

Institute of Science, Nagpur
(An Autonomous Institute of Govt. of Maharashtra)

Department of Botany



**CREDIT STRUCTURE, EVALUATION SCHEME, AND SYLLABUS
OF
FOUR-YEAR BACHELOR OF SCIENCE (HONORS/RESEARCH)
DEGREE WITH A SEMESTER PATTERN IN BOTANY
(FACULTY OF SCIENCE & TECHNOLOGY) BASED ON
DIRECTION 1 OF 2024 ISSUED BY THE INSTITUTE OF
SCIENCE, NAGPUR AS PER NEP 2020**

To be implemented from 2024-2025

Teaching and Examination Schemes:

Teaching and Examination Schemes Four Year B.Sc. (of eight semesters) program is as follows.

Table 5: B.Sc. Semester I

Sr No	Course Category	Name of the course (Title of the Paper)	Course code	Level	Teaching Scheme (hrs)			Total Credit	Evaluation Scheme			
					Theory	Tutorial	Practical		Duration of Examination (Hrs)	Semester End Evaluation (SEE)	Continuous Internal Evaluation (CIE)	Minimum Passing Marks
					Th	Tu	P					
1	Subject (One will be Major and other Minor in Semester III)	Subject 1:- Microbes AndFungi	B-BO111T	4.5	2	--	--	2	2	30	20	25
		Subject 1 Lab	B-BO112P		--	--	2	1	4	30	20	25
		Subject 2:- Microbes AndFungi	B-BO111T		2	--	--	2	2	30	20	25
		Subject 2 Lab	B-BO112P		--	--	2	1	4	30	20	25
2	GE	Refer to GE Basket			2	--	--	2	2	30	20	25
		Refer to GE Basket			2	--	--	2	2	30	20	25
3	VSEC	Refer VSC Basket Subject 1 Mushroom Cultivation and fungal Biotechnology	B-BO113P		--	--	4	2	4 - 6	60	40	50
		Refer VSC Basket Subject 2 Mushroom Cultivation and fungal Biotechnology	B-BO113P		--	--	4	2	4 - 6	60	40	50
4	AEC	English Compulsory		2	--	--	2	2	30	20	25	
5	VEC	Environmental Studies		2	--	--	2	2	30	20	25	
6	IKS	Indian Knowledge System	B-BO114T	2	--	--	2	2	30	20	25	
7	CC	NSS /NCC / Sports / Cultural		--	--	4	2	--	--	100	50	
Total					14	--	16	22	--	390	360	--

Table 6: B.Sc. Semester II

Sr No	Course Category	Name of the course (Title of the Paper)	Course code	Level	Teaching Scheme (hrs)			Total Credit	Evaluation Scheme			
					Theory	Tutorial	Practical		Duration of Examination (Hrs)	Semester End Evaluation (SEE)	Continuous Internal Evaluation (CIE)	Minimum Passing Marks
					Th	Tu	P					
1	Subject (One will be Major and other Minor in Semster III)	Subject 1:- Algae, lichens and bryophytes	B-BO121T	4.5	2	--	--	2	2	30	20	25
		Subject 1 Lab	B-BO122P		--	--	2	1	4	30	20	25
		Subject 2:- Algae, lichens and bryophytes	B-BO121T		2	--	--	2	2	30	20	25
		Subject 2 Lab	B-BO122P		--	--	2	1	4	30	20	25
2	GE	Refer to GE Basket			2	--	--	2	2	30	20	25
		Refer to GE Basket			2	--	--	2	2	30	20	25
3	VSEC	Refer VSC Basket Subject 1 Identification of Angiospermic Plant	B-BO123P		--	--	4	2	4 - 6	60	40	50
		Refer VSC Basket Subject 2 Identification of Angiospermic Plant ure	B-BO123P		--	--	4	2	4 - 6	60	40	50
4	AEC	English Compulsory		2	--	--	2	2	30	20	25	
5	VEC	Constitution of India		2	--	--	2	2	30	20	25	
6	IKS	Indian Knowledge System	B-BO124T	2	--	--	2	2	30	20	25	
7	CC	NSS /NCC / Sports / Cultural		--	--	4	2	--	--	100	50	
Total					14	--	16	22	--	390	360	--

B. Sc. Semester-I
Discipline Specific Core Course (DSC-I)- (B-BO111T)
MICROBES AND FUNGI

Course objectives: -

1. To acquainted students about the morphology, characters and importance of different microorganisms.

Course outcome :-

1. The course, will enable students to know about different types of microorganisms: virus, bacteria, Cyanobacteria, mycoplasma and fungi.

