PRINT ISSN 1119-8362
Electronic ISSN 2659-1499

Full-text Available Online at
https://www.ajol.info/index.php/jasem
https://www.bioline.org.br/ja

J. Appl. Sci. Environ. Manage.
Vol. 28 (7) 2057-2062 July 2024

Evaluation of Biodegradability Potentials of *Pleurotus ostreatus* (jacq) P. Kumm. Cultivated on Solid Wastes Supplemented with Medicinal Plant Leaves

***[1]AYO, EO; [2]OLALEMI, AO; [2]AROTUPIN, DJ**

**[1]Department of Biological Sciences, Joseph Ayo Babalola University, Ikeji-Arakeji, Osun State, Nigeria*
[2]Department of Microbiology, Federal University of Technology Akure, Ondo State, Nigeria.

**Corresponding Author Email: easy4ayo46@gmail.com*
**ORCID: https://orcid.org/0009-0004-7615-5794*
**Tel: +2348068168030*

Co-Author Email: waleolas2002@yahoo.com; djarotupin@futa.edu.ng

ABSTRACT: Mushrooms can be considered as an ecological bioconversion tools to recycle agricultural and agro-industrial wastes. Hence, the objective of this paper was to evaluate the biodegradability potentials of *Pleurotus ostreatus* (jacq) P. Kumm cultivated on solid wastes supplemented with medicinal plant leaves using standard chemical and biological methods. The yield and biological efficiency of *P. ostreatus* revealed that oil palm fibre supplemented with *M. oleifera* had highest (124) and (82.66 %) while *P. ostreatus* cultivated on rags had least (66) and (44.00 %). Degradation of lignin had highest (67.77 %) at (spawn run) in *P. ostreatus* cultivated on rags, while cellulose and hemicellulose had highest (28.58 % and 33.01%) in *P. ostreatus* cultivated on plantain peels supplemented with *M. oleifera* and pampers supplemented with *C. citratus* respectively. Percent carbon content of rags had highest (43.34 %, 39.12 %, 35.76 % and 27.29 %) at first day, spawn run, fructification and spent compost (at harvest) respectively. The nitrogen content increases as the growth phase progresses, plantain peels supplemented with *M. oliefera* had highest (2.41 %, 2.83 %, 2.95 % and 3.01 %) and least of (0.21 %, 0.40 %, 0.73 % and 1.21 %) occurred on pampers supplemented with *M. oliefera* at first day, spawn run, fructification and spent compost (at harvest) respectively. Cultivation of *P. ostreatus* on solid wastes supplemented with medicinal plant leaves can be a good means of waste management and production of mushroom rich in nutraceutical properties.

DOI: https://dx.doi.org/10.4314/jasem.v28i7.17

Cite this Article as: AYO, E. O; OLALEMI, A. O; AROTUPIN, D. J. (2024). Evaluation of Biodegradability Potentials of *Pleurotus ostreatus* (jacq) P. Kumm. Cultivated on Solid Wastes Supplemented with Medicinal Plant Leaves. *J. Appl. Sci. Environ. Manage.* 28 (7) 2057-2062

Dates: Received: 21 May 2024; Revised: 17 June 2024; Accepted: 23 June 2024 Published: 02 July 2024

Keywords: Biodegradation; *P. ostreatus*; Medicinal; leaves; wastes.

Pleurotus ostreatus are saprophytes which can be found growing on moist soil rich in organic matter. Cultivation of *P. ostreatus* has been ranked second largest after *Agaricus bisporus*. Recently, there have been a risen interest to grow mushrooms on different agricultural wastes, this is due to their ability to breakdown complex polysaccharides such as lignin and hemicellulose (Sadik *et al*., 2021). *P. ostreatus* had been cultivated on mixtures of substrates such as sawdust and coconut fiber (Sivaprasad *et al*., 2021), also combination of substrates such as cotton, hemp, and wheat bran (Sisti *et al*., 2021) in different proportions. The cultivation of *P. ostreatus* can be referred to as an ecological system of converting waste since it allows the production of food, compounds of great nutraceuticals properties and recycling of agricultural and agro-industrial waste. Also, the spent compost can be used for feeding animals and as organic fertilizer, thereby reducing environmental pollution (Bellettini *et al*., 2019; Sadik *et al*., 2021). Biodegradation of solid wastes by *P. ostreatus* is a special technique that leads to formation of simpler compounds and production of protein rich food. Biodegradable wastes such as rags (used cloths),

