

Factors influencing mushroom production in Oyo State, Nigeria

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Abstracts

The study investigated factors influencing mushroom production in Oyo State, Nigeria with a view to indentify factors that may influence production. The study was carried out in three (3) LGAs of the State with a total of 202 respondent selected through a multi stage sampling procedure. Data were collected using a structured questionnaire and described with frequency, percentage and mean and analysed with regression model. Result showed that the mean age of the mushroom farmers was approximately 40 years (± 8.65) and 67% were male. It was observed that 79% were married. In addition, many of the farmers (53%) had tertiary education with household size of 1-5 (81%). Furthermore, the result showed that oyster (82%) and pleurotus (67%) were the common species of mushroom cultivated. The scale of production, market for mushroom, educational level, household size and years of experience are among significant factors influencing production. The study concluded that the major problem faced by the respondents in the study area include high cost of raw materials, problems of pest and disease. It is recommended that there is need to provide training on production skills, packaging skills, substrate skills and technical skills that can enhance mushroom production in other to meet demand for mushroom among the end user.

Keywords: mushroom, production, Oyo

Introduction

Edible mushrooms is an excellent source of food with their flavour, texture, nutritional value and high productivity (per unit area) and it helps to ease malnutrition in developing countries as well as improve African countries economy (Eswaran & Ramabadrans, 2000). Odediran *et al.* (2015) reported that mushroom was an important food in the diet, they contain high quality protein and low fat /energy content , they also contain vitamins B1, B2, B6, B12, C, D and rich in minerals essential for human health. Mushrooms have ability of addressing present food challenge as well as future problems that can occur due to increase in population (Victoria *et al.*, 2018). Ayodele *et al.* (2009) submitted that

mushrooms can be converted into powdered form and used in infant food preparations for increased nutritional value.

Mushrooms are served as highly value in Nigeria and it is also served as a cheaper alternative for meat and fish because of its protein content (Ekpo *et al.*, 2009). Edible mushrooms are not only sources of nutrients but also as therapeutic foods in preventing health challenges such as hypertension, diabetes, hypercholesterolemia and cancer (Krishan, 2015) .

Mushroom, popularly called “*Olu*” among the Yoruba, is a popular edible food material in southwest, Nigeria. According to Ayodele *et al.* (2009), mushroom was first use as

hallucinogenic agent in Yoruba tribe of Nigeria. Mushroom production is environmentally friendly and provides a number of opportunities for improving the sustainability of small farming system and rural development. This makes mushroom farming an environmentally friendly enterprise (Wesonga *et al.* 2002). Mushrooms are usually picked in their natural habitats in decayed wood in the forest but due to increase in urbanization and deforestation, it is now very scarce to collect in such a natural environment (Ayodele *et al.*, 2009).

Therefore, there is need for commercially grown mushrooms in rural and urban areas without subjecting the growth to its natural habitat becomes a necessity. As the quantity of wild mushrooms reduce from both the forested or agricultural land areas, cultivated mushrooms become imperative for food security and livelihood sustainability. Thus, this study therefore examined factors influencing mushroom production and challenges faced in the study area.

Methodology

Data collection, sampling technique and sample size

Multistage sampling procedure was used for selecting respondents. The first stage involved a purposive selection of three (3) Research Institutes in Oyo State where training on mushroom production was prevalent. The Institutes were: Forestry Research Institute of Nigeria (FRIN) comprising of the trainees in Ido Local Government Area; National Horticultural Research Institute (NIHORT) comprising of the trainees in Akinyele Local Government Area and National Bio-technology Development Agency (NABDA) in Ogbomoso comprising of the trainees in Surulere Local Government Area. The

second stage involved the proportionate selection of 50% of the mushroom farmers trained in these institutes and FRIN trainees were 180 and 50% respondent was proportionately selected (90), NIHORT trainees were 180 and 50% of the population were selected (90) while NABDA mushroom trainees were 50 and 50% were selected (25). Overall, 205 respondents were selected and administered questionnaires. However, 202 (99% response rate) questionnaires were used for the analysis.

Method of data analysis

Statistical tools such as descriptive analysis (frequency distribution for socioeconomic characteristics, mean for level of skills, charts were used to analyse mushroom species, mean for challenges of the respondents) and regression analysis was used to analyse factors influencing mushroom production among the respondents

RESULTS AND DISCUSSION

Socioeconomic characteristics.

Results in Table 1 show that the mean age of the respondents was 40 years ± 8.65 with 37% to 38% within 31 to 50 years in age. In addition, only few (13%) respondents were above 50 years. This shows that most of the mushroom farmers were in their productive and energetic age which can be considered good for labour intensive type of agriculture practiced in Nigeria. This age group could benefit the marketing and packaging requirements of mushroom production, where vibrant young farmers can take advantage of the marketing strategies to improve their living standard. This finding corroborates with Marshall *et al.* (2005) and Odediran *et al.* (2015) reports which submitted that mushroom production can improve peoples' livelihoods where youths are actively involved.

