RESEARCH ARTICLE

Hymenochaetales from Yeoor Hills, Thane, Maharashtra, India.

Hajirnis Sarita[1] and Mishra Raj[2]

[1]Department of Botany, Satish Pradhan Dnyanasadhana College of Arts, Science and Commerce, Thane (W), India
[2]Principal LSPM College, Chondi, Raigad.
*Corresponding author Email: hsarita64@gmail.com

Manuscript details:

Available online on http://www.ijlsci.in

ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

Editor: Dr. Arvind Chavhan

Cite this article as:
Hajirnis Sarita and Mishra Raj (2016) Hymenochaetales from Yeoor Hills, Thane, Maharashtra, India, Int. J.of. Life Sciences, Special Issue, A7:1-6.

Acknowledgements:
I am very much thankful to my guide Dr. R. L. Mishra, Principal LSPM College, Chondi for rendering valuable guidance for the present research work. I am also thankful to Principal Dr. C. D. Marathe of my Parent institution for his administrative and technical support. Lastly thanks to my family and all my well-wishers.

Copyright: © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

ABSTRACT

The wood rotting Hymenochaetaceous fungi were collected from 'Yeoor Hills' situated in the city of Thane, Maharashtra, India in the monsoon months, June to October of the year 2014 and identified on the basis of macroscopical and microscpoical characters. Three species of Phellinus namely, *P. allardi, P. discipes and P. linteus* and one species each of *Coltricia cinnamomea* and *Inonotus tabacinus* were recorded for which an artificial key for the three genera was prepared and similarly for the three species of Phellinus.

Keywords: Hymenochaetales, Wood-rotting, Yeoor Hills, Artificial key.

INTRODUCTION

The variety and galaxy of fungi and their natural beauty occupy prime place in the biological world. Only a fraction of total fungal wealth has been subjected to scientific scrutiny and mycologists have to unravel the unexplored and hidden wealth.

Fungi are among the few organisms that can effectively break down wood. Wood is composed primarily of cellulose, hemicellulose and lignin. Lignin is a complex polymer that is highly resistant to degradation, and it encrusts the more readily degradable cellulose and hemicellulose. Wood rotting fungi, most of which are also members of Basidiomycota, infect trees through wounds, branch stubs and roots and decay the inner heartwood of living trees. Wood rot is of two main types viz. brown rot and white rot. Brown rot fungi are fungi responsible for causing the Brown rot in plants. They selectively degrade cellulose and hemicellulose in wood, leaving behind the more recalcitrant lignin. The decayed wood is brown in color White rot fungi degrade cellulose, hemicellulose, and lignin at approximately equal rates. The decayed wood is pale in color, light in weight, and has a stringy texture. White rot fungi are the only organisms that can completely degrade lignin. Lignin is one of the most abundant organic polymers, accounting for 30% of the organic carbon on the planet only cellulose is more abundant (Boerjan et al. 2003). Extensive decay weakens the tree, and reduces the quality of wood in trees harvested for timber.

The members of the Family Hymenochaetaceae of Order Hymenochaetales are mostly tropical, saprophytic and more rarely parasitic on living plants, always causing a white rot of dead and living wood. As described by Donk (1948), basidiomes are characteristically perennial, leathery or woody, resupinate to stipitate, clavaroid or coralloid with a smooth, rugose, irpiciform, hydnoid or poroid hymenophore distinctly brown and generative hyphae always with simple septa. Setoid elements are variably present in the hymenium, trama or context or on the pileal surface. **Setae** when present are dark brown. Spores are smooth or ornamented and hyaline or brownish. Members of the family Hymenochaetaceae respond positively towards the Xanthochroic reaction i.e. blackening with KOH (Fiasson & Bernillon 1977, Fiasson 1982).

MATERIALS AND METHODS

Fungal specimens were collected from 'Yeoor hills', Thane, Maharashtra, India. Photographs were taken on-field and necessary characters noted down. For morphotaxonomic studies the monographic works of Largent (1977) and Singer (1986) were referred. For microscopic studies sections from the dehydrated pileus and stipe were rehydrated, stained and observed. All measurements were taken under 100X magnification except for tramal patterns which were under 40X magnification and expressed in microns (µm). The books used for identification of the specimens were Ryvarden and Johansen (1980) and Sharma (1995). The systematic arrangement in the present article follows Hibett et al. (2007). Name corrections, authorities and taxonomic assignments of all taxa reported in this work were checked against the (<Mycobank.org>), In addition, websites of international mycological centers such as (< index fungorum.org>) and (<species fungorum.org>) were also referred.