**Corresponding Author Email: easy4ayo46@gmail.com*
**ORCID: https://orcid.org/0009-0004-7615-5794*
**Tel: +2348068168030*

pampers, papers, plantain peels and oil palm wastes are common domestic wastes that constitute nuisance in the environment, these wastes are made up of lignocellulosic materials such as cellulose, hemicellulose and lignin. The wastes are often burnt after disposal, thereby leading to critical environmental pollution and wastage of resource. Increase in environmental deteriorations, diminishing quality of health can affect the future well-being of humankind (Pandey *et al*., 2014).

The ability of *P. ostreatus* to generate extracellular enzymes means that they can be cultivated on a broad lignocellulosic by-products, and they have special capabilities to depolymerize, cleave carbon– carbon linkages, and breakdown lignin to CO_2 and H_2O, due to their capability, *P. ostreatus* play a special role in carbon recycling in terrestrial ecosystems (Yang *et al*., 2020; Del Cerro *et al*., 2021). Wastes such as pampers, papers and oil palm fibre have been used for the cultivation of mushrooms but only to a limited extent, supplementation of solid waste has been found to increase mushroom yield in *Pleurotus sajor-caju* Banik *et al*., 2014. Therefore, the objective of this paper was to evaluate the biodegradability potentials of *P. ostreatus* (jacq) P. Kumm cultivated on solid wastes supplemented with medicinal plant leaves.

MATERIALS AND METHOD

Preparation of Substrates: Rags, pampers, papers, plantain peels and oil palm fibre were prepared and supplemented with Neem leaves (*A. indica*), Moringa leaves (*M. oleifera*), Lemon grass (*C. citratus*) and Scent leaves (*O. gratissimum*) in 75g / 75g ratio. Each substrate was chopped to fine particles, moistened, sterilized at 121^{o}C for 15 minutes and left to cool over-night following the standard method of Fasoranti *et al.* (2019).

Cultivation of P. ostreatus: The substrates were sterilized and allowed to cool, *P. ostreatus* spawn was cultivated using top spawning according to the method of Mkhize *et al.* (2016).

Evaluation of Yield and Biological Efficiency of P. ostreatus Substrates: At primordia formation, bags were perforated to enhance fructification. The pinheads grow to their full size and the mature fruit bodies were harvested.

The fruit bodies were harvested by twisting clockwise and then anti-clockwise so that adjacent smaller fruit bodies were not disturbed. The yield was expressed as fresh fruit bodies produced per bag. Biological efficiency was calculated as the percentage conversion dry substrates to fresh fruit bodies following (Khare *et al.,* 2010).

$$BE = \frac{\text{Fresh weight of mushroom}}{\text{Dry weight of substrates}} \times 100 \quad (1)$$

Where BE = Biological efficiency

Cellulose, Hemicellulose and Lignin Evaluation of P. ostreatus Substrates: Cellulose, hemicellulose and lignin evaluation was assessed following the method of Jayme and Lang (1963). Samples were digested using acid detergent solution (0.5M H_2 $S0_4$ + 2% cetyl trimethyl ammonium bromide (CTAB) and 72% H_2 SO_4). The digested sample was filtered with Glass micro fiber filter (GF/C). Filtrate was analyzed by Bradford method (1976) to calculate protein. Then a residue was dried at 105 ^{o}C and its weight was deducted from initial weight of lignocellulose. Two hundred mg of sample was mixed with 2 ml of 72% H_2 $S0_4$ and the mixture was placed in water bath at 300 ^{o}C for 1 h, and made up 30ml with distilled water and then heated in autoclave for 1hour. The hot solution was filtered through GF/C and lignin residues were washed with hot water. The GF/C was then dried at 105^{o}C and finally lignin was deducted from 200 mg. The remaining was cellulose according to the method of Pandey *et al*., 2014.

