PVKN GOVT. COLLEGE(A), CHITTOOR

DEPARTMENT OF BOTANY

PVKN GOVT. COLLEGE(AUTONOMOUS), CHITTOOR

Accredited with 'A' Grade by NAAC

www.pvkngcchittoor.info

CERTIFICATE COURSE

ON

"MEDICINAL PLANTS"

2019-20

(INSTITUTIONAL PERMISSION)

Certificate Course on Medicinal Plants
Department of Botany
PVKN. Govt. College (A), Chittoor
2019-20

Notification for Admission and conduct the Certificate Course

27-12-2019.

Applications are invited from the eligible candidates for admission into the Certificate Course on Medicinal Plants for aspirants for the year 2019-20.

Eligibility : Intermediate (Bi.P.C)

Fee details : Free

Duration of Course : 30 hours from 17-02-2020 to 20-03-2020

Admission Process : The prescribed application form for the admission is available in the department. The filled in applications shall be submitted to the course coordinator Dr. L. Md. Bhakshu, Certificate Course on Medicinal Plants, Department of Botany, PVKN. Govt. College (A), Chittoor.

The Admission Schedule : Last date of the receipt of application : **16-02-2020.**

Class Details : Classes of the course shall be conducted during 17-02-2020 to 20-03-2020 daily two hours from 9.00 am to 10.00 am and 4.00 pm to 5.00 pm.

The Department of Botany is permitted to conduct Certificate Course on Medicinal Plants for the year 2019-20.

PRINCIPAL
P.V.K.N. GOVT. COLLEGE,
CHITTOOR.

PVKN GOVT. COLLEGE (A), CHITTOOR

IQAC -Resolution Copy

The IQAC committee along with Chairperson and Coordinator, convened a meeting on _____ and resolved to conduct " Certificate/ Value Add-on courses " in the month of 17-02-2020 to 20-03-2020 according to the feasibility of the departments.

It is also resolved to submit the details as per the checklist well in advance by the departments who had given their consents.

Check list:

1. **IQAC Resolution**
2. **Department wise Resolution**
3. **Course structure and planning**
    a. **Date and timing schedule**
    b. **Course out comes, Syllabus and model question papers**
    c. **Feedback form**
    d. **Model Certificate**
4. **Students' enrolment list**
5. **Attendance register for 30 hours and more (Online/ Offline)**
6. **Audio visual Aids (if available), PPTs, Handouts/ Printed material**
7. **Test(Exam) and Certificate distribution**
8. **Submission of Critical Analysis Report to IQAC**

Departmental Resolution Copy

Department of BOTANY

As per the circular issued by the IQAC dated _____ the department of Botany has conducted a meeting on 07-05-2019 and unanimously resolved to conduct a Certificate / Value add-on course in the month of February and march, 2020 with the duration of a minimum of 30 hours on "MEDICINAL PLANTS" with a workload of 30Hrs and nominated Dr. L.Md. Bokshu as the course co-ordinator.

Notice Board

The department of Botany is going to conduct a certificate course on "MEDICINAL PLANTS", from 17-02-2020 to 20-03-2020 with min 30 working hours.

Interested candidates should come and register your names in the department on or before 16-02-2020

PRINCIPAL
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DEPARTMENT OF BOTANY:: PVKN GOVT. COLLEGE(A), CHITTOOR

A Certificate Course on "MEDICINAL PLANTS"

Along with study material, study assignments are provided, in total involving approximately 30 hours of work. The course is divided into 3 units with an assignment set at the end of each.

UNIT 1: INTRODUCTION AND SCOPE

- Introduction & Scope of Medicinal Botany.
- Ayurveda, Siddha & Folklore Medicinal Systems of India.
- Some common herbal practices used to cure – fever, worms, diarrhoea, cough & cold, Arthritis & rheumatism, stone in urinary tract, eczema or fungal infections.
- Market value and Employability & Cultivation of Medicinal Plants

UNIT 2: COMMON MEDICINAL PLANTS AND THEIR PROPERTIES

- Basics of Pharmacological activities of Medicinal Plants with type studies
- *Gymnema sylvestre* (Diabetes)
- *Azadirachta indica* (General treatments)
- *Curcuma longa* (Turmeric)
- *Ocimum sanctum* (Thulsi)
- *Catharanthus roseus* (billaganneru)
- *Aloe vera* (kalabanda)

UNIT 3: MEDICINAL PLANT CONSTITUENTS AND CONSERVATION

- Plant secondary metabolites of medicinal importance – Alkaloids, glycosides, mucilages & sterols (Brief account).
- Chemicals constituents in relation to Traditional uses of some important medicinal plants
- Concept of IUCN, Red Data Book, threat categories Concept of IUCN, Red List criteria, threat categories
- Conservation of medicinal plants, (In-situ and Ex-situ conservation methods); Conservation through cryopreservation

***

COURSE FEE: No Fee

Suggested Excursuses: (Internal Evaluation)

Preparation of Herbarium of 20 local Medicinal plants :	**10** marks
Documentary project report on the medicinal plants	**10** marks
Three tests (one for each unit):	**30** marks
A Written End Examination for	**50 marks**

Minimum Eligibility for Certification: 70%

Student Enrolment list:

S.No.	Name of the Student	Group	Class/ Year	Signature of the Student
1)	G.Sireesha	M.Sc	I	G.Sireesha
2)	B.K.Sowmya	M.Sc	I	B.K. Sowmya
3)	T. Pavan Kumar Reddy	M.Sc	I	T. pavan kumar Reddy
4)	V.Balasubramanyam	M.Sc	I	V. Balasubramanyam
5)	P.Mallikarjuna	M.Sc	I	P.Mallikarjuna
6)	G.A.Bhavitha	M.Sc	I	G.A. Bhavitha
7)	S.Reshma	M.Sc	I	S. Reshma
8)	Shaik Reshma	M.Sc	I	S Reshma
9)	M.Renuka	M.Sc	I	M. Renuka
10)	D.Nirosha	M.Sc	I	D. Nirosha
11)	D.Kumari	M.Sc	I	D kumari
12)	M.Aswini	M.Sc	I	M. Aswini
13)	M.Baby	M.Sc	I	M. Baby.
14)	N.Mounika	M.Sc	I	N. Mounika
15)	P.Sreelekha	M.Sc	I	P. Sreelekha
16)	S.P.Bhanusree	M.Sc	I	S.P Bhanu Sree
17)	S.Mounika	M.Sc	I	S. Mounika
18)	K.Reddi Prasanna	M.Sc	I	K. Reddi Prasanna
19)	P.Shireesha	M.Sc	I	P. Shireesha
20)	C.Mamatha	M.Sc	I	C. Mamatha

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CHITTOOR.

Time table for certificate course on Medicinal plants

S.No	Date	Day	9.00 AM - 10.00 AM	4.00 PM - 5.00 PM
01	18/2/2020	Tuesday	CMS	MH - Practical
02	19/2/2020	Wednesday	LMD	CMS
03	20/2/2020	Thursday	M.H	LMD - Practical
04	21/2/2020	Friday	CMS	MH
05	22/2/2020	Saturday	LMD	CMS
06	24/2/2020	Monday	MH	
07	25/2/2020	Tuesday	LMD	
08	26/2/2020	Wednesday	MH	MH - Practical
09	27/2/2020	Thursday	CMS	
10	28/2/2020	Friday	LMD	CMS - Practical
11	29/2/2020	Saturday	MH	
12	02/3/2020	Monday	CMS	
13	03/3/2020	Tuesday	LMD	
14	04/3/2020	Wednesday	MH	LMD - Practical
15	05/3/2020	Thursday	CMS	
16	06/3/2020	Friday	LMD	CMS - Practical
17	07/3/2020	Saturday	MH	
18	10/3/2020	Tuesday	CMS	
19	11/3/2020	Wednesday	LMD	CMS - Practical
20	12/3/2020	Thursday	MH	
21	13/3/2020	Friday	CMS	MH - Practical
22	17/3/2020	Tuesday	LMD	
23	18/3/2020	Wednesday	MH	LMD - Practical
24	19/3/2020	Thursday	CMS	
25	20/3/2020	Friday	LMD	CMS - Practical

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Scope of Medicinal Botany

INTRODUCTION AND IMPORTANCE OF MEDICINAL PLANTS AND HERBS

The term "medicinal plant" include various types of plants used in herbalism ("herbology" or "herbal medicine"). It is the use of plants for medicinal purposes, and the study of such uses.

The word "herb" has been derived from the Latin word, "herba" and an old French word "herbe". Now a days, herb refers to any part of the plant like fruit, seed, stem, bark, flower, leaf, stigma or a root, as well as a non-woody plant. Earlier, the term "herb" was only applied to non-woody plants, including those that come from trees and shrubs. These medicinal plants are also used as food, flavonoid, medicine or perfume and also in certain spiritual activities.

Plants have been used for medicinal purposes long before prehistoric period. Ancient Unani manuscripts Egyptian papyrus and Chinese writings described the use of herbs. Evidence exist that Unani Hakims, Indian Vaids and European and Mediterranean cultures were using herbs for over 4000 years as medicine. Indigenous cultures such as Rome, Egypt, Iran, Africa and America used herbs in their healing rituals, while other developed traditional medical systems such as Unani, Ayurveda and Chinese Medicine in which herbal therapies were used systematically.

Traditional systems of medicine continue to be widely practised on many accounts. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several synthetic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments.

Among ancient civilisations, India has been known to be rich repository of medicinal plants. The forest in India is the principal repository of large number of medicinal and aromatic plants, which largely collected as raw materials for manufacture of drugs and perfumery products. About 8,000 herbal remedies have been codified in AYUSH systems in INDIA. Ayurveda, Unani, Siddha and Folk (tribal) medicines are the major systems of indigenous medicines. Among these systems, Ayurveda and Unani Medicine are most developed and widely practised in India.

Recently, WHO (World Health Organization) estimated that 80 percent of people worldwide rely on herbal medicines for some aspect of their primary health care needs. According to WHO, around 21,000 plant species have the potential for being used as medicinal plants.

As per data available over three-quarters of the world population relies mainly on plants and plant extracts for their health care needs. More than 30% of the entire plant species, at one time or other were used for medicinal purposes. It has been estimated, that developed countries such as United States, plant drugs constitute as much as 25% of the total drugs, while in fast developing countries such as India and China, the contribution is as much as 80%. Thus, the economic importance of medicinal plants is much more to countries soch as India than to rest of the world. These countries provide two third of the plants used in modern system of medicine and the health care system of rural population depend on indigenous systems of medicine.

Treatment with medicinal plants is considered very safe as there is no or minimal side

effects. These remedies are in syne with nature, which is the biggest advantage. The golden fact is that, use of herbal treatments is independent of any age groups and the sexes. The ancient scholars only believed that herbs are only solutions to cure a number of health related problems and diseases. They conducted thorough study about the same. experimented to arrive at accurate conclusions about the efficacy of different herbs that have medicinal value. Most of the drugs, thus formulated, are free of side effects or reactions. This is the reason why herbal treatment is growing in popularity across the globe. These herbs that have medicinal quality provide rational means for the treatment of many internal diseases, which are otherwise considered difficult to cure.

Medicinal plants such as Aloe, Tulsi, Neem, Turmeric and Ginger cure several common ailments. These are considered as home remedies in many parts of the country. It is known fact that lots of consumers are using Basil (Tulsi) for making medicines, black tea, in pooja and other activities in their day to day life.

In several parts of the world many herbs are used to honour their kings showing it as a symbol of luck. Now, after finding the role of herbs in medicine, lots of consumers started the plantation of tulsi and other medicinal plants in their home gardens.

Medicinal plants are considered as a rich resources of ingredients which can be used in drug development either pharmacopoeial, non- pharmacopoeial or synthetic drugs. A part from that, these plants play a critical role in the development of human cultures around the whole world. Moreover, some plants are considered as important source of nutrition and as a result of that they are recommended for their therapeutic values. Some of these plants include ginger, green tea, walnuts, aloe, pepper and turmeric etc. Some plants and their derivatives are considered as important source for active ingredients which are used in aspirin and toothpaste etc.

Apart from the medicinal uses, herbs are also used in natural dye, pest control, food, perfume, tea and so on. In many countries different kinds of medicinal plants/ herbs are used to keep ants, flies, mice and flee away from homes and offices. Now a days medicinal herbs are important sources for pharmaceutical manufacturing.

Recipes for the treatment of common ailments such as diarrhoea, constipation, hypertension, low sperm count, dysentery and weak penile erection, piles, coated tongue, menstrual disorders, bronchial asthma, leucorrhoea and fevers are given by the traditional medicine practitioners very effectively.

In Over the past two decades, there has been a tremendous increase in the use of herbal medicine; however, there is still a significant lack of research data in this field. Therefore since 1999, WHO has published three volumes of the WHO monographs on selected medicinal plants.

Importance of some herbs with their medicinal values:

Herbs such as black pepper, cinnamon, myrrh, aloe, sandalwood, ginseng, red clover, burdock, bayberry, and safflower are used to heal wounds, sores and boils.

Basil, Fennel, Chives, Cilantro, Apple Mint, Thyme, Golden Oregano, Variegated Lemon Balm, Rosemary, Variegated Sage are some important medicinal herbs and can be planted in kitchen garden. These herbs are easy to grow, look good, taste and smell amazing and many of them are magnets for bees and butterflies.

Many herbs are used as blood purifiers to alter or change a long-standing condition by eliminating the metabolic toxins. These are also known as 'blood cleansers'. Certain herbs improve the immunity of the person, thereby reducing conditions such fever.

Some herbs are also having antibiotic properties. Turmeric is useful in inhibiting the growth of germs, harmful microbes and bacteria. Turmeric is widely used as a home remedy to heal cut and wounds.