RESULTS AND DISCUSSION

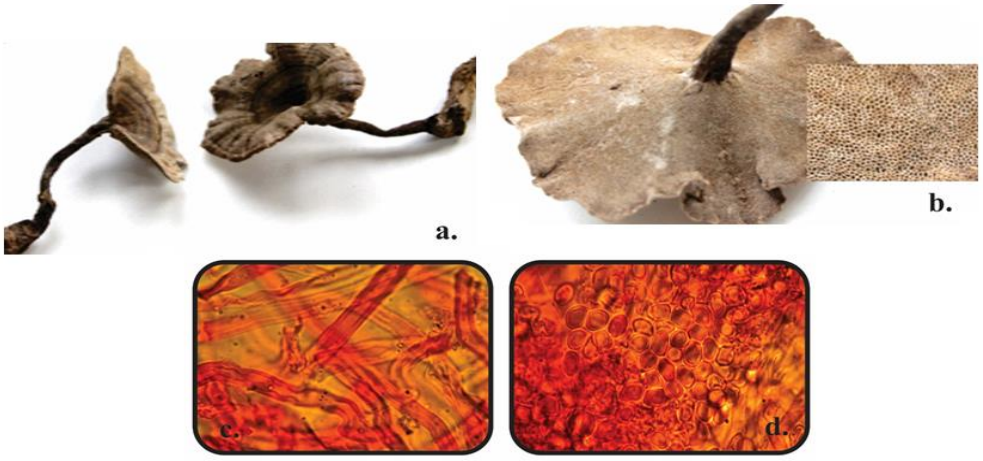
Out of the total specimens collected, 5 of them were identified to belong to Family Hymenochaetaceae of Order Hymenochaetales of Class Agaricomycetes of Phylum Basidiomycota of Sub-kingdom Dikarya of Kingdom Fungi. Out of the 5 species identified, 3 species belonged to genus Phellinus and 1 species each to genus Coltricia and Inonotus.

Artificial Key for Genera

1	Basidiomes pileate, centrally stipitate	***Coltricia***
1	Basidiomes resupinate to pileate, sessile or with a lateral tapering base	2
	Perennial, hyphal system dimitic, basidiomes woody and hard	
2	Annual, hyphal system monomitic, basidiomes thin, flexible when fresh and	***Phellinus***
2	brittle and fragile when dry.	***Inonotus***

Coltricia cinnamomea (Jacq.) Murrill, Bulletin of the Torrey Botanical Club 31 (6): 343 (1904) [MB#119718]

Specimen no.1 **Plate 1**



a. Habit b. Hymenial view & part magnified
c. Hyphal system d. Badiospores

Basidiomes annual, solitary, pileate, laterally stipitate but appearing central as the two edges of the pileus connect behind the stipe, corky when wet, leathery on drying; Pileus 70 × 40 × 4 mm, dimidiate to circular (when projects behind the stipe) plane but shallowly depressed in the centre, surface concentrically zonate, yellowish white towards margin (3B2) and rosewood (9D5) towards the centre, texture velvety with presence of minute hair, margin expanded, wavy, acute; Stipe 53 × 8 mm, violet brown (10F6), eccentric, terete, equal throughout but slightly expanded at the base; Hymenophore porate, pores circular to angular, 1-2 per mm, greyish brown (10D3); Context 2 mm thick, colour rose wood (9D5); Hyphal system monomitic, generative hyphae with hyaline wall, variously thickened, septate and width 6-8 µm; Basidiospores (6.5-)7-8.5(-8.5) × (5-)5.5-5.5(-6.5), (7.63±0.54 × 5.66±0.43) µm, Q = 1.34, broadly ellipsoid to ellipsoid, wall thick, smooth, hyaline with apicular germ pore, dextrinoid. No black reaction with KOH.