Determination of Carbon: Carbon was determined following the method of Walkley and Black (Nelson and Sommers, 1996) 0.5 g samples at first day, at completion of spawn run, at fructification and spent compost (after harvest) were crushed and dried. Two blanks were included to standardize $FeSO_4$ solution. 15 ml K_2 Cr_2 O7 solution was added. Then rapid addition of 20 ml of concentrated H_2 SO_4, the flask was swirled for 2 to 3 times and was allowed to stand for 30 minutes. 200 ml distilled water was added then 10 ml conc. Phosphoric acid and 1ml indicator was added and titrated against $FeSO_4$ following the method of Pandey *et al*., 2014.

Determination of Nitrogen: Nitrogen content was determined following Microjeldal method. 2.0 g of oven dried powdered samples at first day, at completion of spawn run, at fructification and spent compost (after harvest. Crushed dried sample was taken into 500 ml Kjeldalh flask. 10 ml of digestion mixture and 20 ml of concentrated sulphuric acid was added. The flask was heated for 4 to 6 hour in a digestion fume hood until clean solution is obtained. The solution was made up to 100 ml with distilled water following the method of Pandey *et al*., 2014.

RESULTS AND DISCUSSION

Oyster mushrooms have been found to possess degradative enzymes that are capable to breakdown lignocellulosic wastes, the results obtained revealed that number of fruiting bodies, stalk height (cm) and cap width (cm) of *P. ostreatus* cultivated on solid wastes supplemented with *M. oleifera* had highest number of fruity bodies of (8-9), *P. ostreatus* cultivated on Rags had least (2-5). *P. ostreatus* cultivated on plantain peels supplemented with *C. citratus* had highest height (7.1 cm) and *P. ostreatus* cultivated on rags had least (3.7 cm), *P. ostreatus* cultivated on pampers supplemented with *O. gratissimum* had highest cap width (7.6 cm) and *P. ostreatus* cultivated on oil palm fibre had least (3.5 cm) Table 1, this is therefore an indication that supplements such as *Moringa oliefera* leaves can enhance the productivity of *P. ostreatus*, this is similar to the findings of (Nasreen *et al*., 2016) who compared the growth and yield of *P. ostreatus* on lignocellulosic waste.

The yield performance and biological efficiency of *P. ostreatus* revealed that oil palm fibre supplemented with *M. oleifera* had highest (124) and (82.66 %) while *P. ostreatus* cultivated on Rags had least (66) and (44.00 %) respectively Table 2.

This is similar to the report of Ogundele *et al*. (2017) who found that yield of *P. ostreatus* cultivated on sawdust depend on the nutrient content.

Table 1: Number of Fruiting Bodies, Stalk Height (cm) and Cap width (cm) of *P. ostreatus* Cultivated on Solid Wastes

Substrates	Number of fruity bodies	Stalk height	Cap width
R	2-5	3.7	4.6
RAI	3-6	4.5	6.2
RMO	7-9	5.8	7.4
ROG	4-8	5.3	5.6
RCC	4-7	6.1	6.5
PMP	3-7	4.5	5.0
PMPAI	4-8	4.7	5.9
PMPMO	6-7	6.6	7.3
PMPOG	5-6	6.3	7.6
PMPCC	5-7	6.1	5.7
P	3-5	4.6	5.2
PAI	3-7	5.4	6.5
PMO	8-7	6.5	6.2
POG	5-6	6.2	6.4
PCC	4-7	7.3	5.3
PP	5-5	5.6	6.5
PPAI	6-5	6.5	6.4
PPMO	9-6	5.6	7.4
PPOG	7-7	6.3	7.1
PPCC	7-6	7.1	6.6
OP	5-7	4.8	3.5
OPAI	6-2	4.5	4.6
OPMO	8-9	6.3	5.4
OPOG	5-8	5.7	5.0
OPCC	6-7	6.8	5.5

Table 2: Total Yield and Biological Efficiency of *P. ostreatus* Cultivated on Solid Wastes