To reduce fever and the production of heat caused by the condition, certain antipyretic herbs such as Chirayta, black pepper, sandal wood and safflower are recommended by traditional Indian medicine practitioners.

Sandalwood and Cinnamon are great astringents apart from being aromatic. Sandalwood is especially used in arresting the discharge of blood, mucus etc.

Some herbs are used to neutralize the acid produced by the stomach. Herbs such as marshmallow root and leaf. They serve as antacids. The healthy gastric acid needed for proper digestion is retained by such herbs.

Indian sages were known to have remedies from plants which act against poisons from animals and snake bites.

Herbs like Cardamom and Coriander are renowned for their appetizing qualities. Other aromatic herbs such as peppermint, cloves and turmeric add a pleasant aroma to the food, thereby increasing the taste of the meal.

Some like aloe, sandalwood, turmeric, sheetraj hindi and khare khasak are commonly used as antiseptic and are very high in their medicinal values. Ginger and cloves are used in certain cough syrups. They are known for their expectorant property, which promotes the thinning and ejection of mucus from the lungs, trachea and bronchi. Eucalyptus, Cardamom, Wild cherry and cloves are also expectorants. Herbs such as Chamomile, Calamus, Ajwain, Basil, Cardamom, Chrysanthemum, Coriander, Fennel, Peppermint and Spearmint, Cinnamon, Ginger and Turmeric are helpful in promoting good blood circulation. Therefore, they are used as cardiac stimulants. Certain medicinal herbs have disinfectant property, which destroys disease causing germs. They also inhibit the growth of pathogenic microbes that cause communicable diseases.

Herbal medicine practitioners recommend calmative herbs, which provide a soothing effect to the body. They are often used as sedatives. Certain aromatic plants such as Aloe, Golden seal, Barberry and Chirayata are used as mild tonies. The bitter taste of such plants reduces toxins in blood. They are helpful in destroying infection as well. Certain herbs are used as stimulants to increase the activity of a system or an organ, for example herbs like Cayenne (Lal Mirch, Myrrh, Camphor and Guggul.

A wide variety of herbs including Giloe, Golden seal, Aloe and Barberry are used as tonics. They can also be nutritive and rejuvenate a healthy as well as diseased individual. Honey, turmeric, marshmallow and liquorice can effectively treat a fresh cut and wound. They are termed as vulnerary herbs.

PHARMACOGNOSY & CHEMICAL AND PHARMACOLOGICAL CLASSIFICATION CRUDE DRUGS

Pharmacognosy:

Pharmacognosy is the study of medicinal uses of various naturally occurring drugs its history, sources, distribution, method of cultivation, active constituents, medicinal uses, identification test, preservation methods, substituents and adulterants.

Crude Drug:

The term crude drug generally applied to products of either plant or animal origin. Most of the crude drugs are plant in origin very few are animal in origin. Crude drug consists of definite plant parts such as leaf, flower, fruit, seed, wood, bark and root etc. Crude drugs may also be obtained by simple physical process like drying [aloe from dried leafy juice of Aloe, opium is the dried latex from poppy capsulel or extraction with water (black catechu from the wood of Acacia catechu). Drugs should collected during definite season, at particular time of the day and at some special stage of development.

Eg: 1. Ephedra and drugs of roots and rhizomes are collected in Autumn.

2. Leaf drugs are collected during the flowering season.

3. Hyoscyamus, Belladona (Solanaceae) are collected in the morning and during dry weather.

4. Clove is collected in bud condition.

Classification of crude drugs:

1. Chemical classification: Crude drugs are classified based on the active principle present in the plant. Irrespective of the morphological characters, the drugs with similar chemical constituents are grouped in to the same group.

Chemical Constituent Group	Example
Alkaloids	Nicotiana, Belladona, Cinchona, Opium
Glycosides	Senna leaves, Aloe, Glycyrriza
Carbohydrates and Organic acids	Sodium alginate, Tragacanth
Volatile oils	Cinnamon bark, Nut meg, Cardamom, Clove
Resins	Colopony, Balsam of Peru, Asafoetida
Tannins	Catechu, Myrobalan, Amla, Tea
Enzymes	Diastase, Papain, Pepsin, Trypsin
Lipids	Bee wax, Kokum butter, Lanolin
Esters	Pyrethrum
Antibiotics	Pencillins, Cephalosporins

2. Pharmacological classification : (Grouping of drugs according to their pharmacological action or of the most important constituent or therapeutic use). This classification is also known as therapeutic classification.

S.No	Pharmacological Category	Example
01	Drugs acting on gastro intestinal tract Bitters Carminative Emetics	Cinchona Metha, Cardamom, Fennel Ipecacuanha
02	Drugs acting on respiratory system Expectorant Bonchodilators	Vasaka, Liquorice, Ipecacuanha, Eperda, Tea
03	Drugs acting on central nervous system CNS stimulant Analeptic Hallucinogenics	 Tea, Coffee Nux vomica, Lobelia, Camphor Cannabis, Poppylatex
04	Drugs acting on Cardio vascular system Cardiotonic Cardio depressants Antihypertensive	Digitalis, Squill, Strophanthus Cinchona, Veratrum Rauwolfia
05	Drugs acting on autonomic nervous system Adrenergic Cholinergic	Ephedra Physostigma, Pilocarpus
06	Antispasmodic	Datura, Hyoseyamus, Opium
07	Anti Cancer	Vinca, Podophyllum, Taxus
08	Anti Rehumatic	Aconite, Colchicum, Guggul
09	Anthelmintic	Male fern, Vidang
10	Astringent	Catechu, Myrobalans
11	Anti Malarials	Cinchona, Artemisia
12	Immunomodulatory	Ginsen, Ashwagandha
13	Immunizing Agent	Vaccines, Sera, Toxoids, Anti toxins
14	Dru acting on skin membrane	Bees wax, Wool fat
15	Chemotherapeutics	Anti biotics
16	Local Anaesthetics	Coca

ORGANOLEPTIC AND MICROSCOPIC EVALUATION OF CRUDE DRUGS

Evaluation means determining the identity, purity and starch gr quality or activity of the drug. The crude drugs can be identified on the basis of their morphological, histological, chemical, physical and biological studies.

1. Narcoleptic evaluation :

Narcoleptic means evaluation starch gr of drugs by colour, odour, taste, size, shape, occasionally the sound snap of its fracture and the feel of the drug to touch. Organoleptię stalks po analysis represents the simplest, yet the most human form of analysis.

Ex: (a) Pungent taste of Ginger and Capsicum.

(b) Aromatic oduour of umbelliferous fruits.

(c) Ovoid shape of gum acacia.

(d) Morphologial differentiation of Indian senna and Alexandrian senna.

(e) Sweet taste of liquorice.

(f) Disc-shaped seeds of nux-vomica.

(g) Fractured surfaces in Chincona and Quillaia.

2. Microscopic evaluation:

Microscopic evaluation is insensible in the identification of herbs, as well as identifying small fragments of crude or powdered herbs, and in the detection of adulterants. This method allows a more detailed examination of a drug and it can be used to identify organised drugs by their known histological characters.

Histological study can be carried out by marking thin section (transfer section or longitudinal section). Then the thin section in stained with solution according to the type of element and ther examine under the microscope. The microscopical examination d powdered drugs depend on presence or absence of certain cells (e) P d C important tissue elements such as stone cells, fibers or depends on cells element when such as starch grains, oil droplets, calcium oxalate, crystali method aleurones grains.

The techniques like microscopic linear measurements, determination of leaf constants and quantitative microscopy are also used in this evaluation.

A. Linear measurements: Linear measurements include size of starch grains, length and width of fibres, trichomes etc.,

Eg: (i) The diameter of different starch grains assists in distinguishing different varieties of Ipecacuanha. The diameter of starch grains in Cassia bark distinguished from Cinnamon.

(ii) The diameter of starch grains helps in detection of senna stalks powdered senna leaf.

B. Leaf constants: Determination of leaf constants include stomatal number, stomal index, Vein islet, Vein termination number and Palisade ratios.

(a) Stomatal number: Stomata are minute pores present on the leaf. The stomatal number is average number of stomata per. sq. mm. of epidermis of the leaf.

(b) Stomatal index: It is the percentage which the number of stomata formed to the total number of epidermal cells ,each stoma being counted as one cell.

(c) Vein Islet number: It is defined as the number of vein islets per sq.mm. of the leaf surface midway between the midrib and the margin.

(d) Vienlet termination number: Vein termination is the ultimate free termination of veinlet. It is defined as the number of veinlet termination per sq.mm. of the leaf surface midway between the midrib and margin.

(e) Palisade Ratio: It is defined as average number of palisad cell. beneath each epidermal cell. Palisade ratio can be determined with powdered drug.

C. Quantitative microscopy /Lycopodium method: This is are important technique employed in identification of powdered drug when chemical and physical methods are inapplicable. Using this method, one can determine the proportions of the substances present by means of the microscope using the Lycopodium spore method .Lycopodium spores are very characteristic in shape and appearance and exceptionally uniform in size .A powdered drug is evaluated by this technique, if contains.

1. Countable well defined particle eg: Starch grains or Pollen gains.

2. Single layered cells or tissues, the area of which may be traced under suitable magnification or the objects of uniform thickness and the length of which can be measurable under suitable magnification and actual area calculated.

Adulterated starchy drugs can be determined by counting the number of starch grains per mg and calculating the amount from the known number of starch grains per mg of the pure starch or starchy material.

Thus if Spent Ginger is the adulterant, one knows that ginger contains 2,86000 starch grains per mg and the amount used as an adulterant can also be calculated. The percentage of purity of an authenticated powdered ginger is calculated using the following equation.

NW * 94000SxMxPx 100% = purity of drugs

Where

N = Number of characterstic structure (e.g.stach grains) in 2fields,

W = Weight in mg of Lycopodium taken

S = Number of Lycopodium spores in the same 2 fields,

M = Weight in mg of the sample, calculated on basis of sample dried at 105° C and

P = 286 in case of ginger starch grains powder.

Lycopodium spore method can be used for evaluation of powdered clove, ginger, cardamom, nut meg, umbelliferous fruits etc.

PHYSICAL EVALUATION OF CRUDE DRUGS.

Physical methods are often used to determine the solubility, specific gravity, optical rotation, viscosity, refractive index, melting point, water content, and degree of fibre elasticity and other physical characteristics of the herbal material

(a) **Moisture content**: The moisture content of drug favours the growth of microbes which deteriorate the quality of drug by microbial enzymes. So the moisture content of drug should be determined and should also be controlled. Moisture content also vary with the type of drug. The moisture content is determined by heating a drug at 105° C in an oven to constant weight. Eg: Digitalis not more than 5% (w/w) and Aloe not more than 10% (w/w).

(b) Viscosity: Viscosity is the resistance of a fluid to flow. Viscosity of a liquid is constant at a given temperature and is an index of its composition. Hence it can be used as means of standardizing

liquid drugs. Eg: Pyroxylin kinematic viscosity

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05	Drugs acting on autonomic nervous system Adrenergic Cholinergic	Ephedra Physostigma, Pilocarpus
06	Antispasmodic	Datura, Hyoseyamus, Opium
07	Anti Cancer	Vinca, Podophyllum, Taxus
08	Anti Rehumatic	Aconite, Colchicum, Guggul
09	Anthelmintic	Male fern, Vidang
10	Astringent	Catechu, Myrobalans
11	Anti Malarials	Cinchona, Artemisia
12	Immunomodulatory	Ginsen, Ashwagandha
13	Immunizing Agent	Vaccines, Sera, Toxoids, Anti toxins
14	Dru acting on skin membrane	Bees wax, Wool fat
15	Chemotherapeutics	Anti biotics
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(g) Fractured surfaces in Chincona and Quillaia.

2. Microscopic evaluation

Microscopic evaluation is insensible in the identification of herbs, as well as identifying small fragments of crude or powdered herbs, and in the detection of adulterants. This method allows a more detailed examination of a drug and it can be used to identify organised drugs by their known histological characters.

Histological study can be carried out by marking thin section (transfer section or longitudinal section). Then the thin section in stained with solution according to the type of element and ther examine under the microscope. The microscopical examination d powdered drugs depend on presence or absence of certain cells (e) P d C important tissue elements such as stone cells, fibers or depends on cells element when such as starch grains, oil droplets, calcium oxalate, crystali method aleurones grains.

The techniques like microscopic linear measurements, determination of leaf constants and quantitative microscopy are also used in this evaluation.

A. Linear measurements: Linear measurements include size of starch grains, length and width of fibres, trichomes etc.,

Eg: (i) The diameter of different starch grains assists in distinguishing different varieties of Ipecacuanha. The diameter of starch grains in Cassia bark distinguished from Cinnamon.

(ii) The diameter of starch grains helps in detection of senna stalks powdered senna leaf.

B. Leaf constants: Determination of leaf constants include stomatal number, stomal index, Vein islet, Vein termination number and Palisade ratios.

(a) Stomatal number: Stomata are minute pores present on the leaf. The stomatal number is average number of stomata per. sq. mm. of epidermis of the leaf.

(b) Stomatal index: It is the percentage which the number of stomata formed to the total number of epidermal cells ,each stoma being counted as one cell.

(c) Vein Islet number: It is defined as the number of vein islets per sq.mm. of the leaf surface midway between the midrib and the margin.

(d) Vienlet termination number: Vein termination is the ultimate free termination of veinlet. It is defined as the number of veinlet termination per sq.mm. of the leaf surface midway between the midrib and margin.

(e) Palisade Ratio: It is defined as average number of palisad cell. beneath each epidermal cell. Palisade ratio can be determined with powdered drug.

C. Quantitative microscopy /Lycopodium method: This is are important technique employed in identification of powdered drug when chemical and physical methods are inapplicable. Using this method, one can determine the proportions of the substances present by means of the

microscope using the Lycopodium spore method .Lycopodium spores are very characteristic in shape and appearance and exceptionally uniform in size .A powdered drug is evaluated by this technique, if contains.