Holotype: Terricolous (on soil), gregarious, India, Maharashtra, Thane, Yeoor Hills, Temperature: 28ºC, Humidity: 83 %, GPS Coordinates: 19º20´53´´N 72º91´94´´E, Altitude 110.05 m asl, 21 Sept. 2014, S. Hajirnis

Remarks: The rose wood colour, velvety texture and the concentric zones on the pileus, a thin, long stipe, monomitic hyphal system and ellipsoid basidiospores with an apicular germ pore are some of its distinguishing characters.

The stip is principally the only characteristic that separates the genus from genera like *Inonotus, Coltriciell* and *Phyloporia.*

Inonotus tabacinus (Mont.) G. Cunn., Bulletin of the New Zealand Department of Industrial Research 78: 3 (1948) [MB#121567], **Specimen no. 2**

Basidiomes annual, lignicolous, pileate, sessile, scattered, solid, hard; Pileus 28 × 18 × 4 mm, dimidiate to flabelliform, narrow at the base, reddish brown (9E7), velutinate, hair grey, dry; margin entire and acute. Hymenophore poroid, pores minute, 8-9 pores per mm, angular, 1mm deep, reddish brown; Context 5 mm thick, reddish brown (9D6); Hyphal system monomitic, generative hyphae thin walled, hyaline, septate, with a broad lumen, 3-4 wide µm.Setae 18.69 × 8.97 µm, hymenial setae abundant, ventricose; Basidia 9 × 4 µm, broadly clavate with four sterigmata at their tip; Basidiospores (6.0-)6.5–6.5(-8.0) × (4.0-)4.5–5.0(-6.0), (6.67±0.48 × 4.88±0.43), Q = 1.36, ellipsoid, spore wall thin, hyaline smooth, ventricose, 17.5 × 6.3 µm, non-amyloid and non-dextrinoid; Black reaction with KOH.

Holotype: Terricolous (on soil), Gregarious, India, Maharashtra, Thane, Yeoor Hills, Temperature: 28ºC, Humidity: 83 %, GPS Coordinates: 19º20´53´´N 72º91´94´´E, altitude 110.05 m asl, 21 Sept. 2014, S.Hajirnis

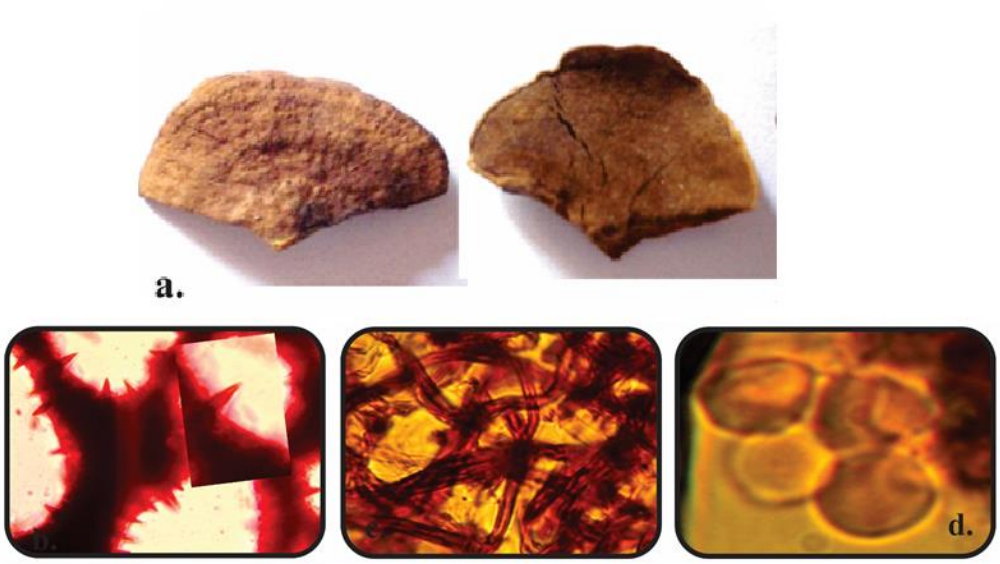


Plate 2 : **a. Habit & Hymenial view b. Pores showing setae (seta magnified) c. Hyphal system d. Badiospores**

Remarks: The present species can be easily identified by its thick and hard pileus, reddish brown colour, dimidiate shape, grey hair on its surface and poroid hymenium. Also monomitic hyphal system, hymenial setae, ellipsoid spores and a black reaction with KOH are some more characters helping in confirming the species. It differs from the type species *Inonotus hispidus* which has the surface of the basidiocarp hairy at maturity, absence of branched setae and larger spore size