The Sex of the respondents shows that many (67%) of mushroom farmers were male. This suggested that male farmers were more involved in mushroom production compared to the female counterparts who are possibly more engaged with other either domestic or farming activities as well as non-farm activities. This result is in line with Ayodele *et al.* (2009) and, Kayode *et al.* (2015) who reported that male dominated mushroom production in their study areas. The marital profiles of the respondents revealed that majority (79%) of the farmers were married. This suggested that majority of the respondents had a stable family which will enrich decision-making process in agricultural production. This outcome lends credence to the findings of Hawksworth (2001) and Odediran *et al.* (2015) who discovered that majority of mushroom farmers were married. As regards to the educational qualification, most of the respondents (53%) had tertiary education. This shows that more average of the sampled respondents were educated, and they could read and write. The fact that majority of the respondents had tertiary education meant that people with formal education had interest in mushroom production. They are also more likely to possess the ability to acquire and interpret messages and information related to their farming operations especially, the approved techniques of agrochemicals application. These may have significant impacts on the productivity and their ability to imbibe better management practices that could improve mushroom production and protect them against agrochemical exposure. This conforms to the assertions of Odediran *et al.*, (2015), Dhanushkodi *et al.*, (2017) who affirmed that most farmers in mushroom production are educated with at least secondary school education. Regard the household size of the respondents (81.2%) of the respondent had household size

between 1-5 members. The size of farming household is crucial in peasant agriculture and this is so because of labour availability for daily operations on the farm. Higher family size often reduces the cost incurred on hired labour.

Despite all the efforts done by other researchers, mushroom sector in Nigeria particularly in Oyo State is still under-exploited to tap the potential of mushrooms as a source of income and socio-economic development. Contributions of mushrooms cultivation to the livelihoods of the rural communities have been given less priority regardless of plenty edible mushroom species. The significance of edible fungi lies with their extensive subsistence uses in developing counties, although this is an area where there are still significant gaps in information Ayodele *et al* (2009).

Species in mushroom production

Results in figure 1 shows the species of mushroom cultivation by farmers. The result revealed that majority of the farmers in the study areas cultivate oyster mushroom species (82.7%), Pleurotus mushroom species were (67%) and Sajor-caju mushroom species were (10%). This implies that Oyster mushroom species is the easiest mushroom species that farmers in the study areas and that the environment of the study areas supports the growth and cultivation of this type of mushroom. This is in line with the result Apetorgbor *et al.* (2005), Dhanushkodi *et al.* (2017) who reported that oyster mushroom was the commonly grown mushroom among the farmers and the oyster mushroom is comparatively the easiest and least expensive to grow in the study areas. The report of Chang (2006) also support the findings reported that the most cultivated type of mushroom specie in the study area is Oyster mushroom specie and this is the

most known and cultivated type of mushroom in the world.

2. Skills Acquisition in Mushroom Production

Table 2 shows the respondents' distribution based on the skills acquisition in the mushroom production. Percentages were used to rank the skill acquisition in mushroom production in order of attainment by the respondents. Marketing skill rated 1st, Packaging skill rated 2nd, Production skill rated 3rd, Substrate technique rated 4th and Technical skill rated 4th. The table further showed the skill acquired by farmers of mushroom in the Oyo state. It indicate that all the skills were acquired but with preference to marketing and packaging skills. The consumption of mushroom is low and not very popular among consumers. The implication is that there is dire need to acquired better marketing skills, rebrand and package the products in order to attract more customers. This finding agrees with Chang & Miles (2004) and Oyedele *et al.* (2018) who observed that mushroom requires less technical skills because it could be grown under different climatic conditions.

3. Factor influencing mushroom production

Table 3 reveals the factor influencing the mushroom production among farmers in the study area using Ordinary Least Square regression model. This model was used as it accommodates dependent variables that are continuous. Results of the analysis revealed that scale of production was positively significant at 5% level of significance. This implies that farmers with large scale of production are likely to incur less unit cost of production compared to farmers with small scale production. The result of this finding is in consonance with that of Kimole

(2012); Dhanushkodi *et al.* (2017); Oyedele *et al.* (2018) who found that scale of production is an important factor to mushroom farmers. The market for mushroom was positively significant at 5% level. This means that an increase in market size for mushroom will also increase the production of mushroom farmers. The result of this finding agrees with that of Mohammed *et al.* (2017) that reported that household size has positive relationship with welfare loss. This outcome contrasts that of Apetorgbor *et al.* (2005); Shahi *et al.* (2018) who observed that mushroom were sold majorly in area market.