DSC-I Theory	Hours: 2Hours/Week	Marks: 40+10=50	Credit: 2
Unit-I			
<ol style="list-style-type: none"> 1. Viruses: General characteristic and nature of viruses, Classification of viruses based on host. 2. Ultrastructure of TMV, structure and multiplication and economic importance of T4 – bacteriophage. 3. Mycoplasma: morphology, properties and pathogenicity. 			7.5 Hrs
Unit-II			
<ol style="list-style-type: none"> 1. Bacteria: cell structure, cilia, flagella, reproduction: Vegetative, Asexual and Sexual methods. Economic importance. 2. Cyanobacteria: Cell ultrastructure, Structure of heterocyst, structure and reproduction in <i>Nostoc</i> 3. Economic importance of Cyanobacteria 			7.5 Hrs
Unit-III			
<ol style="list-style-type: none"> 1. Fungi: Classification (Alexopoulos 1979), 2. Economic importance's of Fungi. 3. Life history of – 4. <i>Albugo</i>(Oomycetes) 5. <i>Mucor</i>(Zygomycetes) 			7.5 Hrs
Unit-IV			

1. Fungi: life history of – <ul style="list-style-type: none"> • <i>Aspergillus</i>(Ascomycetes) • <i>Puccinia</i>(Basidiomycetes) • <i>Cercospora</i>(Deuteromycteres) 	7.5 Hrs
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List of Books

1. Singh V., Pande, P. C., and Jain D.K. (2005): A Text book of Botany, Rastogi Publications, Meerut.
2. Alexopoulos, C. J. (1962): C.J.: Introductory Mycology, Wiley International Edition.
3. Gangulee. H. C. and Kar, A. K. (1989): College Botany, Vol. 1 New Central Book Agency, (P) Ltd. London.
4. Dubey R. C., Maheshwari D.K. (1999): Text Book of Microbiology (S. Chand and Co.)
5. Prescott *et. al.*, (1999): Microbiology 3RDedn. (WmC. Brown Pub)
6. Vasishta, B. R. (1990): Fungi (S. Chand and Co. New Delhi)
7. Dutta A. C. (1963), Botany for degree students, (Revised edition) Oxford University Press, New Delhi 110002, India.

B. Sc. Semester-I

Discipline Specific Core Course Laboratory Exercise (B-BO112P)

Based on DSC Paper 1	Hours: 2 Hours/Week	Marks: 30+20(Internal)=50	Credit: 1
<ol style="list-style-type: none">1. Study of ultrastructure of TMV2. Study of ultrastructure of T4 Bacteriophages.3. Study of various types of Bacteria.4. Perform Gram staining technique5. Study of <i>Nostoc</i>6. Study of Mycoplasma structure7. Study of fungal genera :<ul style="list-style-type: none">• <i>Albugo</i>• <i>Mucor</i>• <i>Aspergillus</i>• <i>Puccinia</i>• <i>Cercospora</i>			

Suggested activity:

Seminar, Quiz, debate, Assignments, collection and study of Algae and Bryophytes available in local area, Field work, Study Projects, Models etc. are Part of Curriculum. Botanical Excursion (one short excursion is compulsory)

B. Sc. - SEMESTER –I BOTANY PRACTICAL

Based on Paper I and Paper II B-BO112P

Time: 4hrs.

Max. Marks: 30

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| 1. Gram stain the given Bacterial strain (A) identify giving reasons. | 5 Marks |
| 2. Stain the given Cyanobacterial material (B) identify giving reasons. | 4 Marks |
| 3. Identify the given Fungal material (C) prepare a temporary mount and write identifying characters. | 4 Marks |
| 4. Identify the given Fungal material (D) prepare a temporary mount and write identifying characters. | 4 Marks |
| 5. Spotting: | 3 Marks |
| E. Virus | |
| F. Bacteria | |
| G. Fungi | |
| 6. Viva-voce | 5 Marks |
| 7. Record and excursion report (submission is compulsory) | 5 Marks |
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B. Sc. Semester-I

VSC Course Laboratory Exercise (B-BO113P)

VSC: Mushroom Cultivation and Fungal Biotechnology (B-BO113P)

Objective: To raise curiosity in students for cultivation of mushrooms.