***Phellinus* is the largest genus of all polypores.**

Artificial key for species to genus *Phellinus*

Key to species

1 Basidiomes resupinate *P. allardi*

1 Basidiomes pileate…… 2

2 Basidiomes annual, Hymenial setae present……*P. linteus*

2 Basidiomes perennial, Hymenial setae absent……*P. discipes*

Phellinus allardii (Bres.) S. Ahmad, Basidiomycetes of West Pakistan: 57 (1972) [MB#319735]

Specimen No. 3

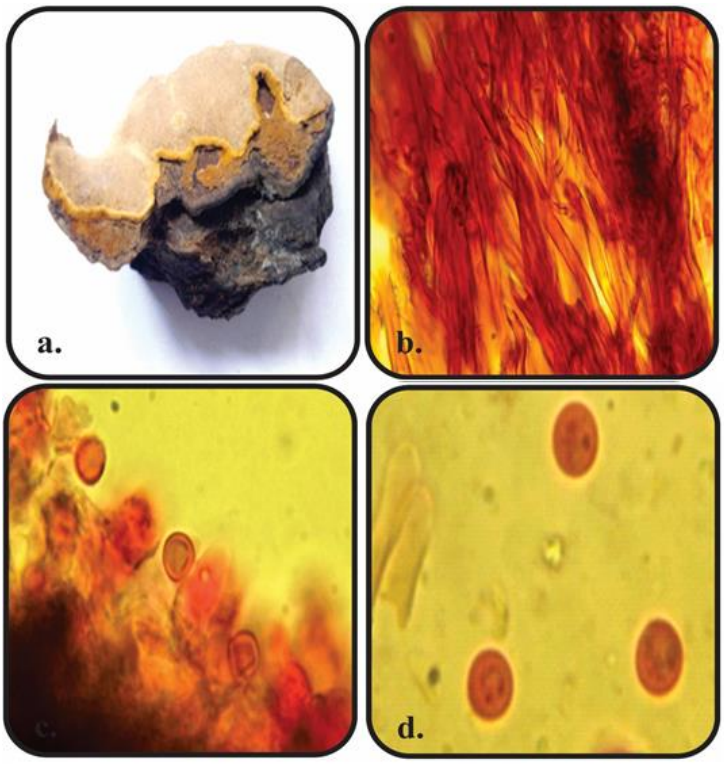


Plate 3. a. Habit b. Hyphal system c. Basidia d. Badiospores

Basidiomes, annual, lignicolous, resupinate, present as an entire large patch on the substratum; Hymenophore exposed, brownish orange (6C3) in the centre and brownish orange (6C6) towards the periphery, porate, pores minute; Context 0.1mm thick, brownish orange (6C6) Hyphal System dimitic, generative hyphae with a thin to thick hyaline wall, broad lumen, septate, 4 µm wide, skeletal hyphae unbranched, thick walled, solid, 3.7-4.5µm wide; Setae absent; Basidia ellipsoidal, 12 × 6 µm; Basidiospores (4.5-)5–5.5(-5.5) × (4-)4.5-5(-5), (5.18±0.27 × 4.70±0.21) µm, Q = 1.1, sub globose, spore wall thin and smooth; dextrinoid; Black Reaction with KOH.

Holotype: Terricolous (on soil), Gregarious, India, Maharashtra, Thane, Yeoor Hills, Temperature: 28ºC, Humidity: 83 %, GPS Coordinates: 19º20´53´´N 72º91´94´´E, altitude 110.05 m asl, 21 Sept. 2014, S. Hajirnis

