations of DEHP.

Strain	DH (µm)							
	Culture media							
	MS		MS+750 mg/l DEHP		MS+1200 mg/l DEHP		MS+1500 mg/l DEHP	
	YZ	MZ	YZ	MZ	YZ	MZ	YZ	MZ
P. ostreatus 37	2.12^{f} (0.064)	2.00^{g} (0.265)	2.29^{c} (0.158)	2.24^{d} (0.180)	2.29^{c} (0.053)	2.59^{a} (0.217)	2.41^{b} (0.275)	2.19^{e} (0.223)
L. edodes	3.08^{c} (0.111)	2.97^{d} (0.275)	2.80^{e} (0.286)	2.95^{d} (0.120)	3.16^{b} (0.267)	2.81^{e} (0.605)	2.84^{e} (0.298)	3.31^{a} (0.112)
P. ostreatus 26	2.48^{f} (0.154)	2.86^{c} (0.081)	3.33^{a} (0.329)	3.11^{b} (0.184)	2.76^{d} (0.148)	2.84^{c} (0.140)	2.36^{g} (0.070)	2.54^{e} (0.159)

Means with the same letter within a row are not significantly different. Data were evaluated using ANOVA and Tukey test. (P<0.01). Numbers in parenthesis correspond to SD of three separate experiments.

Conclusions. In general, *L. edodes* presented the highest u_r, Bm, TCW and DH in 1500 mg/l of DEHP, which suggest that this organism has a less specific enzymatic system in relation to *P. ostreatus* that allows it to grow in high concentrations of this compound.

References.

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