Substrates	Dry weight of substrates	Wet weight of substrates	1st flush	2nd flush	3rd flush	Total Weight	B. E %
R	150	420	35	20	11	66	44.00
RAI	150	462	42	24	16	82	54.67
RMO	150	466	50	26	22	98	65.33
RCG	150	461	45	39	19	103	78.03
RCC	150	458	43	25	19	87	68.66
PMP	150	534	38	23	12	73	48.66
PMPAI	150	515	43	27	17	87	58.00
PMPMO	150	528	50	39	23	112	74.66
PMPCG	150	533	47	29	20	93	62.00
PMPCC	150	536	44	26	20	90	60.00
P	150	570	39	24	14	77	52.33
PAI	150	566	44	28	18	90	60.00
PMO	150	582	51	40	23	114	76.00
PCG	150	590	48	30	21	99	66.00
PCC	150	548	45	27	20	92	61.33
PP	150	416	40	26	16	82	54.66
PPAI	150	421	46	30	19	95	63.33
PPMO	150	425	53	42	23	118	78.66
PPCG	150	412	50	39	22	111	74.00
PPCC	150	417	47	32	20	99	66.00
OP	150	542	43	28	18	89	59.33
OPAI	150	552	48	32	21	101	67.33
OPMO	150	548	55	44	25	124	82.66
OPCG	150	539	52	41	24	117	78.00
OPCC	150	538	49	34	22	105	71.33

The biodegradation of cellulose, hemicellulose and lignin content in the solid wastes supplemented with medicinal plant leaves at spawn run, during fructification and after harvest (spent compost) revealed that degradation of lignin had highest degradation rate at mycelia formation state (spawn

run) with highest (67.77 %) in *P. ostreatus* cultivated on Rags and least (32.97 %) in *P. ostreatus* cultivated on plantain peels supplemented with *M. oliefera*, cellulose had highest (28.58 %) in *P. ostreatus* cultivated on plantain peels supplemented with *M. oleifera* and hemicellulose (33.01%) in *P. ostreatus* cultivated on pampers supplemented with *C. citratus* during fructification Table 3.