1. Countable well defined particle eg: Starch grains or Pollen gains.

2. Single layered cells or tissues, the area of which may be traced under suitable magnification or the objects of uniform thickness and the length of which can be measurable under suitable magnification and actual area calculated.

Adulterated starchy drugs can be determined by counting the number of starch grains per mg and calculating the amount from the known number of starch grains per mg of the pure starch or starchy material.

Thus if Spent Ginger is the adulterant, one knows that ginger contains 2,86000 starch grains per mg and the amount used as an adulterant can also be calculated. The percentage of purity of an authenticated powdered ginger is calculated using the following equation.

NW * 94000SxMxPx 100% = purity of drugs

Where

N = Number of characterstic structure (e.g.stach grains) in 2fields,

W = Weight in mg of Lycopodium taken

S = Number of Lycopodium spores in the same 2 fields,

M = Weight in mg of the sample, calculated on basis of sample dried at 105° C and

P = 286 in case of ginger starch grains powder.

Lycopodium spore method can be used for evaluation of powdered clove, ginger, cardamom, nut meg, umbelliferous fruits etc.

PHYSICAL EVALUATION OF CRUDE DRUGS.

Physical methods are often used to determine the solubility, specific gravity, optical rotation, viscosity, refractive index, melting point, water content, and degree of fibre elasticity and other physical characteristics of the herbal material

(a) Moisture content: The moisture content of drug favours the growth of microbes which deteriorate the quality of drug by microbial enzymes. So the moisture content of drug should be determined and should also be controlled. Moisture content also vary with the type of drug. The moisture content is determined by heating a drug at 105° C in an oven to constant weight. Eg: Digitalis not more than 5% (w/w) and Aloe not more than 10% (w/w).

(b) Viscosity: Viscosity is the resistance of a fluid to flow. Viscosity of a liquid is constant at a given temperature and is an index of its composition. Hence it can be used as means of standardizing liquid drugs. Eg: Pyroxylin kinematic viscosity

(c) Melting Point: The melting point of a solid is the temperature at which it changes state from solid to liquid. Plant constituents have very sharp and constant melting points. Eg: Colophony-75-85° C

(d) Solubility: The presence of adulterant in a drug could be indicated by solubility studies. This is useful for the examination of many oils, oleoresins etc

.S.NO	DRUG	SOLUBILITY
1	Alkaloid bases	Chloroform
2	Alkaloid salts	Polar solvents
3	Glycosides	alcohol &water

(e) Optical Rotation: Many substances of biological origin, having a chiral centre can rotate the plane of polarized light either to right (Dextro rotatory) or to the left (Laevo rotaroty). The extent of rotation is expressed in degrees, plus (+) indicating rotation to the right and minus (-) indication rotation to the left. Such compounds are optically active and hence called optical rotation.

S.NO	DRUG	ANGLES OF OPTICAL ROTATION
1	Caraway oil	+75 to+80
2	Eucalyptus oil	0to+10
3	Chenopodium oil	-30 to -8

(f) Refractive index: Refractive index is defined as the property of a material that changes the speed of light, computed as the ratio of the speed of light in a vacuum to the speed of light through the material. Refractive index of a compound varies with the wavelength of the incident light, temperature and pressure.

S.NO	DRUG	REFRACTIVE INDEX
1	Arachis oil	1.4678to 10470
2	Castor oil	104758 to10527
3	Clove oil	1.527 to 10535

(g) Ash Values: The residue remaining after incineration is the ash content of the drug which simply represents inorganic salts, naturally occurring in drug or adhering to it or deliberately added to it, as a form of adulteration. Different types of ash values are used in detection of crude drugs like, total ash, acid-insoluble ash, water soluble ash and sulphated ash.

1. Total ash is useful in detecting the crude drugs that are mixed with sand, soil, calcium oxalate, chalk powder

2. The ash insoluble in dilute hydrochloric acid is called Acid insoluble ash. It is often of more value than the total ash. The calcium oxide or carbonate, yielded by the incinerated oxalate, will be soluble in hydrochloric acid when the ash is treated with hydrochloric acid; remaining ash is weighed, which is known as the acid in-soluble ash.

3. Water soluble ash is used to detect the presence of material exhausted by water.

4. Sulphated ash is done by addition of sulphuric acid in order to get sulphate salts, and the

percentage of ash is calculated with reference to the air-dried drug.

Eg: The total ash values of Ginger-6% Water-soluble ash values of Ginger-1.7%

(a) Specific gravity: Specific gravity is almost known as relative density. It is the ratio of the mass of liquid or solid to the mass of an equal volume of distilled water at 4°C.Eg: Castor oil-0.95

(b) Extractive values: The extracts obtained by exhausting crude drugs with different solvents are approximate measures of their chemical constituents. Various solvents are used according to the type of the constituents to be analysed. Water soluble extractives-This method is applied to drugs which contain water soluble active constituents of crude drugs such as glycosides, tannins, mucilage etc., Ether soluble extractives This method is used for the extraction of volatile oils and fixed oils.

(c) Foreign organic matter: They may be insect, mould, earthy matter, animal excreta etc. Each and every vegetable drug has their own limits of foreign organic matter. Eg: Garlic should not contain more than 2%, saffron should not contain more than 2%, Shatavari should not contain more than 1%

ORGANOLEPTIC AND MICROSCOPIC STUDIES

PRINCIPLES AND COMMON ADULTERANTS OF *ALSTONIA SCHLOARIS* BARK:

Narcoleptic means being, affecting or relating to qualities such as taste, color, odor, and feel of a substance that stimulates the sense organs. Microscopic characters include the anatomical details of drug producing plant as seen in transverse, longitudinal sections, maceration study and the size measurement of various types of cells.

Botanical Name: Alstonia scholaris

Family: Apocyanaceae

Common Name: Dita bark, Devil tree

Vernacular Name: Yedakula ponna

Biological Source: Bark

Botanical description: Alstonia scholaris is an elegan evergreen tree, found in most parts of India. All parts of the tree can be considered poisonous. It is a tall elegant tree with greyish rough bark. Branches are whorled, and so are the leaves, i.e., several of them coming out of the same point.

Narcoleptic studies (Bark): Young bark curved is channelled or occasionally quilled or double quilled, 3-4 mm in thickness, externally very rough, longitudinally and transversely fissured; rusty grey, marked with transversely elongated white lenticels, thick cork often getting exfoliated with an exposure of cream coloured cortex, internally dark-greyish brown, irregular longitudinally striated; fracture splintery exposing a soft somewhat spongy tissue. Odour mild and pleasant; taste persistently bitter and gritty.

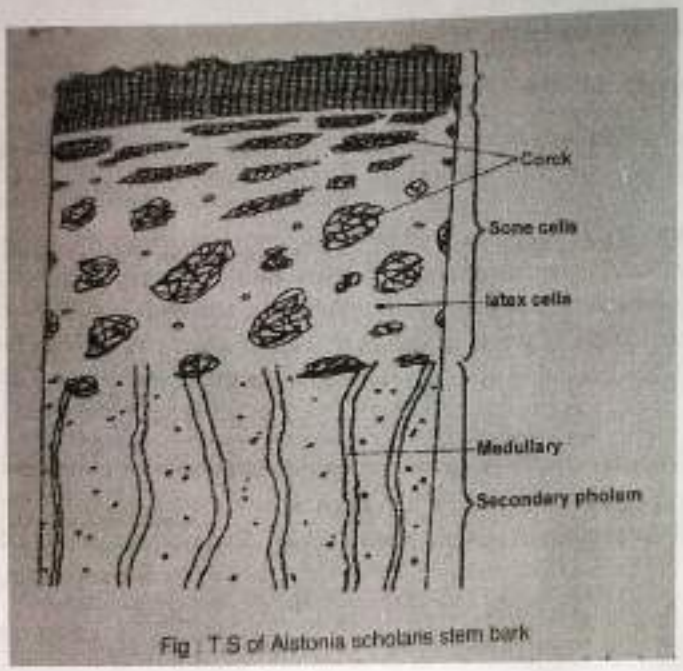
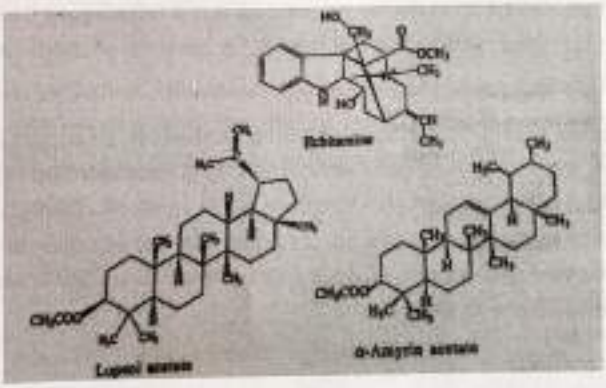


Fig : T.S of Alstonia scholaris stem bark

Microscopic studies (Bark): Transverse section of the bark showed three distinct regions, cork, cork cambium and secondary cortex. The cork was multilayered made up of thick cork cells. The cork cambium forms a narrow zone made up of 2-3 layers of cells. Followed by cork cambium a broad zone of secondary cortex was present composed of parenchymatous cells. Secondary cortex showed presence of numerous prismatic crystals of calcium oxalate, traversed by laticiferous canals and sclereids of various size, shapes and thickness forming groups of 2 to 20, occasionally running in the form of bands, associated with idioblasts; non lignified fibres.

Active Principles: Alkaloids are one of the major constituents of the species. Among different alkaloids, Echitamine, Echitamine chloride are most important. Lupeol acetate, Alstonic acids A and B, amyrin acetate and ursolic acid have also been recorded.



Pharmacology: Bark is used in traditional medicine to treat dysentery and fever. In Ayurveda, it is used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite and for upper purification process of Panchakarma. The milky juice of the tree is applied to ulcers.

Adulterants: The cannot be made easily adulterated because of its peculiar lenticels. Some times adulterated with Cratavea sps bark.

PRINCIPLES AND COMMON ADULTERANTS OF *ADHATODA VASICA.*

Botanical Name: Adhatoda vasica

Family: Acanthaceae

Common Name: Malbar Nut Tree

Vernacular Name: Addasaram

Biological Source: Leaves

Botanical description: Bushy shrub with foetid smell.

Leaves elliptic to lanceolate. Flowers white, throat red or yellow, in axillary and terminal spikes. Narcoleptic studies (Leaves): The leaves are entire when fresh and crumped or broken when dried. Shape is lanceolate-ovate, crenate to entire margin, acuminate apex, base tapering. The leaves are broad, pinnate venation, glabrous or slightly pubescent green when fresh, on drying the colour changes from brown to grey.

Microscopic studies (Leaf): Leaf shows dorsiventral structure with two layers of palisade cells below upper epidermis. Epidermis shows caryophyllaceous stomata with sinous epidermal cells, with glandular tichomes with unicellular stalk and four celled head. One to five celled uniseriate trichomes are also present in few number. Mesophyll contains prismatic and acicular crystals of calcium oxalate.

Chemical constituents (Active Principle): Vasaka contains several alkaloids but the major includes Quinazoline derivatives such as Vasicine, Vasicinone, 6-hydroxyvasicine and adhatonine. The drug also contains volatile oil, betalin and vasakin. It is also reported that vasaka contains adhatodic acid are also present in few number. Mesophyll contains prismatic and acicular crystals of calcium oxalate.

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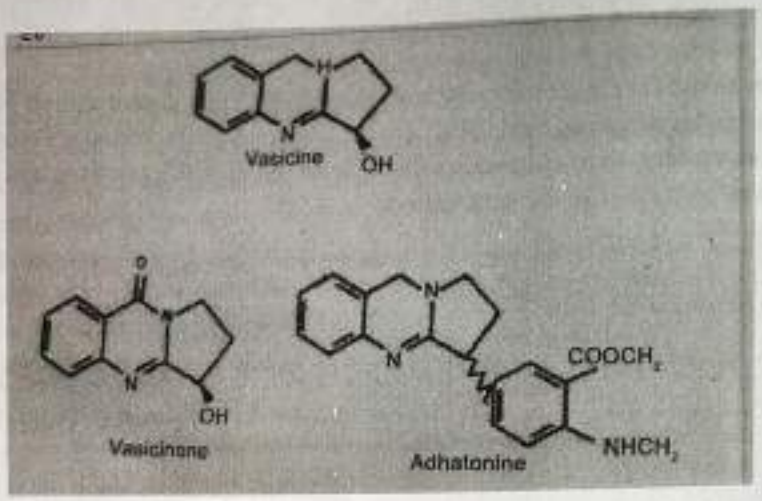


Pharmacology: Vasaka is used as expectorant and bronchodilator. The leaf extract has been used for treatment of bronchitis and asthma for many centuries. It relieves cough and breathlessness. It is also prescribed commonly in Ayurveda for bleeding due to idiopathic thrombocytopenic purpura, local bleeding due to peptic ulcer, piles, menorrhagia etc. Large doses of fresh juice of leaves have been used in tuberculosis.

Adulterants: Can be adulterated with leaves of Justicia sps, Adathoda beddomei leaves.

ACTIVE PRINCIPLES AND COMMON ADULTERANTS OF *STRYCHNOS NUX VOMICA*.