The result reveal that age, educational level, years of experience, household size and labour were all significant factors influencing mushroom production in the study area. This implies that larger household size and higher number of people in their production age would increase mushroom production. This result is corroborated with the results of Dhanushkodi *et al.* (2017) and Zhang *et al.* (2014) which revealed that and household size influence mushroom production. The implication of this result also means that mushroom production can be source of employment opportunity for youth. Membership of mushroom association was found to be positively significant at 5% level. This is just in accordance with a priori expectations. This result means that the more the farmers attend their associations, the more they are likely to be kept abreast of and updated about new trends and development as regard mushroom production. Farmers' association serves as an avenue for organizing training, workshops and so on farmers engaging in one or more type of crop production. This finding lends credence to Kimole (2012); Dhanushkodi *et al.* (2017); Oyedele *et al.* (2018) who reported that adequate support of mushroom farmers through fund,

subsidized raw materials and training will go a long way in improving mushroom production.

Finally, monthly income from mushroom has a positive relationship with the production of mushroom conforming to a priori expectations. The variable was found to be positively significant at 10% level. The result implies that as income of farmers increases, production of mushroom will also increase. This could be because revenue generated from production of mushroom is a catalyst or an encouragement for farmers to intensify efforts in the production of mushroom. However, the amount of mushroom produced monthly was not significant at 5% level. This implies that, it has no effect in determining the quantity of mushroom production of the respondents in the study area. The monthly average mushroom production was 4 490kg which is relatively low compared to what was reported by Ayodele *et al* (2009) in similar study carried out in another mushroom producing state of Nigeria.

4. Challenges in mushroom production

Table 4 revealed the challenges of mushroom farmers encounter in the study area. It shows that religion problem (2.96 ± 0.21) ranked 1st, low demand ($2.22\pm 0.0.67$) ranked 2nd, high cost of raw materials (2.22 ± 0.56) ranked 3rd, inadequate manpower (2.19 ± 0.67) ranked 4th, pest and diseases (2.1 ± 0.58) ranked 5th, poor availability of spawn (2.22 ± 0.67) ranked 6th, unfavorable environment condition (2.09 ± 0.41) ranked 7th, low awareness of edible mushroom (2.05 ± 0.74) ranked 8th, poor marketing (2.03 ± 0.41) ranked 9th, lack of production skill (1.98 ± 0.67) ranked 10th, inadequate training on how to cultivate mushroom (1.98 ± 0.67) ranked 10th, Lack of capital / credit facilities (1.86 ± 0.84) ranked

12th, labour intensive (1.84 ± 0.73) ranked 13th and inadequate information on mushroom cultivation (1.80 ± 0.57) ranked 14th. The table also revealed that majority of the challenges confronting farmers of mushroom are minor constraints except religion which was indicated as other constraints. This implies that farmers of mushroom were confronted with lack of credit facilities, inadequate training on how to cultivate mushroom, inadequate information on mushroom cultivation, poor marketing, poor availability of spawn, low awareness of edible of mushroom, pest and diseases, low demand for mushroom and so on. This result is in tandem with Zhang *et al.* (2014), Dhanushkodi *et al.* (2017), Shahiet *et al.* (2018) who identified marketing problem and low demand for mushroom for its cultivation.

Conclusions

Based on the research findings, the following conclusions are drawn:

The finding shows that most mushrooms farmers were male and married and they are still in active age group. The major problem faced by the respondents include high cost of raw materials, problems of pest and disease, poor availability of spawn and lack of capital.

Based on the findings, the study recommends the need to arouse the interest of more women into mushrooms production since their contributions to agriculture has been favourably documented in extant literature. Mushroom farmers should be adequately trained on skills such as production skills, packaging skills, substrate skills and technical skills with a view to increasing production for food security by the agricultural stakeholders, especially in Agricultural Development Programme and the Ministry of Agriculture. This would help to increase the income from mushroom production and provide food security.

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Table 1 Distribution of the respondents based on their socio-economic measures (n = 202)

Socioeconomic characteristics	Frequency	Percentage (%)	Mean \pm SD
Age (years)			
>30	24	11.9	40.78 \pm 8.65
31-40	75	37.1	
41-50	78	38.6	
51	25	13.4	
Gender			
Male	136	67.3	
Female	66	32.7	
Marital status			
Single	25	12.4	
Married	160	79.2	
Widow	8	4.0	
Separated	9	4.5	
Educational level			
Primary	21	10.4	
Secondary	65	32.2	
Tertiary	108	53.5	
No formal education	8	4.0	
Household size			
<1-5	164	81.2	4.13 \pm 1.60
6 and above	38	18.8	

Source: Field survey (2019)