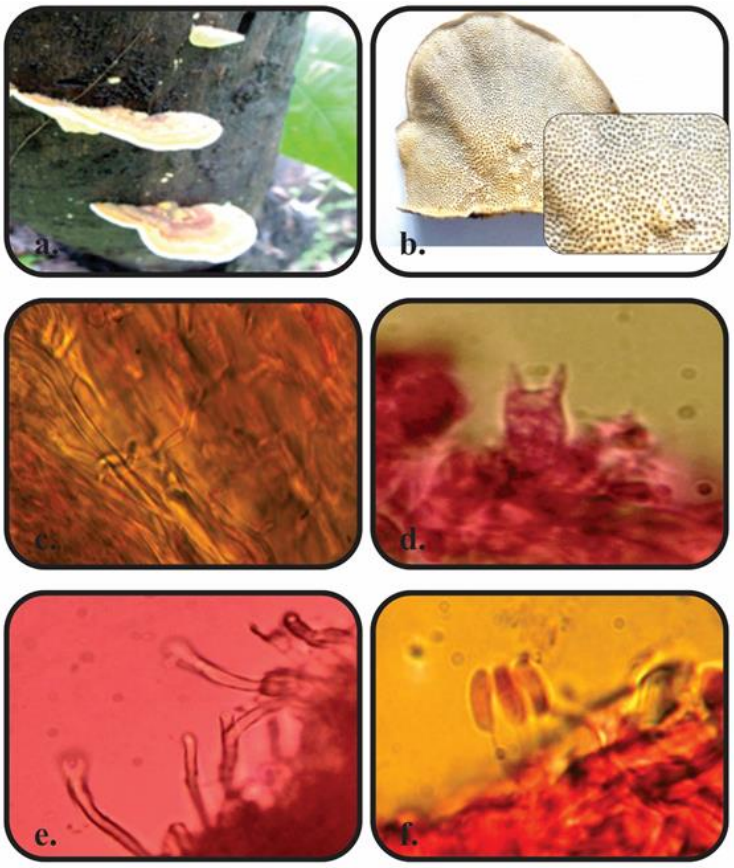


Plate 4 : **a. Habit b. Hymenial view with part magfied c. Hyphal system d. Basidia e. Cystidia f. Badiospores**

Remarks: The resupinate habit of this species with a brownish orange hymenophore lined by a conspicuous margin makes this species easily recognizable from its other closely related species. Also the absence of setae, non-dextrinoid reaction, rusty brown and sub-globose spores are typical of the species.

Phellinus discipes (Berk.) Ryvarden, Kew Bulletin 31 (1): 88 (1976) [MB#319752]
Specimen no. 4 **Plate 4**.

Basidiomes annual, lignicolous, scattered, pileate, sessile, attached by a broad margin, coriaceous when fresh to hard when dry; Pileus 28 × 18 mm, dimidiate, yellowish brown (5D5), concentrically zonate, surface strigose, hair unbranched, margin plane, entire, 1 mm thick; Hymenophore porate, pores circular to angular, 3-4 per mm, pore depth 0.05 mm towards the centre; Context 1-2 mm, greyish yellow (1B3); Hyphal system dimitic, generative hyphae thin to thick walled, hyaline, with a broad lumen, septate and feebly branched with width 2.5-3.5 µm, skeletal hyphae thick walled, solid, unbranched with width 13.5-15.5 µm; Setae absent; Basidia10 × 4.5 µm, broadly clavate with four sterigmata; Basidiospores (4.5-)5.5-6(-6.5)×(2-)2.5-2.5(-3)µm, (5.71±0.40 × 2.41±0.22) µm, Q = 2.36, cylindric, smooth, hyaline, dextrinoid; Black with KOH.

Holotype: Terricolous (on soil), Gregarious, India, Maharashtra, Thane, Yeoor Hills, Temperature: 28ºC, Humidity: 83 %, GPS Coordinates: 19º20´53´´N 72º91´94´´E, altitude 110.05 m asl, 21 Sept. 2014, S. Hajirnis

Remarks: The yellowish brown, dimidiate and hairy pileus and a porate hymenophore make the species easily identifiable in the woods. Besides the dimitic hyphal system, absence of setae, and cylindric basidiospores also contribute to the distinguishing characters of the species. The present species differs from the original species in the size of the spores being smaller.