Table 3: Biodegradation of Cellulose, Hemicellulose and Lignin by *P. ostreatus*

SST	Cellulose				Hemicellulose				Lignin			
	C	SR	F	SC	C	SR	F	SC	C	SR	F	SC
R	48.10	46.33 (3.68)	**38.84 (19.25)**	36.11 (24.92)	34.33	32.21 (6.17)	**28.12 (18.08)**	27.43 (20.09)	16.57	**5.34 (67.77)**	4.33 (73.87)	3.09 (81.35)
RAI	35.23	32.01 (9.14)	**26.09 (25.94)**	21.40 (39.26)	42.30	40.44 (4.40)	**36.74 (13.14)**	35.94 (15.04)	22.47	**10.60 (52.83)**	7.09 (68.45)	6.76 (69.92)
RMO	52.00	47.99 (7.71)	**38.03 (26.86)**	33.98 (34.65)	38.11	34.23 (10.18)	**29.54 (22.49)**	27.55 (27.71)	9.89	**4.33 (56.22)**	2.83 (71.39)	2.05 (79.27)
ROG	50.70	46.22 (8.84)	**38.88 (23.31)**	34.87 (31.22)	33.70	31.30 (7.12)	**27.05 (19.73)**	26.06 (22.67)	15.60	**6.72 (56.92)**	4.77 (69.42)	3.06 (80.38)
RCC	43.50	40.00 (8.05)	**34.33 (21.08)**	30.40 (30.11)	25.60	23.85 (6.84)	**19.44 (24.06)**	17.34 (32.27)	30.90	**15.87 (48.64)**	13.33 (55.89)	12.97 (58.03)
PMP	36.80	33.12 (10.00)	**29.20 (20.65)**	23.64 (35.76)	30.73	26.83 (12.69)	**24.33 (20.83)**	23.21 (24.47)	34.30	**14.14 (58.76)**	12.12 (64.66)	12.10 (64.72)
PMPAI	23.12	20.44 (11.59)	**17.04 (26.30)**	15.33 (33.69)	38.06	33.99 (10.69)	**31.54 (17.13)**	30.87 (18.89)	38.82	**17.44 (52.07)**	14.55 (62.52)	14.11 (63.65)
PMPMO	39.50	34.86 (11.75)	**28.66 (27.44)**	25.78 (34.73)	32.34	27.43 (15.18)	**23.54 (27.21)**	21.54 (33.40)	28.20	**14.45 (48.76)**	10.33 (63.37)	09.24 (67.23)
PMPOG	37.40	33.32 (10.90)	**30.95 (17.25)**	28.01 (25.11)	31.22	26.55 (14.96)	**23.75 (23.93)**	22.44 (28.12)	31.38	**17.25 (45.02)**	13.04 (54.44)	12.87 (58.99)
PMPCC	45.59	42.44 (6.91)	**35.40 (22.35)**	31.53 (30.84)	21.39	18.53 (13.37)	**14.33 (33.01)**	12.98 (39.32)	33.02	**16.06 (51.36)**	13.65 (58.66)	13.23 (59.93)
P	43.34	40.85 (5.75)	**29.07 (26.00)**	28.39 (34.49)	35.31	32.34 (8.41)	**29.04 (17.76)**	28.44 (19.46)	21.35	**8.42 (60.56)**	5.66 (73.49)	5.04 (73.39)
PAI	30.16	26.04 (13.66)	**22.55 (25.23)**	19.03 (36.90)	43.12	40.40 (6.31)	**35.70 (17.21)**	34.22 (20.64)	26.72	**11.38 (57.41)**	8.12 (69.61)	8.04 (69.91)
PMO	46.11	41.98 (8.95)	**33.22 (27.95)**	32.58 (29.34)	37.14	33.93 (8.64)	**29.04 (21.81)**	27.33 (26.41)	16.75	**8.09 (51.70)**	5.23 (68.78)	4.67 (72.12)
POG	44.36	41.78 (5.56)	**37.43 (15.62)**	33.99 (23.37)	36.55	34.98 (4.34)	**31.46 (13.92)**	29.33 (19.75)	19.09	**9.65 (49.45)**	6.45 (66.21)	6.08 (68.15)
PCC	40.40	37.98 (5.99)	**33.44 (17.22)**	31.88 (21.09)	26.82	24.32 (9.32)	**20.30 (24.31)**	18.55 (30.84)	32.78	**14.11 (56.96)**	11.34 (65.41)	10.99 (66.47)
PP	33.60	31.56 (6.07)	**25.48 (24.67)**	22.06 (34.35)	57.23	52.00 (9.14)	**49.43 (13.62)**	47.45 (17.09)	9.17	**3.32 (63.79)**	2.23 (75.68)	2.09 (77.21)
PPAI	20.43	17.00 (16.79)	**14.66 (28.24)**	11.12 (45.57)	65.09	63.30 (2.75)	**58.11 (10.72)**	57.40 (11.81)	14.91	**6.55 (56.07)**	3.04 (79.61)	3.00 (79.87)
PPMO	36.25	31.77 (12.36)	**24.92 (28.50)**	24.46 (32.52)	58.20	54.96 (5.57)	**49.47 (14.66)**	48.67 (16.37)	4.55	**3.05 (32.97)**	1.15 (74.72)	0.99 (78.24)
PPOG	34.33	30.23 (11.94)	**24.34 (29.09)**	22.33 (34.95)	58.30	55.77 (4.34)	**51.40 (11.84)**	50.87 (12.74)	7.37	**3.55 (51.83)**	1.06 (85.61)	0.78 (89.42)
PPCC	30.56	27.45 (9.52)	**23.09 (24.44)**	21.78 (28.73)	48.34	46.40 (4.01)	**42.11 (12.89)**	40.78 (15.64)	21.14	**10.22 (51.66)**	7.66 (63.77)	7.08 (66.51)
OP	40.60	37.43 (7.81)	**32.23 (20.61)**	26.98 (33.55)	34.88	31.60 (9.40)	**27.33 (21.65)**	25.00 (28.33)	24.52	**9.34 (61.91)**	7.09 (71.08)	6.98 (71.53)
OPAI	27.36	24.40 (10.81)	**20.93 (23.50)**	17.96 (34.36)	42.10	40.44 (3.94)	**36.11 (14.23)**	34.56 (17.91)	30.05	**14.55 (51.58)**	11.23 (62.63)	11.00 (63.39)
OPMO	43.55	38.29 (12.07)	**32.67 (24.98)**	29.32 (32.67)	36.90	30.39 (17.64)	**26.45 (28.32)**	25.77 (30.16)	19.55	**9.44 (51.71)**	6.33 (67.62)	5.52 (71.76)
OPOG	41.28	37.43 (9.33)	**32.22 (21.95)**	29.98 (27.37)	35.37	32.96 (6.81)	**31.33 (11.42)**	30.04 (15.07)	23.35	**10.12 (56.66)**	7.66 (67.19)	6.87 (70.58)
OPCC	37.70	34.28 (9.07)	**30.68 (18.62)**	29.34 (22.18)	25.62	23.67 (7.61)	**20.23 (21.04)**	18.33 (28.45)	36.68	**17.09 (53.40)**	14.44 (60.63)	14.10 (61.56)