Botanical Name: *Strychnos nux-vomica*

Family: Loganiaceae

Common Name: Poison Nut, Semen strychnos, Bachelor's button, Vomit nut,

Vernacular Name : Visha muhsti, Mushti

Biological source: Seeds

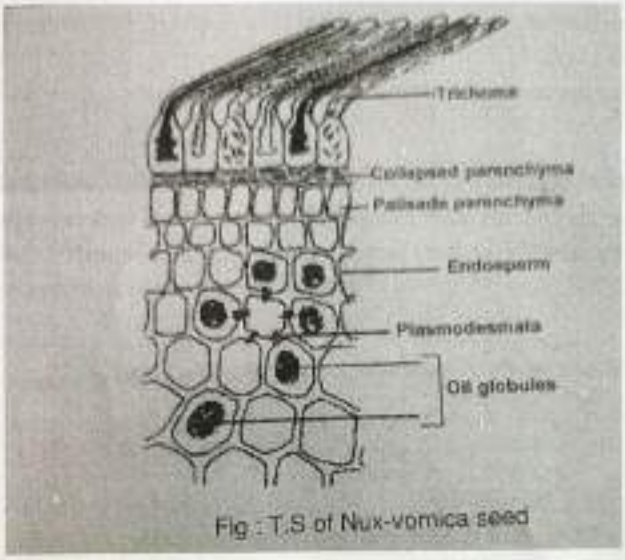
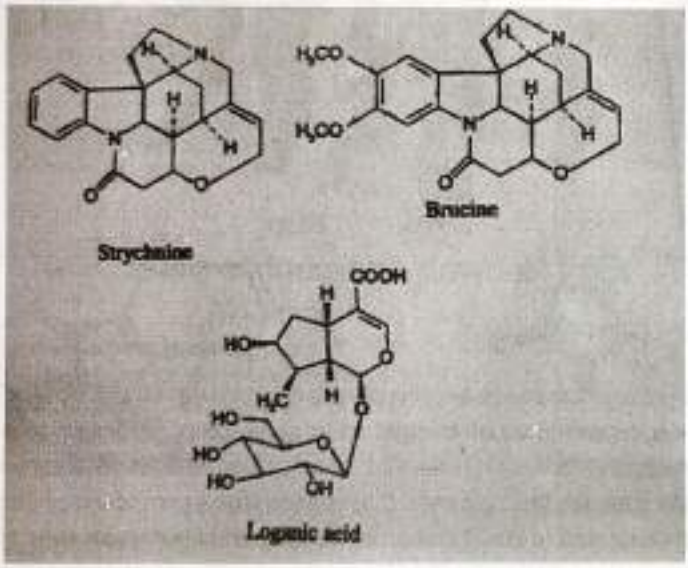


Fig : T.S of Nux-vomica seed

Botanical description: A medium sized tree with a short, crooked, thick trunk, the wood is white hard; closely grained, durable and the root very bitter. Branches are covered with a smooth ash-coloured bark. Leaves opposite, oval, shiny, smooth on bothsides. Flowers small, greenish white, funnel shaped, in small terminal cymes. Fruit with smooth hard rind or shell which when ripe is a lovely orange coloured, rilled with a soft white jelly like pulp containing five seeds.Narcoleptic **studies (Seeds)**: Seeds are covered with a soft wooly like substance, white and horny internally. Seeds are disc shaped, densely covered with closely appressed satiny hairs. Hairs radiating from the centre of the flattened sides and giving to the seeds a characteristic shine. Seed are very hard with a dark grey horny endosperm in which small embryo embedded in; no odour but very bitter in taste.

Microscopy (Seed): The testa is thick walled covered with twisted lignified trichomes. The base of trichome is large with slit like pits. The upper part of the trichome is nearly at right angles to the base and has wavy walls. Endosperm is composed of a thick walled cellulosic parenchyma. The walls mainly composed of hemicellulose and swell considerably in water with polygonal lumen and plasmodesmata. Aleuron grains and fixed oils are present in endosperm and embryo.

Chemical Constituents (Active principle): Nux-vomica seedscontain alkaloids strychnine, brucine, also traces of strychnicine, andalso traces of a glucoside Loganin and Caffeotannic acid. Strychnineis therapeutically active and toxic alkaloid. Brucine is chemicallydimethoxy strychnine and is less toxic.



Pharmacology: The seeds are alexiteric, appetizer, aphrodisiac, anthelmintic, purgative, nervine tonic and CNS stimulant.

Adulterants: Strychnos nux vomica seeds are commonly adulterated with seeds of Strychnos potatorum, S.nux blanda.

PRINCIPLES AND COMMON ADULTERANTS OF *RAUWOLFIA SERPENTINE.*

Botanical Name: Rauwolfia serpentina

Family: Apocynaceae

Common Name: Indian sanke root, Serpentine root

Vernacular Name: Sarpagandha, Pathalagandhi

Biological source: Root

Botanical Description: Rauwolfia serpentiana is a shrubby plant with leaves in three whorls. Flowers white in axillary corymbs. Drupe purpulish-black with single ovoid seed.

Narcoleptic studies (Roots): Dried roots are Sub cylindrical to subcylindrical, tortuous, stout, yellowish brown. The outer surface is greyish-yellow, light-brown or brown. Young pieces contain slight wrinkles while old pieces have longitudinal ridges. Fracture is short, fractured surface smooth, yellowish buff in colour. Odour indistinct, taste bitter.

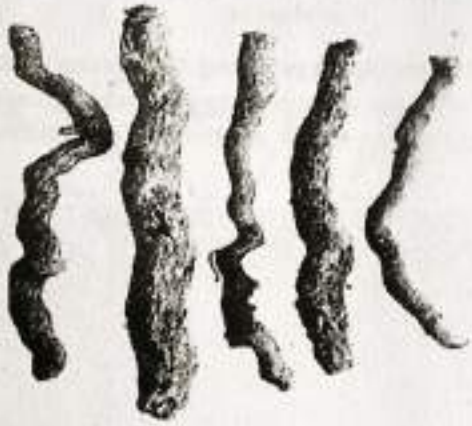
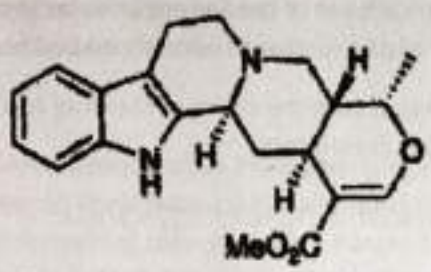
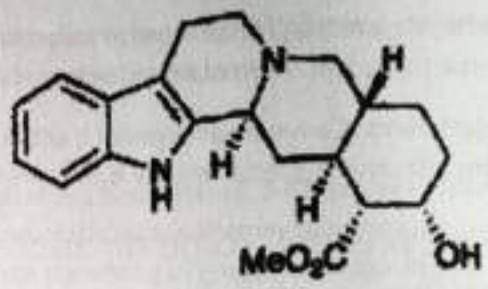


Fig : Rauwolfia serpentina-Root

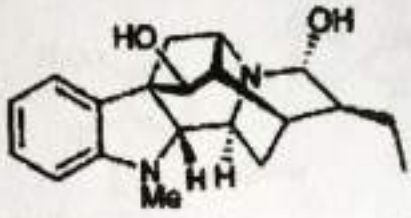
Microscopic studies (Root): Transverse section of root is circular to oval in outline, shows a stratified cork, which is divided into two to eight alternating zones. It consists of one to seven layers of smaller and radially narrower, suberized, non lignified cells alternating with one to three layers of larger radially broader, lignified cells. The phelloderm is composed of about ten to twelve layers of tangentially elongated to isodiametric, cellulosic parenchymatous cells and with small sized twin prismatic crystalsof calcium oxalate. Cells of secondary cortex are parenchymatous and contain starch grains, simple and compound, spherical with a distinct hilum in the form of a split. Phloem is narrow and consists of parenchyma with scattered sieve tissue; parenchyma alternate with broader medullary rays composed of large cells and usually two to four cells wide. Xylem lignified, composed of few, small sized isolated or radially arranged xylem vessels, tracheids and fibres alternating with uni or multi seriate medullary rays, parenchymatous cells are pitted and embedded with starch grains.



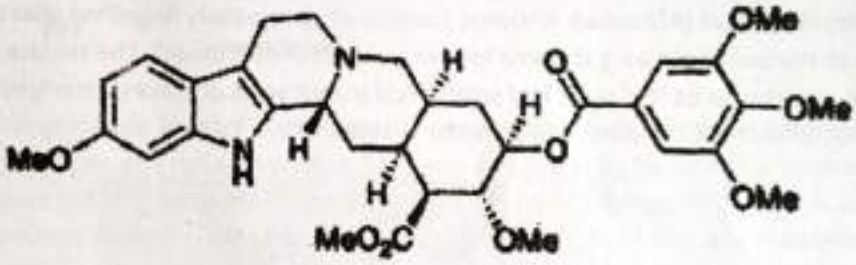
ajmallicine



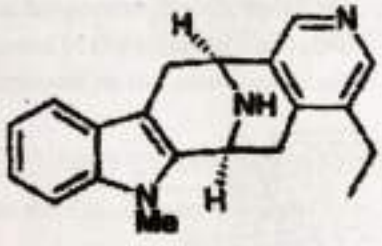
yohimbine



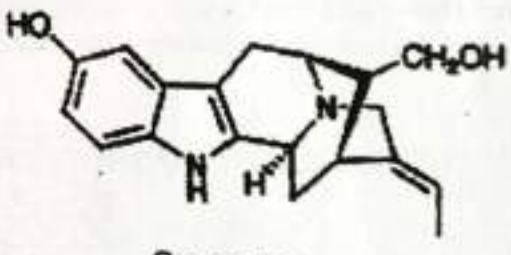
ajmaline



reserpine



suavecline



Sarpagine

Chemical constituents (Active Principle): Rauwolfia contains resinous matter and more than 80 alkaloids. Alkaloids are mostly concentrated in the bark of roots. The rhizome also contain small amounts of phytosterol, fatty acids, unsaturated alcohols etc. The main chemical constituents are Reserpine, Rescinnamine, Serpentine, Ajmaline, Ajmalicine, Deserpidine, Syrosingopine etc.,

Pharmacology: Rauwolfia is used as hypnotic, sedative and antihypertensive. It is specific for insanity and reduces blood pressure. It is given in labours to increase uterine contractions and in certain neuropsychiatric disorders. Ajmaline, which has pharmacological properties similar to

those of quinidine, is marketed in Japan for the treatment of cardiac arrhythmias. Ajmalicine used in the treatment of circulatory diseases, in relief of obstruction of normal cerebral blood flow.

Adulterants: Commercial material is often adultrated with the stems of the drug and roots of other Rauwolfia speices mainly R.tetraphylla and R.densifolora.

Principles and common adulterants of *Zingiber officinale.*

Botanical Name: Zingiber officinale

Family: Zingiberaceae

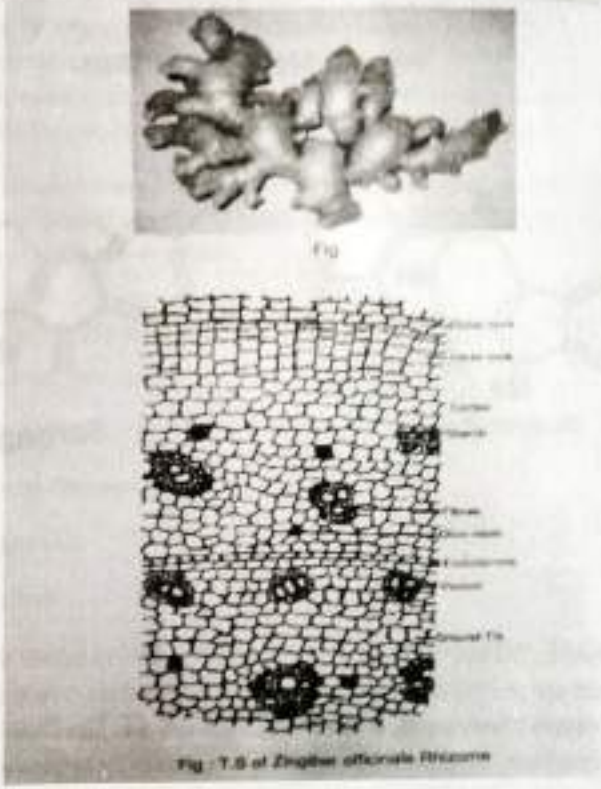
Common Name: Ginger

Vernacular Name: Allam

Biological source: Rhizome

Botanical Description: A slender perennial rhizomatous herb with leafy stem. Flowers yellowish green, in dense cone like spikes. Fruits oblong with globose seeds.

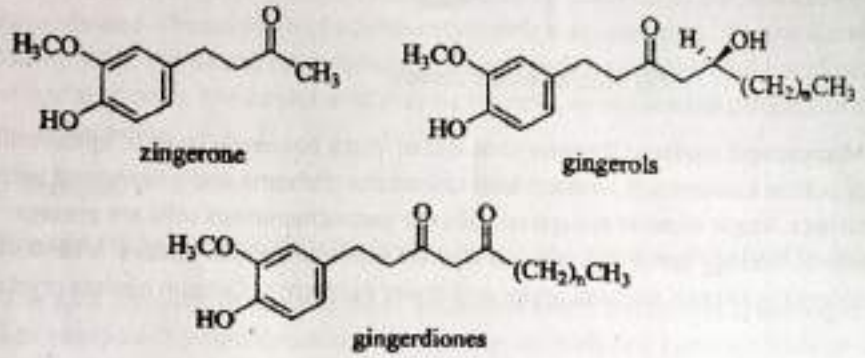
Narcoleptic studies (Rhizome): Rhizome consists of sympodially branched laterally compressed pieces of horizontal growing rhizome known as "Races" or "Hands". The surface is marked with circular closely placed leaf scars and small circular root scars at places, clearly visible on rhizomes. The drug is aromatic in odour, and pungent in taste.



Microscopic studies (Rhizome): The cork is the outermost layer with irregular parenchymatous cells and dark brown colour. The inner cork is few layered, colourless parenchymatous cells arranged in radial rows. Cork is absent in Jamaica Ginger. Phellogen is indisctinct. A broad zone of

parenchymatous cortex embedded with yellowish brown oleoresin cells and collateral, closed non lignified fibrovascular bundles of various sizes present beneath the epidermis.

