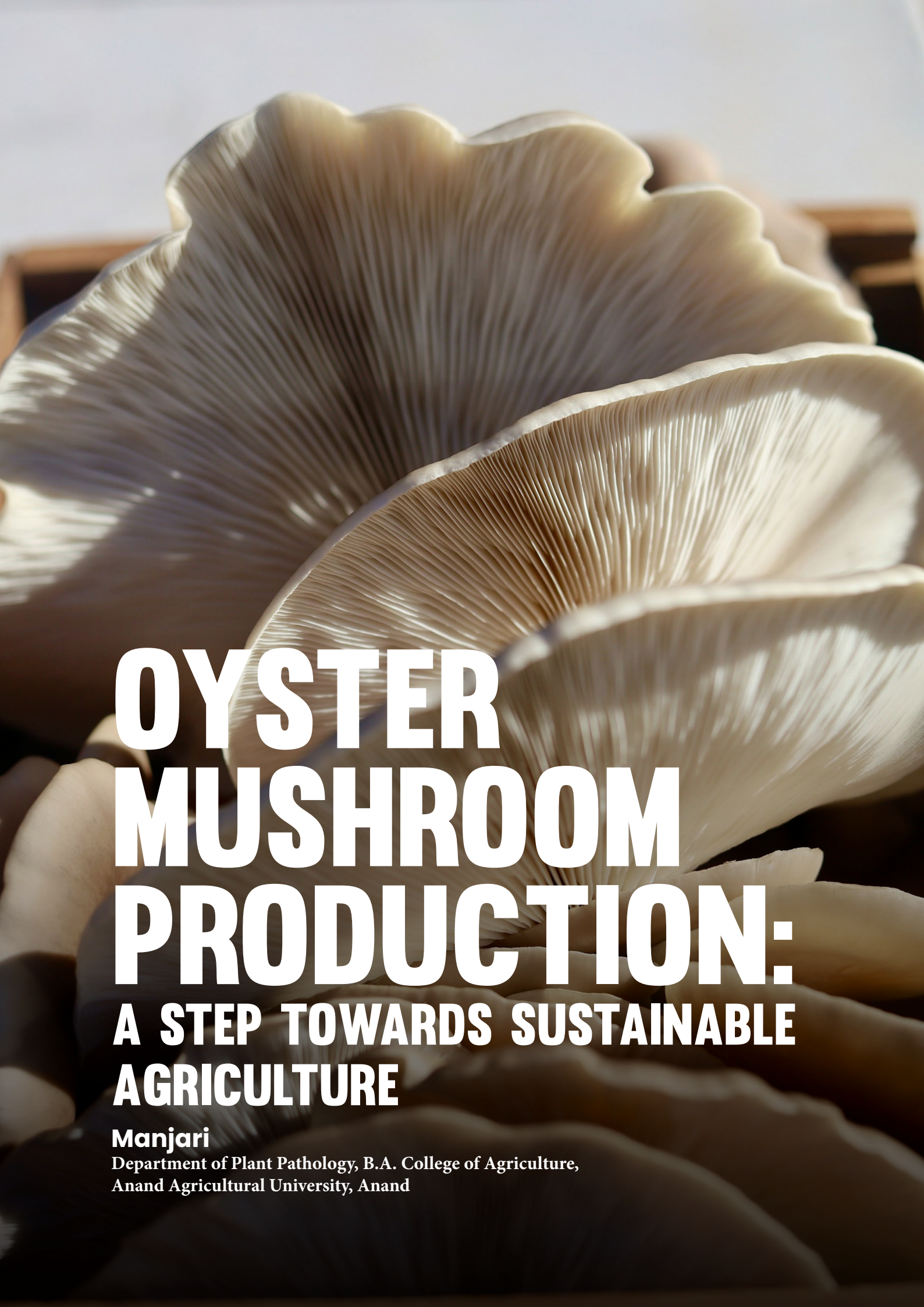

OYSTER MUSHROOM PRODUCTION: A STEP TOWARDS SUSTAINABLE AGRICULTURE

Manjari
Department of Plant Pathology, B.A. College of Agriculture,
Anand Agricultural University, Anand

INTRODUCTION

The Oyster mushroom was first described by Dutch naturalist Nikolaus in 1775. He named it Agaricus ostreatus. It was transferred to genus Pleurotus by Paul Kummer. Cultivation of Oyster mushroom began in Germany where Pleurotus ostreatus was grown on experimental basis by Flack in 1917. The commercial cultivation of Oyster mushroom began in USA and Europe in 1974. In India, oyster mushroom production began in the year 1962 by cultivating *Pleurotus flabellatus* on paddy straw. Jandaik introduced *Pleurotus sajor-caju* in India which led to the beginning of commercial cultivation of Oyster mushroom in India. Pleurotus consists of 40 species out of which *Pleurotus eryngii, Pleurotus citrinopileatus, Pleurotus flabellatus, Pleurotus ostreatus, Pleurotus djamor var.rosae* and *Pleurotus florida* are most commonly cultivated on different types of agricultural wastes.

NUTRITIONAL STATUS OF MUSHROOM

Mushrooms are considered as complete food because of its high nutritional status. Mushrooms are low in calories, high in fiber and contain many important vitamins and minerals. Some also have medicinal properties such as complex carbohydrates that strengthen the immune system. In terms of nutrition they contain:-

Protein:- Most mushrooms have a high protein content, usually around 20-30% by dry weight. This can be useful for vegetarians or anyone looking to increase the protein content in their diet.

Fiber:- Mushrooms helps to lower cholesterol and is important for the digestive system.