Key: SST = Substrates; *C= control, SR= At spawn run, F= At fructification, SC= Spent compost, OP= Oil palm fibre, Rags, PMP= Pampers, P=Papers, PP = Plantain peels, OPAI= Oil palm fibre+Azadirachta indica, OPMO= Oil palm fibre +Moringa oliefera, OPOG= Oil palm fibre +Occimum gratissimum, OPCC= Oil palm fibre +Cymbopogon citratus.*

Rapid degradation of lignin and moderate degradation of cellulose and hemicelluloses recorded during vegetative growth of *P. ostreatus.* Moderate degradation of lignin, rapid depletion of cellulose and hemicellulose were recorded during fructification might be due to variation in nutrient uptake of *P. ostreatus* during the different growth phase. This is similar to other study of Pandey *et al.*, 2014, who studied biodegradation of wheat straw by *P. ostreatus* that the cellulose and hemicellulose serve as energy

source for the formation of fruit bodies and lignin during vegetative phase. Also similar result of bioconversion was reported by Anike *et al*. (2016), in the use of *P. ostreatus* for bioconversion of substrates such as peanut shells and cornstalks during the stage of mycelial development.

Percent carbon, nitrogen and their ratio in solid wastes during growth of *P. ostreatus* revealed that carbon content of rags had highest (43.34 %, 39.12 %, 35.76 % and 27.29 %) while plantain peels supplemented with *M. oliefera* had least (11.33 %, 6.94 %, 8.78 %) and (5.37 %) on pampers supplemented with *M. oliefera* at first day, at spawn run, at fructification and spent compost (at harvest) respectively. The carbon content decreased after completion of spawn run and spent compost, and the nitrogen content increased gradually at different growth phase, many authors have reported that the reduction in carbon content from the resulting biomass (fungus and substrate) can be reported as part of its assimilation into the mycelium of the fungus and in part by its loss to the atmosphere as carbon dioxide during respiration of the fungus. The nitrogen loss might be due to volatilization during the N mineralization process (Isroi *et al*., 2011; Anike *et al*., 2016; Del Cerro *et al*., 2021). The carbon to nitrogen ratio (C:N) had highest (131.33 %, 62.09 %, 40.63 % and 24.15 %) on rags and least (4.70 %, 3.24 %, 2.97 %) on plantain peels supplemented with *M. oliefera* and (1.97 %) on pampers supplemented with *M. oliefera* at first day, spawn run, fructification and spent compost (at harvest) respectively. The nitrogen content increases as the growth phase progresses, plantain peels supplemented with *M. oliefera* had highest (2.41 %, 2.83 %, 2.95 % and 3.01 %) while pampers supplemented with *M. oliefera* had least (0.21 %, 0.40 %, 0.73 % and 1.21 %) at first day, spawn run, fructification and spent compost (at harvest) respectively, Table 4.