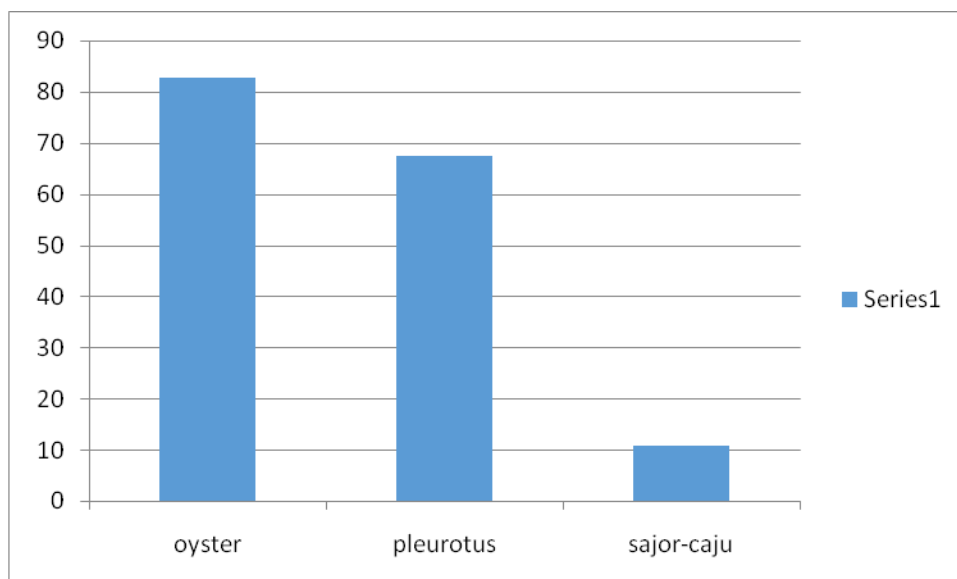


Figure 1: Species in mushroom production
Source: Field survey (2019)

Table 2: Levels of Skills Acquisition in Mushroom Production n=202

Skill in mushroom	YES	Ranking
Marketing skill	183(90.6)	1 st
Packaging skill	192(95.0)	2 nd
Production skill	198(98.0)	3 rd
Substrate technique	200(99.0)	4 th
Technical skill	200(99.0)	4 th

Source: Field Survey (2019)
 Figures in parentheses are percentages
 SD = Standard Deviation

Table 3: Factors influencing mushroom production among the respondents n=202

Variables	Coefficients	Std Error	t-Value	P-value
(Constant)	3.079	.645	4.771	.000
Scale of production produce	.681	.159	4.279	.000
Amount of mushroom	5.995E-6	.000	1.744	.083

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Produce monthly

Market for	421	.102	4.110	.000
Mushroom				
Age	.032	.013	2.429	.016
Educational level	323	.118	2.743	.007
Household size	.170	.065	2.631	.009
Years of experience	.240	.042	5.712	.000
Labour	1.063E-5	.000	2.002	.047
Selling per week	.002	.002	1.042	.299

Source: Field survey (2019)

Table 4 Challenges facing mushroom production in the study area n=202

Items	Major Constraint	Minor constraint	Not constraints	Mean (\pm SD)	Ranked
Religion problem	9 (4.5)	0(0.0)	193 (95.5)	2.96 \pm 0.21	1 st
Low demand of mushroom	28 (13.9)	101 (50.0)	73 (36.1)	2.22 \pm 0.67	2 nd
High cost of raw materials	14 (6.9)	129 (63.9)	59 (29.2)	2.22 \pm 0.56	3 rd
Inadequate Manpower	30 (14.9)	104 (51.5)	68 (33.7)	2.19 \pm 0.84	4 th
Pest and diseases	21 (10.4)	129(63.9)	52 (13.4)	2.09 \pm 0.41	5 th
Poor availability Of spawn	34 (16.8)	116 (57.4)	52 (25.7)	2.09 \pm 0.65	6 th
Unfavorable environment condition	9 (4.5)	166 (82.2)	27 (13.4)	2.09 \pm 0.74	7 th
low awareness of edible mushroom	50 (24.8)	92 (45.5)	60 (29.7)	2.05 \pm 0.74	8 th
poor marketing	14 (6.9)	168 (83.2)	20 (9.9)	2.03 \pm 0.41	9 th
lack of skill	47 (23.3)	112 (55.4)	43 (21.3)	1.98 \pm 0.67	10 th
inadequate training on how to cultivate mushroom	48 (23.3)	112 (55.4)	43 (21.3)	1.98 \pm 0.67	10 th
lack of capital	78 (38.6)	84 (41.6)	40 (19.8)	1.86 \pm 0.84	12 th
labour intensive	72 (35.6)	90 (44.6)	40 (19.8)	1.84 \pm 0.41	13 th
Inadequate information on mushroom	34 (6.9)	168(83.2)	20 (9.9)	2.03 \pm 0.41	14 th

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cultivation

Source: Field Survey (2019)

Figures in parentheses are percentages

SD = Standard Deviation