Chemical Constituents (Active Principle): Ginger contains 1- 2% volatile oil, 5-8% pungent resinous mass and starch. The volatile oil is responsible for the aromatic odour. Rhizome contains an essential oil containing monoterpenes, Pungent principle consisting of gingerols, shogaols and related phenolic ketone derivatives. Other chemical include Gingerrenones A, B, C, Gingerdiols and Gingerdiones.



Pharmacology: Gingerol and Shagaol supress gastric contractions. Both fresh and dried rhizomes supress gastric secretions and reduce vomting. Shogaols and gingerols have cardio- tonic effect. Anti-migraine effect is due to ginger's ability to decrease platelets aggregation. Ginger is used as an antiemetic, positive inotropic, spasmolytic, aromatic stimulant, carminative, condiment and flavouring agent. Ginger is used as stomachic, an aromatic, carminative, stimulant and flavouring agent. Ginger oils is used in the mouth washes, ginger beverages and liquors.

Adulterants: Ginger may be adulterated by addition of wormy, drug or spent ginger which has been exhausted in the extraction of resins and volatile oil. Sometimes pungency of exhausted ginger is increased by the addition of capsicum.

PRINCIPLES AND COMMON ADULTERANTS OF *CATHARTHUS ROSEUS*.

Botanical Name: Catharanthes roseus

Family: Apocynaceae

Common Name: Madagascar Periwinkle

Vernacular Name : Billa ganneru

Biological source: Whole plant

Botanical Description : Perennial herb with elliptic-obova to oblong leaves. Flowers rose or white, solitary or paired in axils. Follicles pubescent with numerous black seeds.

Fig : *Catharanthus roseus*

Narcoleptic and Microscopic studies : Dorsriventral leaf of Vinca has single layer of epidermal cells covered with thick cuticle Epidermis is covered with unicellular trichome and interrupted with cruciform type stomata. Single layer of elongated palisade parenchymatous cells are present beneath the epidermis. Spongy parenchyma is 5-8 layered with intercellular spaces. Midrib shows the presence of collenchyma both towards upper and lower epidermis. Calcium oxalate crystals are absent.

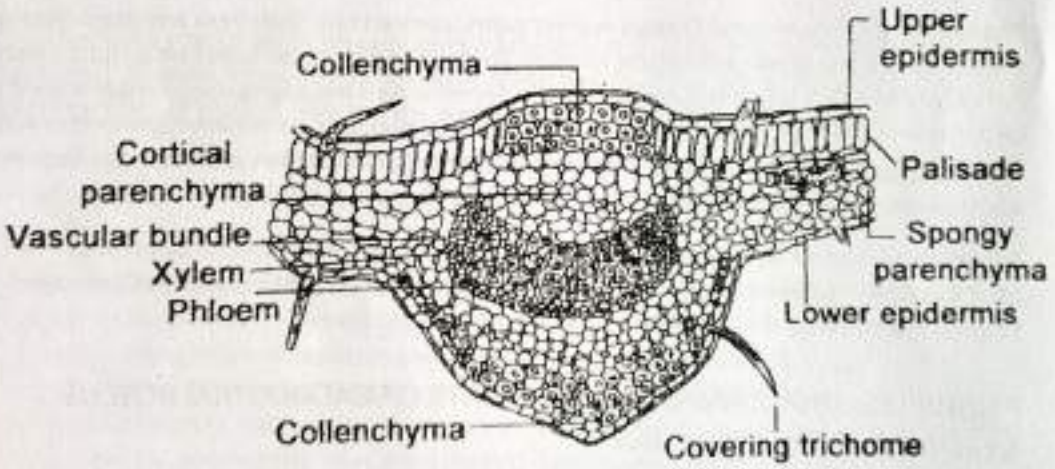


Fig : T.S of Catharanthus roseus leaf

Chemical Constituents (Active Principles): The drug contain alkaloids-vinblastin, vincristine,

cathartic, catharanthinol, vinoline, vindoline etc.

Pharmacognosy: Vinblastine is an anti-tumorous alkaloid. Itsuppress the immune response. Vincristine sulphate is an antineoplastic agent which may act by arresting mitosis at the metaphase. It is given in the treatment of childhood leukaemias. Vinca also exhibits hypotensive and antidiabetic activity.

Adulterants: As the plant is not used directly in any preparations, no adulterants are reported so far. Plant industrially used to extract alkaloids.

COMMON ADULTERANTS OF MEDICINAL PLANT PARTS LIKE BARK, LEAF, SEED, STEM, ROOT AND OTHER PARTS.

Adulteration is an addition of another substance to any item in order to increase the quantity of the item in raw form or prepared form, which may result in the loss of actual quality of item. These substances may be other available food items or non-food items.

An adulterant is a pejorative term for a substance found within other substances such as food, fuels or chemicals even though it is not allowed for legal or other reasons. t will not normally be present in any specification or declared contents of the substance, and may not be legally allowed. The addition of adulterants is called adulteration. The most common reason for adulteration is the use by manufacturers of undeclared materials that are cheaper than the correct and declared ones. The adulterants may be harmful, or reduce the potency of the product, or they may be harmless.

For example:

1 The leaf can be adulterated with Justicia leaves and leaves of Adhatodabeddomei.

2. The bark Alstoniacan be sometimes adulterated with the bark of Cratevasps. The bark cannot be made easily adulterated because of its peculiar lenticels and gummy nature of bark when peeled off from the stem.

3. Strychnos nux vomica seeds are commonly adulterated with seeds of Strychnospotatorum, S.nuxblanda. Powdered nux- vomica has been adulterated by the addition of powdered olive stones-endocarp of fruits of olive and the seeds of Phytelephasmacrocarpa, Palmae.

4. Commercial material or Rauwolfia serpentinais often adulterated with the stems of the drug androots of other Rauwolfia speices mainly R.tetraphylla, R.beddomei, R.micrantha and R.densiflora.

5. Ginger may be adulterated by addition of wormy, drug or spent ginger which has been exhausted in the extraction of resins and volatile oil. Sometimes pungency of exhausted ginger is increased by the addition of capsicum.contractions. Both fresh and dried rhizomes supress gastric secretions and reduce vomting. Shogaols and gingerols have cardio- tonic effect. Anti-migraine effect is due to ginger's ability to decrease platelets aggregation. Ginger is used as an antiemetic, positive inotropic, spasmolytic, aromatic stimulant, carminative, condiment and flavouring agent. Ginger is used as stomachic, an aromatic, carminative, stimulant and flavouring agent. Ginger oils is used in the mouth washes, ginger beverages and liquors.

Adulterants: Ginger may be adulterated by addition of wormy, drug or spent ginger which has been exhausted in the extraction of resins and volatile oil. Sometimes pungency of exhausted ginger is increased by the addition of capsicum.

: The melting point of a solid is the temperature at which it changes state from solid to liquid. Plant constituents have very sharp and constant melting points. Eg: Colophony-75-85° C

(d) Solubility: The presence of adulterant in a drug could be indicated by solubility studies. This is useful for the examination of many oils, oleoresins etc

.S.NO	DRUG	SOLUBILITY
1	Alkaloid bases	Chloroform
2	Alkaloid salts	Polar solvents
3	Glycosides	alcohol &water

(e) Optical Rotation: Many substances of biological origin, having a chiral centre can rotate the plane of polarized light either to right (Dextro rotatory) or to the left (Laevo rotaroty). The extent of rotation is expressed in degrees, plus (+) indicating rotation to the right and minus (-) indication rotation to the left. Such compounds are optically active and hence called optical rotation.

S.NO	DRUG	ANGLES OF OPTICAL ROTATION
1	Caraway oil	+75 to+80
2	Eucalyptus oil	0to+10
3	Chenopodium oil	-30 to -8

(f) Refractive index: Refractive index is defined as the property of a material that changes the speed of light, computed as the ratio of the speed of light in a vacuum to the speed of light through the material. Refractive index of a compound varies with the wavelength of the incident light, temperature and pressure.

S.NO	DRUG	REFRACTIVE INDEX
1	Arachis oil	1.4678to 10470
2	Castor oil	104758 to10527
3	Clove oil	1.527 to 10535

(g) Ash Values: The residue remaining after incineration is the ash content of the drug which simply represents inorganic salts, naturally occurring in drug or adhering to it or deliberately added to it, as a form of adulteration. Different types of ash values are used in detection of crude drugs like, total ash, acid-insoluble ash, water soluble ash and sulphated ash.

1. Total ash is useful in detecting the crude drugs that are mixed with sand, soil, calcium oxalate, chalk powder

2. The ash insoluble in dilute hydrochloric acid is called Acid insoluble ash. It is often of more value than the total ash. The calcium oxide or carbonate, yielded by the incinerated oxalate, will be soluble in hydrochloric acid when the ash is treated with hydrochloric acid; remaining ash is weighed, which is known as the acid in-soluble ash.

3. Water soluble ash is used to detect the presence of material exhausted by water.

4. Sulphated ash is done by addition of sulphuric acid in order to get sulphate salts, and the percentage of ash is calculated with reference to the air-dried drug.

Eg: The total ash values of Ginger-6% Water-soluble ash values of Ginger-1.7%

(a) Specific gravity: Specific gravity is almost known as relative density. It is the ratio of the mass of liquid or solid to the mass of an equal volume of distilled water at 4°C.Eg: Castor oil-0.95

(b) Extractive values: The extracts obtained by exhausting crude drugs with different solvents are approximate measures of their chemical constituents. Various solvents are used according to the type of the constituents to be analysed. Water soluble extractives-This method is applied to drugs which contain water soluble active constituents of crude drugs such as glycosides, tannins, mucilage etc., Ether soluble extractives This method is used for the extraction of volatile oils and fixed oils.

(c) Foreign organic matter: They may be insect, mould, earthy matter, animal excreta etc. Each and every vegetable drug has their own limits of foreign organic matter. Eg: Garlic should not contain more than 2%, saffron should not contain more than 2%, Shatavari should not contain more than 1%

ORGANOLEPTIC AND MICROSCOPIC STUDIES

PRINCIPLES AND COMMON ADULTERANTS OF *ALSTONIA SCHLOARIS* BARK:

Narcoleptic means being, affecting or relating to qualities such as taste, color, odor, and feel of a substance that stimulates the sense organs. Microscopic characters include the anatomical details of drug producing plant as seen in transverse, longitudinal sections, maceration study and the size measurement of various types of cells.

Botanical Name: Alstonia scholaris

Family: Apocyanaceae

Common Name: Dita bark, Devil tree

Vernacular Name: Yedakula ponna

Biological Source: Bark

Botanical description: Alstonia scholaris is an elegan evergreen tree, found in most parts of India. All parts of the tree can be considered poisonous. It is a tall elegant tree with greyish rough bark. Branches are whorled, and so are the leaves, i.e., several of them coming out of the same point.

Narcoleptic studies (Bark): Young bark curved is channelled or occasionally quilled or double quilled, 3-4 mm in thickness, externally very rough, longitudinally and transversely fissured; rusty grey, marked with transversely elongated white lenticels, thick cork often getting exfoliated with an exposure of cream coloured cortex, internally dark-greyish brown, irregular longitudinally striated; fracture splintery exposing a soft somewhat spongy tissue. Odour mild and pleasant; taste persistently bitter and gritty.

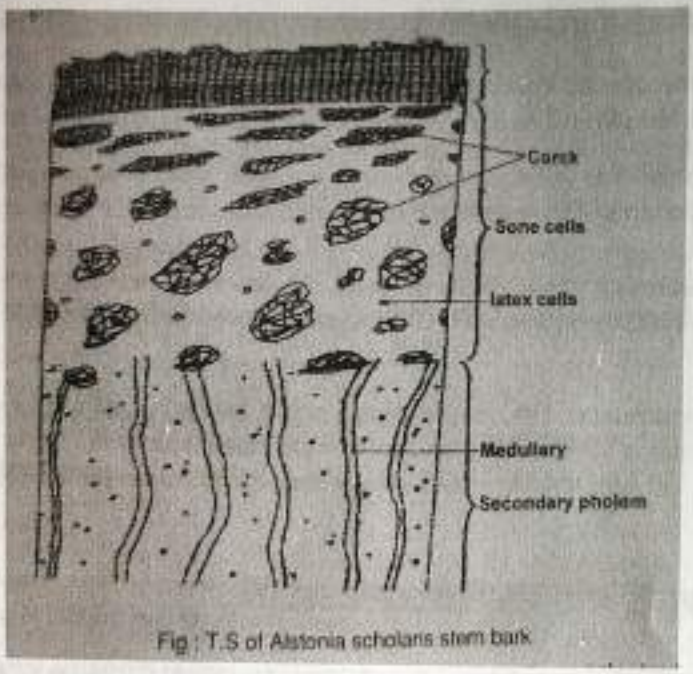
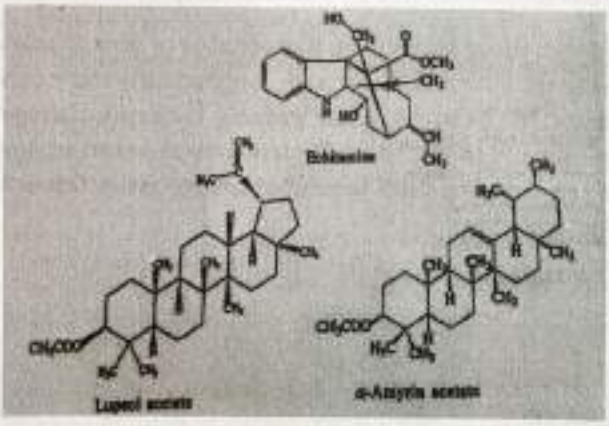


Fig : T.S of Alstonia scholaris stem bark

Microscopic studies (Bark): Transverse section of the bark showed three distinct regions, cork, cork cambium and secondary cortex. The cork was multilayered made up of thick cork cells. The cork cambium forms a narrow zone made up of 2-3 layers of cells. Followed by cork cambium a broad zone of secondary cortex was present composed of parenchymatous cells. Secondary cortex showed presence of numerous prismatic crystals of calcium oxalate, traversed by laticiferous canals and sclereids of various size, shapes and thickness forming groups of 2 to 20, occasionally running in the form of bands, associated with idioblasts; non lignified fibres.