Course Outcomes: By the end of this course, the students will be able to:

1. Describe morphology of mushrooms.
2. Learn the process of Compost preparation.
3. Learn importance of mushrooms in human welfare.
4. Learn the process of cultivation of various mushrooms.
5. Discuss application of fungi in biotechnology.
6. Describe the role of fungi in production of metabolites.

**Laboratory
Exercise**

**Hours: 4
Hours/Week**

**Marks:
60+40(Internal)=100**

Credit: 2

1. To study morphology of commonly available mushrooms.
2. To perform test for presence of carbohydrate, protein and lipids in mushrooms.
3. Study of tools required for mushroom cultivation.
4. Preparation of culture tubes for mushroom cultivation.
5. Preparation of compost for mushroom cultivation.
6. Preparation of spawn for mushroom cultivation.
7. Cultivation of Oyster Mushroom in laboratory.
8. Cultivation of Paddy straw Mushroom in laboratory.
9. Cultivation of Shitake Mushroom in laboratory.
10. Preparation of mushroom dishes.
11. Visit to a commercial mushroom growing facility.

Suggested activity:

Seminar, Quiz, debate, Assignments, collection of mushroom from local area, Field work, Study Projects, Models etc. are Part of Curriculum.

B.Sc. - SEMESTER –I BOTANY PRACTICAL

VSC Course Laboratory Exercise (B-BO113P)

Time: 4-6hrs.

Max. Marks: 60

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| 1. Inoculate the given fungal culture (A) on slant. | 10 Marks |
| 2. Perform casing on mycelial mat (B) under aseptic condition. | 10 Marks |
| 3. Demonstrate inoculation of spawn (C) for cultivation of Oyster /paddy straw mushroom under aseptic condition. | 8 Marks |
| 4. Demonstrate harvesting of mushrooms from given material (D). | 8 Marks |
| 5. Spotting:
E.Tools used for mushroom cultivation
F.Mushroom dishes. | 4 Marks |
| 6. Viva-voce | 10 Marks |
| 7. Practical Record and report of visit to mushroom growing facility.(submission is compulsory) | 10 Marks |
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B. Sc. Semester-I (B-BO114T) Indian knowledge system			
IKS- Theory	Hours: 2 Hours/Week	Marks: 30+20=50	Credits: 2
Module I			
Course Objective: Establish, guide and monitor subject-wise interdisciplinary research groups comprising of researchers from institutes, centers and individuals. Create and promote popularization schemes. Facilitate funding of various projects and develop mechanisms to undertake research			
Course outcome: These guidelines, drafted in line with the National Education Policy (NEP) 2020 mandate to promote research and instruction in Indian Knowledge Systems (IKS), at all levels of education, by preparing and teaching new courses/programmes at the undergraduate and postgraduate levels.			
Module I			
Bhāratīya Civilization and Development of Knowledge System Genesis of the land, Antiquity of civilization, On the Trail of the Lost River, Discovery of the Saraswatī River, the Saraswatī-Sindhu Civilization, Traditional Knowledge System, The Vedas, Main Schools of Philosophy (6+3), Ancient Education System, the Takṣaśilā University, the Nālandā University, Alumni, Knowledge Export from Bhārata.			7.5 Hrs
Module II			
Basics of hypothesis and research methods Art, Music, and Dance, Naṭarāja– A Masterpiece of Bhāratīya Art, Literature, Life and works of Agastya, Lopāmudrā, Ghoṣā, Vālmīki, Patañjali, Vedavyāsa, Yājñavalkya, Gārgī, Maitreyī, Bodhāyana, Caraka, Suśruta, Jīvaka, Nāgārjuna, Kaṇāda, Patañjali, Kauṭīlya, Pāṇini, Thiruvalluvar, Āryabhaṭa, Varāhamihira, Ādi Śaṅkarācārya, Bhāskarācārya, Mādhavācārya.			7.5 Hrs