Phellinus linteus (Berk. & M.A. Curtis) Teng, Zhong Guo De Zhen Jun [Fungi of China]: 762 (1963) [MB#319769] **Specimen no. 5.**

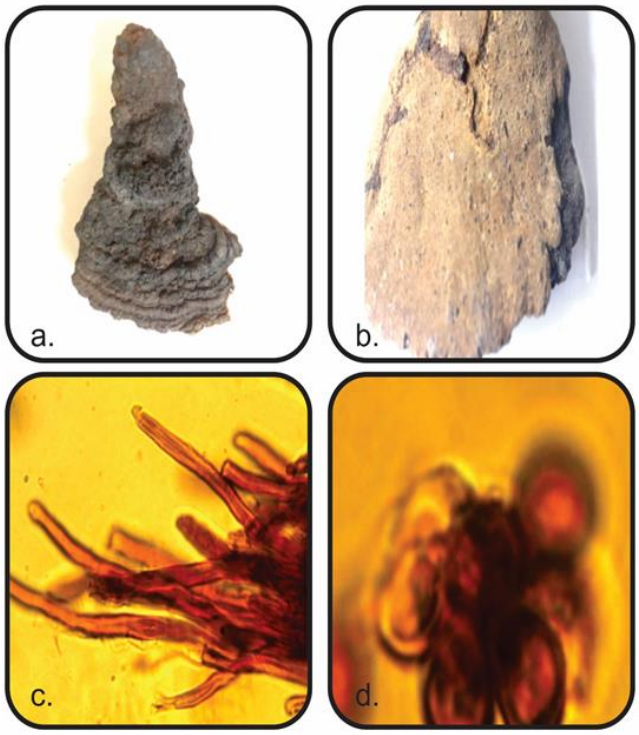


Plate 5 : **a. Habit b. Hymenial view c. Hyphal system d. Badiospores**

Basidiomes perennial, lignicolous, solitary, pileate, sessile, dry, thick, hard and woody; Pileus 140 × 77 × 25 mm, aplanate and flabelliform, brownish red (9E7), concentrically zonate towards the periphery, surface rough, often cracking, margin thick; Hymenophore poroid, pores minute, indistinctly angular, greyish red (8D5), hymenial setae present, acuminate; Context 4 mm thick greyish orange (6D5); Hyphal system dimitic, generative hyphae thin walled, hyaline, with a broad lumen, sparingly branched, width 3.5-4 µm and skeletal hyphae thick walled, solid, unbranched, width 5-6 µm; Basidia 11.71 × 5 µm, cylindrical with four sterigmata at their tips; Basidiospores (4-)4-4.5(-5.5) × (3-)4-4(-5) µm, (4.45±0.45 × 4±0.51) µm , Q = 1.22, sub-globose, rusty brown, slightly thick walled, hyaline, smooth, dextrinoid; Black reaction with KOH.
Holotype: Terricolous (on soil), Gregarious, India, Maharashtra, Thane, Yeoor Hills, Temperature: 28ºC, Humidity: 83 %, GPS Coordinates: 19º20´53´´N 72º91´94´´E, altitude 110.05 m asl, 21 Sept. 2014, S. Hajirnis

Remarks: The perennial habit, dark coloured, hard, woody and aplanate pileus are characters which help to identify the species in the woods. Also the dimitic hyphal system, hymenial setae, sub-globose and rusty brown spores are its diagnostic characteristics

REFERENCES

Boerjan W, Ralph J, Baucher M (2003) Lignin biosynthesis. Annu Rev Plant Biol **54**: 519–546

Donk MA (1948) Notes on Malesian fungi 1. Bulletin of the Botanic Gardens Buitenzorg Series III. 17: 473-482.

Fiasson JL (1982) Distribution of Styrylpyrones in the basidiocarps of various Hymenochaetaceae (Aphyllo-phorales, Fungi) - Biochem. Syst. & Ecol. 10: 289-296.

Fiasson JL, Bernillon J (1977) Chemical identification of styryl pyrones in 4 hymenochetaceae fungi aphyllophorales. *Canadian J. of Botany* 55(23): 2984-2986

Hibbett DS (2007) A higher-level phylogenetic classification of the Fungi..*Mycological Research*, 111: 509-547.

Kornerup A, Wanscher JH (1978) Methuen handbook of colour. 3rd ed. Methuen and Co. Ltd., London. 5-252

Ryvarden L, Johansen I (1980) A preliminary polypore flora of East Africa: 1-636

Sharma JR (1995) Hymenochaetaceae of India. Botanical Survey of India. Calcutta: 1-219

Web Bibliography:
http://www.indexfungorum.org/
http://www.mycobank.org/.

© 2016 | Published by IJLSCI