Active Principles: Alkaloids are one of the major constituents of the species. Among different alkaloids, Echitamine, Echitamine chloride are most important. Lupeol acetate, Alstonic acids A and B, amyrin acetate and ursolic acid have also been recorded.



Pharmacology: Bark is used in traditional medicine to treat dysentery and fever. In Ayurveda, it is

used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite and for upper purification process of Panchakarma. The milky juice of the tree is applied to ulcers.

Adulterants: The cannot be made easily adulterated because of its peculiar lenticels. Some times adulterated with Cratavea sps bark.

PRINCIPLES AND COMMON ADULTERANTS OF *ADHATODA VASICA*.

Botanical Name: Adhatoda vasica

Family: Acanthaceae

Common Name: Malbar Nut Tree

Vernacular Name: Addasaram

Biological Source: Leaves

Botanical description: Bushy shrub with foetid smell. Leaves elliptic to lanceolate. Flowers white, throat red or yellow, in axillary and terminal spikes.

Narcoleptic studies (Leaves): The leaves are entire when fresh and crumped or broken when dried. Shape is lanceolate-ovate, crenate to entire margin, acuminate apex, base tapering. The leaves are broad, pinnate venation, glabrous or slightly pubescent green when fresh, on drying the colour changes from brown to grey.

Microscopic studies (Leaf): Leaf shows dorsiventral structure with two layers of palisade cells below upper epidermis. Epidermis shows caryophyllaceous stomata with sinous epidermal cells, with glandular tichomes with unicellular stalk and four celled head. One to five celled uniseriate trichomes are also present in few number. Mesophyll contains prismatic and acicular crystals of calcium oxalate.

Chemical constituents (Active Principle): Vasaka contains several alkaloids but the major includes Quinazoline derivatives such as Vasicine, Vasicinone, 6-hydroxyvasicine and adhatonine. The drug also contains volatile oil, betalin and vasakin. It is also reported that vasaka contains adhatodic acids are also present in few number. Mesophyll contains prismatic and acicular crystals of calcium oxalate.

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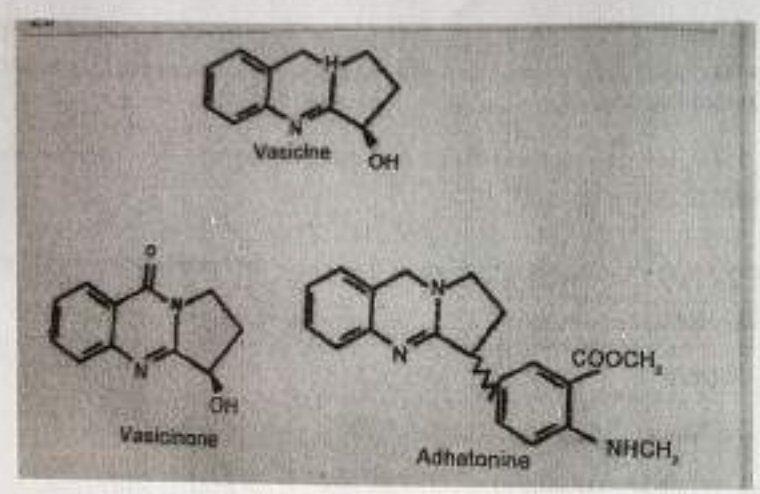


Pharmacology: Vasaka is used as expectorant and bronchodilator. The leaf extract has been used for treatment of bronchitis and asthma for many centuries. It relieves cough and breathlessness. It is also prescribed commonly in Ayurveda for bleeding due to idiopathic thrombocytopenic purpura, local bleeding due to peptic ulcer, piles, menorrhagia etc. Large doses of fresh juice of leaves have been used in tuberculosis.

Adulterants: Can be adulterated with leaves of Justicia sps, Adathoda beddomei leaves.

ACTIVE PRINCIPLES AND COMMON ADULTERANTS OF *STRYCHNOS NUX VOMICA*.

Botanical Name: Strychnos nux-vomica

Family: Loganiaceae

Common Name: Poison Nut, Semen strychnos, Bachelor's button, Vomit nut,

Vernacular Name : Visha muhsti, Mushti

Biological source: Seeds

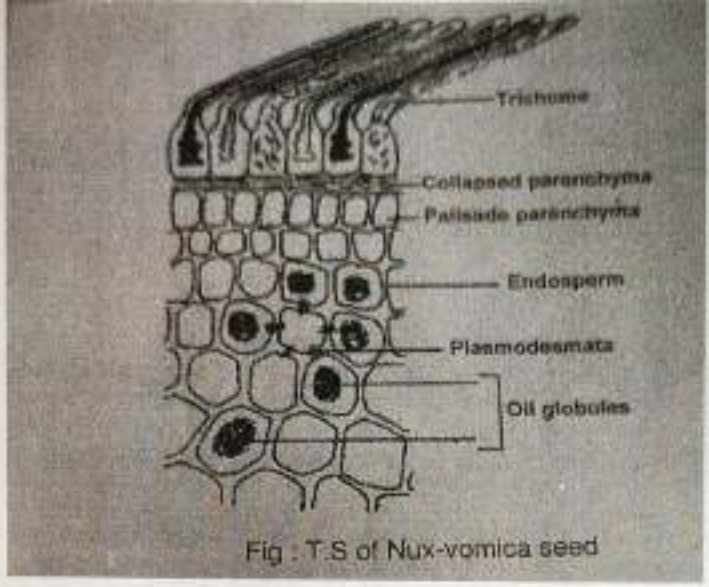


Fig : T.S of Nux-vomica seed

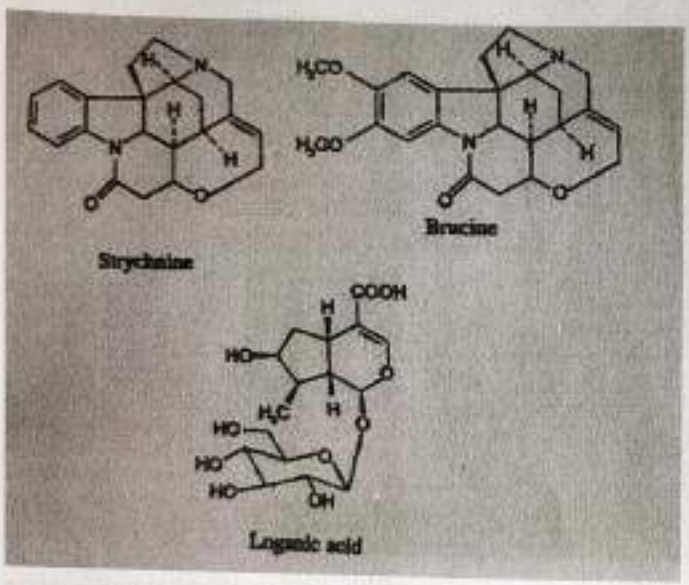
Botanical description: A medium sized tree with a short, crooked, thick trunk, the wood is white hard; closely grained, durable and the root very bitter. Branches are covered with a smooth ash-coloured bark. Leaves opposite, oval, shiny, smooth on bothsides. Flowers small, greenish white, funnel shaped, in small terminal cymes. Fruit with smooth hard rind or shell which when ripe is a lovely orange coloured, rilled with a soft white jelly like pulp containing five seeds.

Narcoleptic studies (Seeds): Seeds are covered with a soft wooly like substance, white and horny internally. Seeds are disc shaped, densely covered with closely appressed satiny hairs. Hairs radiating from the centre of the flattened sides and giving to the seeds a characteristic shine. Seed are very hard with a dark grey horny endosperm in which small embryo embedded in; no odour but very bitter in taste.

Microscopy (Seed): The testa is thick walled covered with twisted lignified trichomes. The base of trichome is large with slit like pits. The upper part of the trichome is nearly at right angles to

the base and has wavy walls. Endosperm is composed of a thick walled cellulosic parenchyma. The walls mainly composed of hemicellulose and swell considerably in water with polygonal lumen and plasmodesmata. Aleuron grains and fixed oils are present in endosperm and embryo.

Chemical Constituents (Active principle): Nux-vomica seedscontain alkaloids strychnine, brucine, also traces of strychnicine, andalso traces of a glucoside Loganin and Caffeotannic acid. Strychnineis therapeutically active and toxic alkaloid. Brucine is chemicallydimethoxy strychnine and is less toxic.



Pharmacology: The seeds are alexiteric, appetizer, aphrodisiac, anthelmintic, purgative, nervine tonic and CNS stimulant.

Adulterants: Strychnos nux vomica seeds are commonly adulterated with seeds of Strychnos potatorum, S.nux blanda.

PRINCIPLES AND COMMON ADULTERANTS OF RAUWOLFIA SERPENTINE.

Botanical Name: Rauwolfia serpentina

Family: Apocynaceae

Common Name: Indian sanke root, Serpentine root

Vernacular Name: Sarpagandha, Pathalagandhi

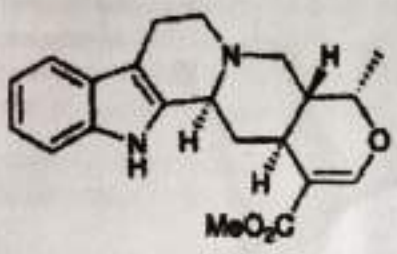
Biological source: Root

Botanical Description: Rauwolfia serpentiana is a shrubby plant with leaves in three whorls. Flowers white in axillary corymbs. Drupe purpulish-black with single ovoid seed.

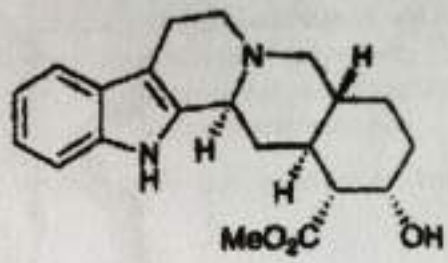
Narcoleptic studies (Roots): Dried roots are Sub cylindrical to subcylindrical, tortuous, stout, yellowish brown. The outer surface is greyish-yellow, light-brown or brown. Young pieces contain slight wrinkles while old pieces have longitudinal ridges. Fracture is short, fractured surface smooth, yellowish buff in colour. Odour indistinct, taste bitter.

Fig : Rauwolfia serpentina-Root

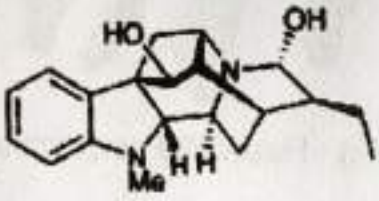
Microscopic studies (Root): Transverse section of root is circular to oval in outline, shows a stratified cork, which is divided into two to eight alternating zones. It consists of one to seven layers of smaller and radially narrower, suberized, non lignified cells alternating with one to three layers of larger radially broader, lignified cells. The phelloderm is composed of about ten to twelve layers of tangentially elongated to isodiametric, cellulosic parenchymatous cells and with small sized twin prismatic crystalsof calcium oxalate. Cells of secondary cortex are parenchymatous and contain starch grains, simple and compound, spherical with a distinct hilum in the form of a split. Phloem is narrow and consists of parenchyma with scattered sieve tissue; parenchyma alternate with broader medullary rays composed of large cells and usually two to four cells wide. Xylem lignified, composed of few, small sized isolated or radially arranged xylem vessels, tracheids and fibres alternating with uni or multi seriate medullary rays, parenchymatous cells are pitted and embedded with starch grains.



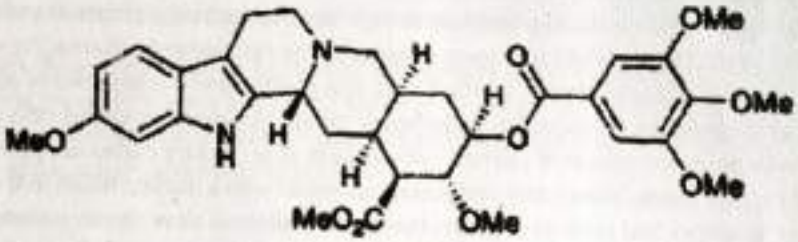
ajmallcine



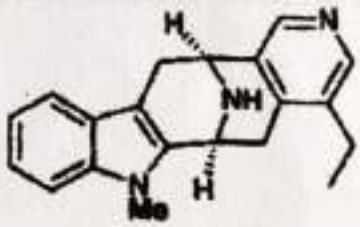
yohimbine



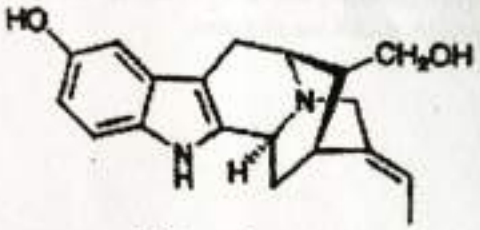
ajmaline



reserpine



suavecline



Sarpagine

Chemical constituents (Active Principle): Rauwolfia contains resinous matter and more than 80 alkaloids. Alkaloids are mostly concentrated in the bark of roots. The rhizome also contain small amounts of phytosterol, fatty acids, unsaturated alcohols etc. The main chemical constituents are Reserpine, Rescinnamine, Serpentine, Ajmaline, Ajmalicine, Deserpidine, Syrosingopine etc.,

Pharmacology: Rauwolfia is used as hypnotic, sedative and antihypertensive. It is specific for

insanity and reduces blood pressure. It is given in labours to increase uterine contractions and in certain neuropsychiatric disorders. Ajmaline, which has pharmacological properties similar to those of quinidine, is marketed in Japan for the treatment of cardiac arrhythmias. Ajmalicine used in the treatment of circulatory diseases, in relief of obstruction of normal cerebral blood flow.