Module III	
Concept of Matter, Life and Universe, Gravity, Sage Agastya's Model of Battery, Velocity of Light, Vimāna: Aeronautics, Vedic Cosmology and Modern Concepts, Bhāratīya Kāla-gaṇanā, Kerala School for Mathematics and Astronomy, History and Culture of Astronomy, Sun, Earth, Moon, and Eclipses, Earth is Spherical and Rotation of Earth, Archaeoastronomy; Concepts of Zero and Pi, Number System, Pythagoras Theorem, and Vedic Mathematics.	7.5 Hrs
Module IV	
Pre-Harappan and Sindhu Valley Civilization, Laboratory and Apparatus, Juices, Dyes, Paints and Cements, Glass and Pottery, Metallurgy, Engineering Science and Technology in the Vedic Age and Post-Vedic Records, Iron Pillar of Delhi, Rakhigarhi, Mehrgarh, Sindhu Valley Civilization, Marine Technology, and Bet–Dwārka	7.5 Hrs

References/Books:

Text books:

1. Textbook on The Knowledge System of Bhārata by Bhag Chand Chauhan,
2. History of Science in India Volume-1, Part-I, Part-II, Volume VIII, by Sibaji Raha, et al. National Academy of Sciences, India and The Ramkrishan Mission Institute of Culture, Kolkata (2014).

Reference Books:

1. Pride of India- A Glimpse of India's Scientific Heritage edited by Pradeep Kohle et al. Samskrit Bharati (2006).
2. Vedic Physics by Keshav Dev Verma, Motilal Banarsidass Publishers (2012).
3. India's Glorious Scientific Tradition by Suresh Soni, Ocean Books Pvt. Ltd. (2010).

B. Sc. Semester-II
Discipline Specific Core Course (DSC)- Paper -II
ALGAE LICHENS AND BRYOPHYTES (B-BO121T)

Course objectives: -

1. To acquainted students about the morphology, characters and importance of different algae and bryophytes.

Course outcome :-

1. The course, will enable students to know about different types of algae, lichen and bryophytes.

DSC Theory	Hours: 2Hours/Week	Marks: 30+20=50	Credit:2
Unit-I			
<ol style="list-style-type: none"> 1. Algae –Classification (Fritsch 1945), 2. Economic importance of Algae 3. Life history of <ul style="list-style-type: none"> • <i>Oedogonium</i>(Chlorophyceae) • <i>Chara</i> (Chlorophyceae) 			7.5 Hrs
Unit-II			
<p style="text-align: center;">Algae – life history of</p> <ol style="list-style-type: none"> 1. <i>Vaucheria</i>(Xanthphyceae) 2. <i>Ectocarpus</i>(Phaeophyceae) 3. <i>Batrachospermum</i>(Rhodophyceae) 			7.5 Hrs
Unit-III			
<ol style="list-style-type: none"> 1. Lichens: Types, Reproduction and Economic importance. 2. Bryophyta: Classification (Proskauer 1957). 3. General characters of various classes of Bryophyta (Hepaticopsida, Anthocerotopsida and Bryopsida), 4. Economic importance and Alternation of Generation. 			7.5 Hrs

Unit-IV	
<p>Life history of –</p> <ol style="list-style-type: none"> 1. <i>Riccia</i> (Haepaticopsida) 2. <i>Anthoceros</i> (Anthocerotopsida) 3. <i>Funaria</i>(Bryopsida) <p>(Note: Development stages not expected)</p>	7.5 Hrs

List of Books

1. Bold H.C. and M. J. Wynne (1978): Introduction of Algae: structure and reproduction (Prentices Hall of India, Pvt. Ltd.)
2. Morris (1986): Introduction to the Algae. Cambridge University press, UK
3. Chopra, G. I. and D. I. Yadav (1980): A text Book of Bryophyta (Arihant Press)
4. Kumar H. D. (1988): Introductory Phycology, Affiliate East- West Press. Pvt. Ltd. (New Delhi)
5. Casselman. (1993). Craft of the Dyer-colour from plants and Lichens. Dover publications, Inc., N. Y.
6. Singh K. P. and Sinha G. P. (2010) Indian Lichens an annotated checklist, M/s Bishen Singh Mahendra pal Singh
7. Smith G. M. (1971) Cryptogamic Botany, Vol. II Bryophyta and Pteridohyta (THM)
8. Sporne, K.R.11: The Morphology of Bryophyta (Hutchinson University, London)
9. Vasistha B. R. (1992): Bryophyta (S. Chand and co. New Delhi)
10. Ram Udar (1970): An introduction to Bryophyta (ShashidharMalviyaPrakashan, Lucknow)
11. Parihar, N. S. (1997): The Biology and morphology of Bryophytes (Central Book Depot. Allahabad)