Table 4: Carbon, Nitrogen and their ratio in Solid Wastes during Growth of *P. ostreatus*

Substrates	First day			At spawn run			At fructification			Spent compost		
	C	N	C:N	C	N	C:N	C	N	C:N	C	N	C:N
R	**43.34**	0.33	**131.33**	39.12	0.63	62.09	35.76	0.88	40.63	27.29	**1.13**	24.15
RAI	**35.23**	1.34	**26.29**	28.34	1.98	14.31	24.10	2.11	11.42	11.12	**2.32**	4.79
RMO	**30.54**	2.01	**15.19**	23.74	2.28	10.41	17.32	2.36	7.34	9.32	**2.53**	3.68
ROG	**33.32**	1.56	**23.35**	26.94	2.11	12.77	16.76	2.28	7.35	13.16	**2.35**	5.60
RCC	**38.09**	0.77	**49.46**	30.12	0.79	38.13	23.56	1.19	19.80	17.07	**1.32**	12.93
PMP	**36.26**	0.37	**98.00**	30.16	0.77	39.17	26.32	1.16	22.69	18.13	**1.32**	13.73
PMPAI	**28.16**	1.45	**13.34**	19.85	2.13	9.32	15.12	2.39	6.32	7.04	**2.51**	2.80
PMPMO	**23.46**	2.11	**11.11**	15.55	2.43	6.40	10.50	2.64	3.98	5.37	**2.72**	1.97
PMPOG	**26.24**	1.64	**16.13**	21.49	2.25	9.55	11.33	2.56	4.43	6.83	**2.54**	2.69
PMPCC	**30.98**	0.87	**35.60**	23.23	0.94	24.71	16.85	1.46	11.54	9.22	**1.51**	6.11
P	**25.34**	0.21	**120.66**	18.56	0.40	46.40	13.33	0.73	18.26	11.77	**1.12**	10.51
PAI	**19.23**	1.31	**10.86**	14.22	1.55	9.17	10.19	1.96	5.19	8.89	**2.31**	3.85
PMO	**12.54**	1.98	**14.67**	10.09	1.85	5.45	8.24	2.21	3.73	6.12	**2.52**	2.43
POG	**15.32**	1.53	**10.01**	11.56	1.67	6.92	9.32	1.13	8.23	8.34	**2.34**	3.56
PCC	**20.07**	0.73	**27.07**	16.34	1.36	12.01	11.10	1.04	10.67	9.64	**1.31**	7.36
PP	**17.54**	0.54	**32.48**	14.08	1.18	11.93	12.21	1.47	8.31	10.31	**1.61**	6.40
PPAI	**14.38**	1.73	**8.31**	12.87	2.53	5.09	10.45	2.70	3.87	8.97	**2.80**	3.20
PPMO	**11.33**	2.41	**4.70**	6.94	2.83	3.24	8.78	2.95	2.97	8.02	**3.01**	2.66
PPOG	**13.11**	1.96	**6.69**	10.33	2.66	3.88	9.34	2.85	3.28	8.77	**2.83**	3.10
PPCC	**15.24**	1.17	**13.03**	9.16	1.34	5.18	11.55	1.78	6.49	10.09	**1.73**	5.83
OP	**40.66**	0.57	**71.33**	34.83	1.03	34.82	27.13	1.25	21.70	19.11	**1.40**	13.65
OPAI	**32.56**	1.76	**18.50**	25.28	2.38	10.62	16.45	2.48	6.63	10.44	**2.66**	3.92
OPMO	**27.88**	2.43	**11.47**	20.13	2.69	7.48	14.77	2.73	5.41	7.13	**2.87**	2.48
OPOG	**30.65**	1.99	**15.40**	23.54	2.51	9.38	13.22	2.65	4.99	9.66	**2.68**	3.60
OPCC	**35.36**	1.20	**29.47**	27.20	1.19	22.86	18.41	1.56	11.80	13.40	**1.66**	8.07

The decrease in C:N as the cultivation period progresses in the substrate may be a limiting factor for the growth of *P. ostreatus* (D'Agostini *et al*., 2011). The reduction obtained during spawn run is similar to the report of Hoa *et al*. (2015) who stated that a higher C:N favours spawn run and a lower C:N favours fructification, this is also similar to the study of (Rodríguez et al., 2018).

Conclusion: This study was conducted to evaluate the degradability of *P. ostreatus* cultivated on some selected domestic solid wastes supplemented with medicinal plant leaves. The result of this study has revealed that supplements added to solid wastes can enhance their degradation rate and the yield of mushrooms cultivated on them, solid wastes supplemented with *M. oliefera* had higher yield and better degradation rate. *M. oliefera* and some other medicinal plant leaves can boost solid waste management when added as supplements.

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