Niacin and other important Vitamin B:- As certain vitamins are found in animal tissues but not in plants, they can be taken up by incorporating mushroom in diet.

Vitamin D:- Essential for the absorption of calcium.

Copper:- Aids in helping the body absorb oxygen and create red blood cells.

Selenium:- An antioxidant that helps neutralize free radicals, thus preventing cell damage and reducing the risk of cancer and other diseases. Mushrooms are the richest source of selenium.

Potassium:- An extremely important mineral that regulates blood pressure and maintain proper functioning of cell.

Apart from these, the nutritional value of mushrooms can be measured in more ways:-

Complex polysaccharides:- Complex carbohydrates are found in mushrooms that are known to stimulate the immune system. The major portion of carbohydrates contains dietary and fermentable fibers with no starch and negligible amount of sugars.

Enzyme inhibiting activity:- Mushrooms can inhibit the production of certain enzymes

such as aromatase which is used to produce estrogen. It reduces the risk of breast cancer.

Triterpenes:- Steroid-like molecules are produced by mushrooms that inhibit histamine release and have anti-inflammatory properties.

Pleurotus spp. is a very rich source of vitamins. They contain exceptionally high amount of folic acid and niacin. The concentration of vitamin B and C are high compared to other vitamins. The content of different vitamins in some commonly cultivated Pleurotus spp. is presented in Table 1.2.

Table 1.1 Vitamin content of oyster mushroom (*Pleurotus* spp.).

Name of Pleurotus species	Vitamin content g/100g dried mushroom				
	Thiamine	Riboflavin	Niacin	Folic acid	Ascorbic acid
P. *ostreatus*	0.32	0.58	8.72	0.052	12.52
P. *flabellatus*	1.46	7.10	73.3	1.22	144
P. *florida*	1.36	7.88	72.9	1.41	113
P. *sajor-caju*	1.75	6.66	60	1.23	111
P. *citrinopileatus*	0.16	0.94	22.20	0.10	<1
P. *pulmonarius*	0.68	0.26	0.48	-	6.74
P. *eous*	2.23	8.97	66.6	1.35	92

MEDICINAL IMPORTANCE OF MUSHROOM

The oyster mushroom (*Pleurotus* sp.) is one of the most important edible and medicinal mushroom because it contains a variety of effective compounds. Some important medicinal properties of mushroom are given below:-

Antimicrobial:-

Oyster mushroom has been explored to combat simple and multiple drug resistant isolates of *Escherichia coli, Staphylococcus epidermidis, S. aureus*, species of *Candida, Streptococcus* and *Enterococcus*. Methanolic extracts of *Pleurotus* species demonstrated an inhibition in growth of *Bacillus megaterium, S. aureus, E. coli, Klebsiella pneumoniae,C. albicans, C. glabrata*, species of *Trichophyton and Epidermophyton* to different degrees.

Antiviral:-

Pleurotus mushroom contain substances that exert direct or indirect antiviral effects as a result of immune-stimulatory activity. Ubiquitin, an anti-viral protein was isolated and identified from fruiting body of Oyster mushroom.

Anti-Human Immunodeficiency Virus (HIV):-

Ribonucleases (RNases: mol. wt. 10.7 kDa) have been isolated and characterized from the P. ostreatus that has the potential to neutralize HIV through degradation of viral genetic material.

Antimutagenic:

89 different extracts of mushroom species were tested for their antigenotoxic and bio-antimutagenic activities on S. typhimurium and E. coli amongst them P. cornucopiae was found to be most effective.

Good for heart:-

Edible mushrooms have little fat content with greater proportion of unsaturated fatty acids (PUFA) and complete absence of cholesterol justifying the fact why it is considered a good diet for heart patients or those who are avoiding fat in their food. Regular consumption of mushrooms like Lentinula, Pleurotus spp. showed decreased cholesterol levels.

Maintaining blood circulation:-

Oyster mushrooms help in maintaining good blood circulation inside body because of low sodium and high potassium content. So, they are suitable alternative for people with high blood pressure.

Regulates digestive system:-

High amounts of digestive fibers present in oyster mushrooms along with oligosaccharides act as prebiotics in intestine and anchor useful bacteria in the colon. This makes the digestion process easier and helps in healthy functioning of bowel.

Hepatoprotective:-

Liver damage by hepatotoxic agents is of vital consequence because chronic liver injury leads to fibrosis, end stage cirrhosis and hepato-carcinoma. Hence, there is an increasing need to search for an agent which could protect the liver from such damages. Many species of Pleurotus contains active compounds like $-glucan, phenol and vitamin C that increase the activity of antioxidant-enzymes viz. catalase, superoxide dismutase; these enzymes are responsible for reduction of hepatic cell necrosis.

Strengthens immunity:-

A diverse collection of polysaccharides and minerals isolated from mushroom is responsible for up-regulatig the immune system. These compounds potentiate the host's innate and acquired immune responses and activate all kinds of immune cells.

CONCLUSION

Indian agriculture will continue to be the main strength of Indian economy. With the variety of agricultural crops grown today, we have achieved food security by producing more than 200 million tons of food grains. However, our struggle to achieve nutritional security is still on. In future, the ever increasing population, depleting agricultural land, changes in environment, water shortage and need for quality food products at competitive rates are going to be important issues. To meet these challenges and to provide food and nutritional security to our people, it is important to diversify the agricultural activities in areas like mushroom cultivation. Mushrooms cultivation will not only impart diversification but also help in addressing the problems of quality food, health and environmental related issues.