B. Sc. Semester-II

Discipline Specific Core Course Laboratory Exercise (B-BO122P)

Based on DSC Paper I	Hours: 2 Hours/Week	Marks: 30+20(Internals)=50	Credit: 1
<ol style="list-style-type: none">1. Study of Algal genera :<ul style="list-style-type: none">• <i>Oedogonium</i>,• <i>Chara</i>,• <i>Vaucheria</i>,• <i>Ectocarpus</i>• <i>Batrachospermum</i>2. Study of Lichens : Thallus structure, Types3. Study of Bryophytes :<ul style="list-style-type: none">• <i>Riccia</i>• <i>Anthoceros</i>• <i>Funaria</i>			

Suggested activity:

Seminar, Quiz, debate, Assignments, collection and study of Algae and Bryophytes available in local area, Field work, Study Projects, Models etc. are Part of Curriculum. Botanical Excursion (one short excursion is compulsory)

B. Sc. - SEMESTER –II BOTANY PRACTICAL

Based on Paper 1 B-BO122P

Time: 4hrs.

Max. Marks: 30

1. Identify the given **Lichen** material (A) **2 Marks**
2. Identify the given **Algal** material (B) prepare a temporary mount and write identifying characters. **4 Marks**
3. Identify the given **Algal** material (C) prepare a temporary mount and write identifying characters. **4 Marks**
4. Identify the given **Bryophytic** material (D) prepare temporary mount and write identifying characters. **4 Marks**
5. **Spotting:** **6 Marks**

E. Lichen

F. Algae.

G. Bryophyte

6. Viva-voce **5 Marks**
 7. Record and excursion report (submission is compulsory) **5 Marks**
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B. Sc. Semester-II
VSC Course Laboratory Exercise

Identification of Angiospermic Plant (B-BO123P)

Course Outcomes:

By the end of this course, the students will be able to:

1. Describe morphology of flowering plants.
2. Learn the technique of Herbarium.
3. Learn to use flora for Identification of flowering plants.
4. Learn the technique of Identification of flowering plants.
5. Understand identification of plant families

Laboratory Exercise	Hours: 4 Hours/Week	Marks: 60+40(Internal)=100	Credit: 2
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1. To study morphology of different types of Roots and its Modifications with examples
2. To study morphology of different types of Stem and its Modifications with Examples.
3. To study morphology of different types of Leaf and its Modifications
4. To study phyllotaxy and venation pattern of different leaves with locally available suitable examples.
5. Study of different types of Inflorescence- i) Racemose, 2) Cymose, 3) Special types
6. To study structure of typical flower.
7. To study accessory whorls of flower-Calyx and Corolla with modifications
8. To study essential whorls of flower Androecium and Gynoecium with Modifications.
9. To study types of fruits-Simple, aggregate and composite with suitable examples.
10. Describing commonly available flowering plant in technical language (*Hibiscus rosa-sinensis*, and *Cassia simea*).
11. Study of dicot families: Brassicaceae, Caesalpiaceae and Fabaceae.
12. Study of dicot families: Solanaceae, and Convolvulaceae.
13. Study of monocot family: Liliaceae.
14. Identification of plants by using Flora (Minimum 4 Plants).
15. Herbarium technique

Suggested activity:

Seminar, Quiz, debate, Assignments, collection of Angiospermic plant and study of higher plants preparation of herbarium and visit to local area, Field work, Study Projects, Models etc. are Part of Curriculum and considered along with attendance for Continuous Internal Evaluation (CIE)

B. Sc. - SEMESTER –II BOTANY PRACTICAL**VSEC Course Laboratory Exercise (B-BO123P)****Time: 4-6hrs.****Max. Marks: 60**

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|--|-----------------|
| 1. Describe the given plant material (A) in technical language and identify the family. | 10 Marks |
| 2. Describe the morphology and modifications of leaf/stem material (B). | 10 Marks |
| 3. Identify the inflorescence/fruit from given material (C) and describe its morphology. | 10 Marks |
| 4. Identify the given plant species (D) using flora | 10 Marks |
| 5. Spotting: | 10 Marks |
| E. Vegetative Morphology | |
| F. Floral morphology | |
| G. Accessory/Essential whorl | |
| H. Write floral formula | |
| 6. Viva-voce | 5 Marks |
| 7. Practical Record and tour report (submission is compulsory) | 5 Marks |
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B. Sc. Semester-II (B-BO124T) Indian knowledge system			
IKS- Theory	Hours: 2 Hours/Week	Marks: 30+20=50	Credits: 2
Module I			
Course Objective: <ol style="list-style-type: none"> 1) To promote interdisciplinary research on all aspects of IKS, 2) Preserve and disseminate IKS for further research and societal applications, 3) Actively engage for spreading the rich heritage of our country and traditional knowledge in the field of Arts and literature, Agriculture, Basic Sciences, Engineering & Technology, Architecture, Management, Economics, etc. 			
Course outcome: <ol style="list-style-type: none"> 1) Establish, guide and monitor subject-wise interdisciplinary research groups comprising of researchers from institutes, centers and individuals. 2) Create and promote popularization schemes. 3) Create and promote popularization schemes. 			
Module I			
History of Science in India: In this lecture, we will discuss India's contributions to the world of science are generally either under-represented or misrepresented. In this lecture, we will offer an introduction to the field, starting with a general historical context to developments in astronomy, mathematics and chemistry.			7.5 Hrs
History of Technology in India: India's technological achievements are generally better known, yet remain underrepresented. In this lecture, we will deal with agriculture, urbanism, early craft techniques and metallurgy. We will also cover topics such as constructions,			

transport, textiles, paper and writing, along with some miscellaneous technologies. Water management was given special importance and produced a variety of systems and devices.	
Module II	
India and the World – I: In this lecture, we will discuss how India has shaped the world, and how the world has shaped India. We will examine how India richly interacted with other cultures and civilization. We will explore exchanges, channels and methods of influence with Mesopotamia, Egypt and Greece.	7.5 Hrs
Module III	
India and the World – II: In this lecture, we will discuss how India has shaped the world, and how the world has shaped India. We will examine how India richly interacted with other cultures and civilization. We will discuss the exchanges with central Asia and China and with South East and Far-East Asia	
Module IV	
Ayurveda – In this lecture, we will discuss the chief characteristics of Indian medical and health tradition. We will discuss how Ayurveda is perhaps the earliest form of Integrative Medicine practiced by humanity. Historical Evolution of Medical Tradition in India: In this lecture, we will cover many health-related topics, including plural medical systems, Ayurveda and other forms of traditional Indian medicine, health and environment, religion and healing. We will trace the evolution of Indian medical tradition by discussing the prominent Ayurvedic <i>acharyas</i> and texts of the ancient period.	

References

1. Balasubramanian, A.V. and M. Radhika, 1989, Local Health Traditions : An Introduction, Chennai:
2. Lok Swasthya Parampara Samvardhan Samithi.
3. Caraka SarhhitS, Sulra Slhana, Chapter I, s'loka 120-121.
4. Chettiar, Veerasami, Undated, Vinodarasamafljar!, Chapter 10, (B. Ratha Naicker and Sons),pp. 165-67.
5. Ethnobiology in India: A Status Report, All India Coordinated Research Project on Ethnobiology (Ministry of Environment and Forests, Government of India, New Delhi), 1994.
6. Periera, Winin, 2000, "The Case of Acacia auriculaeformis," Indianet Issue, 31-34, February 2004.
7. Pillai, S.K., Thotkappiyam - Poruladhigaram (Second Part).
8. Rahika, M. and A.V. Balasubramanian, 1990, Ayurvedic Principles of Food and Nutrition, Part I,
9. Chennai: Lok Swasthya Parampara Samvardhan Samithi.
10. Raghavan, V., 1979, Prataparudriyam of Vidyanatha (ed.), Madras: Sanskrit Education Society.
11. Subramanya, Sastri P.S., (Vaidyaratna), 1944, Lectures on PatafljaU's MahSbhUsya, Vol. 1 (quoted
12. from PaspasUhnika of Patafljali's MaMbhUsya, Annamalai University. Susrulha Sarhhita, Sulra Slhana, Chapter 36, &loka 10.
13. Swaminatha Iyer, U.V., 1937, Ninaivu MafljarT, Part II, quoted from a speech of Dr. U.V. Swaminatha Iyer delivered in Madras