Adulterants: Commercial material is often adultrated with the stems of the drug and roots of other Rauwolfia speices mainly R.tetraphylla and R.densifolora.

principles and common adulterants of *Zingiber officinale.*

Botanical Name: Zingiber officinale

Family: Zingiberaceae

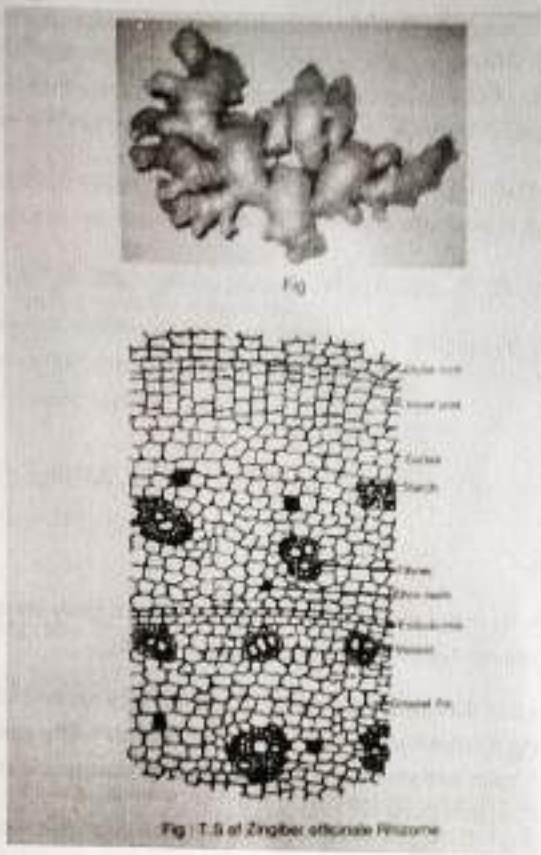
Common Name: Ginger

Vernacular Name: Allam

Biological source: Rhizome

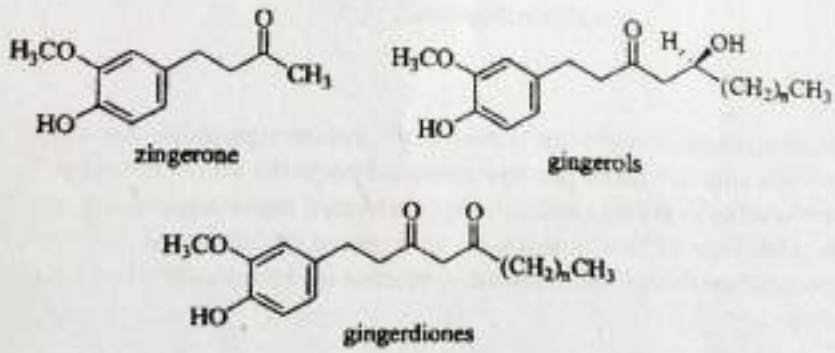
Botanical Description: A slender perennial rhizomatous herb with leafy stem. Flowers yellowish green, in dense cone like spikes. Fruits oblong with globose seeds.

Narcoleptic studies (Rhizome): Rhizome consists of sympodially branched laterally compressed pieces of horizontal growing rhizome known as "Races" or "Hands". The surface is marked with circular closely placed leaf scars and small circular root scars at places, clearly visible on rhizomes. The drug is aromatic in odour, and pungent in taste.



Microscopic studies (Rhizome): The cork is the outermost layer with irregular parenchymatous cells and dark brown colour. The inner cork is few layered, colourless parenchymatous cells arranged in radial rows. Cork is absent in Jamaica Ginger. Phellogen is indisctinct. A broad zone of parenchymatous cortex embedded with yellowish brown oleoresin cells and collateral, closed non lignified fibrovascular bundles of various sizes present beneath the epidermis.

Chemical Constituents (Active Principle): Ginger contains 1- 2% volatile oil, 5-8% pungent resinous mass and starch. The volatile oil is responsible for the aromatic odour. Rhizome contains an essential oil containing monoterpenes, Pungent principle consisting of gingerols, shogaols and related phenolic ketone derivatives. Other chemical include Gingerrenones A, B, C, Gingerdiols and Gingerdiones.



Pharmacology: Gingerol and Shagaol supress gastric contractions. Both fresh and dried rhizomes supress gastric secretions and reduce vomting. Shogaols and gingerols have cardio- tonic effect. Anti-migraine effect is due to ginger's ability to decrease platelets aggregation. Ginger is used as an antiemetic, positive inotropic, spasmolytic, aromatic stimulant, carminative, condiment and flavouring agent. Ginger is used as stomachic, an aromatic, carminative, stimulant and flavouring agent. Ginger oils is used in the mouth washes, ginger beverages and liquors.

Adulterants: Ginger may be adulterated by addition of wormy, drug or spent ginger which has been exhausted in the extraction of resins and volatile oil. Sometimes pungency of exhausted ginger is increased by the addition of capsicum

PRINCIPLES AND COMMON ADULTERANTS OF *CATHARTHUS ROSEUS.*

Botanical Name: Catharanthes roseus

Family: Apocynaceae

Common Name: Madagascar Periwinkle

Vernacular Name : Billa ganneru

Biological source: Whole plant

Botanical Description : Perennial herb with elliptic-obova to oblong leaves. Flowers rose or white, solitary or paired in axils. Follicles pubescent with numerous black seeds.

Fig : *Catharanthus roseus*

Narcoleptic and Microscopic studies : Dorsriventral leaf of Vinca has single layer of epidermal cells covered with thick cuticle Epidermis is covered with unicellular trichome and interrupted with cruciform type stomata. Single layer of elongated palisade parenchymatous cells are present beneath the epidermis. Spongy parenchyma is 5-8 layered with intercellular spaces. Midrib shows the presence of collenchyma both towards upper and lower epidermis. Calcium oxalate crystals are absent.

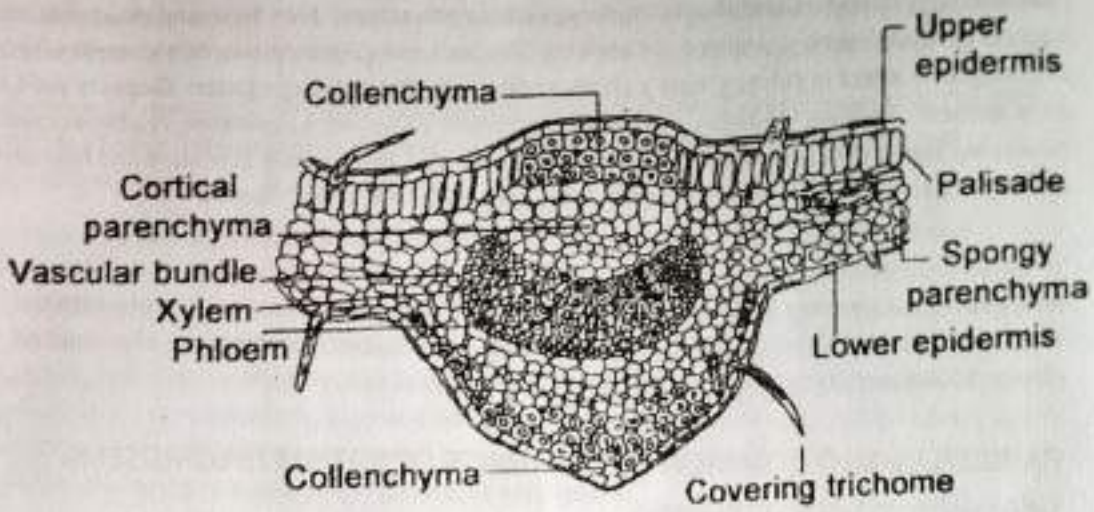


Fig : T.S of Catharanthus roseus leaf

Chemical Constituents (Active Principles): The drug contain alkaloids-vinblastin, vincristine, catharanthin, catharanthinol, vinoline, vindoline etc.

Pharmacognosy: Vinblastine is an anti-tumorous alkaloid. Itsuppress the immune response. Vincristine sulphate is an antineoplastic agent which may act by arresting mitosis at the metaphase. It is given in the treatment of childhood leukaemias. Vinca also exhibits hypotensive and antidiabetic activity.

Adulterants: As the plant is not used directly in any preparations, no adulterants are reported so far. Plant industrially used to extract alkaloids.

COMMON ADULTERANTS OF MEDICINAL PLANT PARTS LIKE BARK, LEAF, SEED, STEM, ROOT AND OTHER PARTS.

Adulteration is an addition of another substance to any item in order to increase the quantity of the item in raw form or prepared form, which may result in the loss of actual quality of item. These substances may be other available food items or non-food items.

An adulterant is a pejorative term for a substance found within other substances such as food, fuels or chemicals even though it is not allowed for legal or other reasons. t will not normally be present in any specification or declared contents of the substance, and may not be legally allowed. The addition of adulterants is called adulteration. The most common reason for adulteration is the use by manufacturers of undeclared materials that are cheaper than the correct and declared ones. The adulterants may be harmful, or reduce the potency of the product, or they may be harmless.

For example: 1 The leaf can be adulterated with Justicia leaves and leaves of Adhatodabeddomei.

2. The bark Alstoniacan be sometimes adulterated with the bark of Cratevasps. The bark cannot be made easily adulterated because of its peculiar lenticels and gummy nature of bark when peeled off from the stem.

3. Strychnos nux vomica seeds are commonly adulterated with seeds of Strychnospotatorum,

S.nuxblanda. Powdered nux- vomica has been adulterated by the addition of powdered olive stones-endocarp of fruits of olive and the seeds of Phytelephasmacrocarpa, Palmae.

4. Commercial material or Rauwolfia serpentinais often adulterated with the stems of the drug androots of other Rauwolfia speices mainly R.tetraphylla, R.beddomei, R.micrantha and R.densiflora.

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OUT COMES OF THE COURSE

- The course provide knowledge on the medicinal plants used in Indian traditional system which is safe and no side effects.
- The course inculcate the development of Indian Culture and respect on the Traditional systems
- The course enlightens the details of the uses, active principles and commercial value and marketing skills
- The course the students on the hands on experiments which helps to identify the medicinal plants with quality
- The stake holders can start a small scale business with quality medicinal products.
- Helps in developing self-employment.

Conclusion

As our lifestyle is now getting techno-savvy, we are moving away from nature. While we cannot escape from nature because we are part of nature. As herbs are natural products they are free from side effects, they are comparatively safe, eco-friendly and locally available. Traditionally there are lot of herbs used for the ailments related to different seasons. There is a need to promote them to save the human lives.

These herbal products are today are the symbol of safety in contrast to the synthetic drugs, that are regarded as unsafe to human being and environment. Although herbs had been priced for their medicinal, flavouring and aromatic qualities for centuries, the synthetic products of the modern age surpassed their importance, for a while. However, the blind dependence on synthetics is over and people are returning to the naturals with hope safety and security. It's time to promote them globally. In view of its broad applications of medicinal plants the Diploma Course in Medicinal Plants has been introduced.

Certificate Course on Medicinal plants

(Each question carries 2 marks)

1.The part of the plant that can be used for the treatment of toothache **(b)**

(a).Fennel (b) Clove

(c) Fenugreek (d) None of the above

2. The alkaloid colchicineco is obtained from **(a)**

(a) Dried corm of colchicum

(b) Dried flowers of colchicum

(c) Dried seeds of colchicum

(d) All the above

3. Alkaloids emetine and cephaeline are obtained from **(a)**

(a) Cephaelis (b) Colchicum

(c) Exogonium (d) None of the above

4. Which has got the purgative properties **(c)**

(a) Colchicum (b) Aconitum

(c) Exogonium (d) None of the above

5. Cinchona is a native of **(d)**

(a) India (b) China

(c) Indonesia (d) None of the above

6. Santalum album is having **(d)**

(a) Medicinal properties (b) Properties of super quality of timber

(c) Cosmotic property (d) All the above

7. Atropine used at the time of eye - testing is obtained from the leaves of **(a)**

(a) Belladona (b) Cinchona

(c) Calotropis (d) None of the above

8.Which of the leaves are used as mosquito repellent **(a)**

(a) Eucalyptus (b) Digitalis

(c) Straonium (d) Cassia

9. Opium is a plant belonging to family **(c)**

(a) Apocyanaceae (b) Euphorbiaceae

(c) Papaveraceae (d) None of the above

10. Rauwolfia serpentina which belongs to apocyanaceae yield medicine of **(d)**

(a) Blood pressure (b) Nerevousness

(c)Insomnia (d) all the above

11. Ashwagandha belongs to genus **(a)**

(a) Withania (b) Solanum

(c) Lycopersicum (d) None of the above

12. Holy basil (Tulsi) is a member of the family **(a)**

(a) Labiatae (b) Asclepiadaceae

(c) Umbelliferae (d) None of the above

13. Which of the following is a blood purifier **(b)**

(a) Opium (b) Emblica

(c) Aegale (d) All the above

14. Solanum nigrum fruit is used **(d)**

(a) Diuretic (b) Sedative

(c) Expectorant (d) All the above

15. Digitalis purpurea produces **(b)**

(a) Toxin (b) Digitoxin

(c) Both a and b (d) None of the above

16. Codeine is an alkaloid obtained from **(a)**

(a) Papaver somniferum (b) Emblica officinalis

(c) Carum copticum (d) None of the above

17. Which of the following is a gymnospermic medicinal plant **(a)**

(a) Thuja occidentalis (b) Areca catechu

(c) Saponaria (d) None of the above

18. Alkaloid berberine is obtained from roots of **(b)**

(a) Bambusa (b) Barberris aristata

(c) Brassica (d) None of the above

19. Myristica fragrans is used as **(c)**

(a) Medicine (b) Caudiment

(c) Both a and b (d) None of the above

20. Botanical name of Liquorice is **(a)**

(a) Glycyrrhiza glabra (b) Cissampelos pareira

(c) Apium graveolens (d) None of the above

21. Which of the following is a powerful expectorent and antispasmodic **(a)**

(a) Vasaka (b) Gheekunvar

(c) Sukhdarshan (d) AK

22. Isabgol is obtained from **(c)**

(a) Root of Margosa (b) Fruit skin of plantago

(c) Seeds of plantago (d) Bark of Ocimum

23. Study of drug plants is known as **(c)**

(a) Pharmacy (b) Pharmacology

(c) Pharmacognosy (d) Pharmaceutical chemistry

24. The alkaloid 'Resrpine' is obtained from **(b)**

(a) Atropa belladona (b) Rauwolfia serpentine

(c) Cajanus cajan (d) Cinchona officinalis

25. Central drug research institute is situated at **(a)**

(a) Lucknow (b) Madras

(c) Bombay (d) Delhi

Attendance Register:

S. No	Name of the Student	Date and Month:														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		18/2	19/2	20/2	21/2	22/2	24/2	25/2	26/2	27/2	28/2	29/2	2/3	3/3	4/3	5/3
1.	G.Sireesha	P	P	P	a	P	P	P	P	P	P	P	P	P	P	P
2.	B.K.Sowmya	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
3.	U. Pavan Kumar Reddy	P	a	P	P	P	a	P	P	P	P	P	P	P	P	P
4.	V.Balasubramanyam	a	P	P	P	P	P	P	P	P	P	P	P	P	P	P
5.	P.Mallikarjuna	P	P	P	P	a	a	P	P	P	a	P	P	P	P	P
6.	G.A.Bhavitha	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
7.	S.Reshma	P	P	P	P	P	P	P	P	P	P	P	P	a	P	P
8.	Shaik Reshma	P	a	P	P	P	P	P	P	P	P	a	P	P	P	P
9.	M.Renuka	a	P	P	P	P	P	P	P	P	P	P	P	P	P	P
10.	D.Nirosha	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
11.	D.Kumari	P	P	P	a	P	P	P	P	P	P	P	P	P	P	P
12.	M.Aswini	P	a	P	P	P	P	P	P	P	P	P	P	P	P	P
13.	M.Baby	P	P	a	P	P	P	P	P	P	P	P	P	P	P	P
14.	N.Mounika	a	P	P	P	P	P	P	P	P	P	P	P	P	P	P
15.	P.Sreelekha	P	P	P	P	P	a	P	P	P	P	P	P	P	P	P
16.	S.P.Bhanusree	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
17.	S.Mounika	a	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18.	K.Reddi Prasanna	P	P	a	P	P	P	a	P	P	P	P	P	P	P	P
19.	P.Shireesha	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
20.	C.Mamatha	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
			B				B			B		B		B		

S. No	Name of the Student	Date and Month:														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		6/3	7/3	10/3	11/3	12/3	13/3	17/3	18/3	19/3	20/3					
1.	G.Sireesha	P	P	P	P	P	P	P	P	P	P	P	P	P	a	P
2.	B.K.Sowmya	P	P	P	P	P	P	P	P	P	P	P	a	P	P	P
3.	V. Pavan Kumar Reddy	P	P	P	P	P	P	P	P	P	P	P	a	P	P	P
4.	V.Balasubramanyam	P	P	P	P	P	P	P	a	P	P	a	P	P	P	P
5.	P.Mallikarjuna	P	P	a	P	P	P	P	P	P	P	P	P	P	a	P
6.	G.A.Bhavitha	a	P	P	P	P	P	P	P	P	P	P	P	P	a	P
7.	S.Reshma	P	P	P	P	a	P	a	P	P	P	P	P	P	P	P
8.	Shaik Reshma	P	P	P	P	P	P	P	P	P	P	a	P	P	P	P
9.	M.Renuka	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
10.	D.Nirosha	P	a	P	P	P	P	P	P	P	P	a	P	P	P	P
11.	D.Kumari	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
12.	M.Aswini	a	P	P	P	P	P	P	P	P	P	P	P	P	P	P
13.	M.Baby	P	P	P	P	a	P	P	P	P	P	P	P	P	P	P
14.	N.Mounika	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
15.	P.Sreelekha	a	P	P	P	P	P	P	P	P	P	P	a	P	P	P
16.	S.P.Bhanusree	P	P	a	P	P	P	P	P	P	P	a	P	P	P	P
17.	S.Mounika	P	P	P	P	P	P	a	P	P	P	P	P	a	P	P
18.	K.Reddi Prasanna	P	P	P	a	P	P	P	P	P	P	P	a	P	P	P
19.	P.Shireesha	P	P	P	P	P	P	P	P	P	P	a	P	P	P	P
20.	C.Mamatha	P	P	P	P	P	P	P	P	P	P	a	P	P	P	a

Certificate course on Medicinal Plants

Feedback Form

Course feedback from Students:

1.Were objectives of the course clear to you

1)Yes 2). No

2.The course contents met your expectations

1) Yes 2) No

3.The level of the course was

1) Good 2)Not Good

4.The contents were illustrated with

1) More examples 2) Few examples

5.The course exposed you to new knowledge and practices

1) Agree 2) Not agree

6.Will you recommend this course to your next Batch

1) Yes 2) No

Critical Analysis Report:

The Department of Botany has been conducted a certificate course (Institutional Permission) on "MEDICINAL PLANTS" from 17-02-2020 to 20-03-2020 with the minimum duration of 30 hours. According to the IQAC and Principals instruction the course has been started the feasibility and convenient of the hours for this academic year. The total students 20 were registered for this course and completed as per the schedule. The objective of the course was fulfilled by acquiring the values of Mushrooms and cultivating procedure of Mushrooms.

OUT COME OF THE COURSE

Hence, the certificate course is very useful to B.Sc BZC Students on the techniques learned during the course might be helpful in identification, medicinal properties and their medicinal constituents and conservation of Medicinal plants. The feedback from students were collected and analyzed. All the students from Botany showed interest to do such type of Certificate course and to continue it for further years also.

Thank you


Feb 17, 2020 12:39:38 PM
13°11'53"N 79°5'44"E
#PVKNGC(A) CTR


Feb 17, 2020 12:44:15 PM
13°11'53"N 79°5'44"E
#PVKNGC(A) CTR

PVKN College launches two new courses

EXPRESS NEWS SERVICE
@ Chittoor

THE Department of Botany of PVKN Government College has started a certificate course in mushroom cultivation and a diploma course in medicinal botany for the academic year 2020-2021. CV Rajeswari, Regional Joint Director of Collegiate Education, attended the inaugural programme as a chief guest.

Addressing students, she exhorted them to pursue their studies keeping in mind the aspirations and dreams of their parents. She underlined the importance of mushroom cultivation and medicinal botany in the present-day context.

College principal G Ananda Reddy said that the students should be motivated to make use of the courses and learn organic cultivation since organic products have good demand in the market.

Botany Department incharge C Meera Saheb said that the college started the new courses to meet the local requirements of the stakeholders as it enjoys autonomy in introducing new curriculum. He advised the students to become entrepreneurs by choosing self-employment courses. Mushroom cultivation certificate course coordinator Mohano Behara explained the course structure, objectives and benefits.

JOB-ORIENTED COMPUTER COURSE

The Computer Science Department of PVKN Government College launched a certificate course in computer fundamentals and office automation. Principal Anand Reddy advised the students to learn computer technologies, which enable them to get good placements. The skill-based certificate courses will be very useful to students, he said.

THE INDIAN EXPRESS Wed, 19 February 2020
https://epaper.newindianexpress.com/c/49149094

వృత్తి విద్యా కోర్సులతో ప్రయోజనం : ఆర్జేడీ

సమావేశంలో మాట్లాడుతున్న ఆర్జేడీ డాక్టర్ రాజేశ్వరి

చిత్తూరు సెంట్రల్, ఫిబ్రవరి 17: వృత్తి విద్యా కోర్సులు విద్యార్థులకు ఎంతో ప్రయోజనాన్ని చేకూర్చుతాయని ఉన్నత విద్య ఆర్జేడీ(కడప) డాక్టర్ రాజేశ్వరి అన్నారు. సోమవారం స్థానిక కేవీకేఎస్ ప్రభుత్వ డిగ్రీ కళాశాలలో ప్రిన్సిపాల్ ఆనందరెడ్డి అధ్యక్షతన జరిగిన కార్యక్రమంలో పట్టుగొడుగుల పెంపకం, ఔషధ వృక్షశాస్త్రం సర్టిఫికెట్ కోర్సులను ఆర్జేడీ ప్రారంభించారు. ఈ సందర్భంగా ఆర్జేడీ మాట్లాడుతూ విద్యార్థులు వృత్తి కోర్సులు చదవడం ద్వారా భవిష్యత్‌లో తక్షణమే స్థిరపడే అవకాశం ఉందన్నారు. అనంతరం కళాశాల తరపున ఆర్జేడీని సన్మానించారు. కార్యక్రమంలో కోర్సుల సమన్వయకర్త డాక్టర్ మోహన్ బెహరా, వృక్ష శాస్త్ర విభాగాధిపతి మీరాసాహెబ్, అధ్యాపకులు భక్త, శశికళ, హేమలత, సుజన, విద్యార్థులు పాల్గొన్నారు.

ఆంధ్రజ్యోతి ABN Tue, 18 February 2020
https://epaper.andhrajyothy.com/c/49116113

certificate course

DIPLOMA IN MEDICINAL BOTANY

Department of Botany
P.V.K.N. Govt. College (A), Chittoor.A.P.517002.

Admission Application

1	Name of the Student	G. Sireesha
2	Father/Husband name	G. Ramesh Reddy
3	Gender	Female
4	Date of Birth & Age	21-09-1999
5	Aadhar Number	535863126655
6	Educational qualifications	Degree(B.Sc) [B.Z.C], M.Sc 1st year
7	Whether SC/ST/General/PW	OC (kapu)
8	Course session applied for	**March to August 2020**
9	Online account payment	**To the Principal A/c No. 2117010055976**
10	Amount Rs.	Free **500/-**
11	Place of studying/working	chittoor, P.V.K.N Govt College
12	Address for Correspondence	P.V.K.N Govt college. chittoor 517002
13	Contact number& Email - ID	9550573673 Sireesha siri7887@gmail.com
14	Signature of the Applicant	G. Sireesha
	Place	chittoor
	Date	06-03-2020

For Office Use Only

15	Admission Number	
16	Fee details	
17	Signature of the Coordinator	
18	Signature of the Principal	

PRINCIPAL
P.V.K.N. GOVT. COLLEGE
CHITTOOR.

certificate course

DIPLOMA IN MEDICINAL BOTANY

Department of Botany
P.V.K.N. Govt. College (A), Chittoor.A.P.517002.

Admission Application

1	Name of the Student	B k SOWMYA
2	Father/Husband name	B. MOHAN
3	Gender	female
4	Date of Birth & Age	24 - 12 - 1998
5	Aadhar Number	8679 4133 9756
6	Educational qualifications	Degree B.Sc [BZC], M Sc Ist year
7	Whether SC/ST/General/PW	BC-A
8	Course session applied for	**March to August 2020**
9	Online account payment	**To the Principal A/c No. 2117010055976**
10	Amount Rs.	Free ~~500/-~~
11	Place of studying/working	chittoor . P.V.K.N Govt college
12	Address for Correspondence	P.V.K.N Govt college - chittoor 517002
13	Contact number& Email - ID	8106336706 sowmyachinna435@gmail.com
14	Signature of the Applicant	B k Sowmya
	Place	Chittoor
	Date	06 - 03 - 2020

For Office Use Only

15	Admission Number	
16	Fee details	
17	Signature of the Coordinator	
18	Signature of the Principal	

PRINCIPAL
P.V.K.N. GOVT. COLLEGE
CHITTOOR

certificate course **DIPLOMA IN MEDICINAL BOTANY**

Department of Botany
P.V.K.N. Govt. College (A), Chittoor.A.P.517002.

Admission Application

1	Name of the Student	T. Pavan kumar Reddy.
2	Father/Husband name	T. Reddy sekhar Reddy.
3	Gender	Male
4	Date of Birth & Age	7-11-1998
5	Aadhar Number	893635944192
6	Educational qualifications	Degree B.Sc[B.Z.C], MSc 1st year
7	Whether SC/ST/General/PW	OC (kapu)
8	Course session applied for	**March to August 2020**
9	Online account payment	**To the Principal A/c No. 2117010055976**
10	Amount Rs.	Free ~~500/-~~
11	Place of studying/working	chittoor, P.V.K.N (govt college
12	Address for Correspondence	2-12/1, chimperivaripalli, Thambalapalli (post & mandal), chittoor - 517418
13	Contact number& Email - ID	9494671281, Pavanthettu@gmail.com
14	Signature of the Applicant	T. Pavan kumar Reddy..
	Place	
	Date	

For Office Use Only

15	Admission Number	
16	Fee details	
17	Signature of the Coordinator	
18	Signature of the Principal	

PRINCIPAL
P.V.K.N. GOVT. COLLEGE
CHITTOOR.

1/17

certificate course

DIPLOMA IN MEDICINAL BOTANY

Department of Botany
P.V.K.N. Govt. College (A), Chittoor.A.P.517002.

Admission Application

1	Name of the Student	V. Balasubramanyam
2	Father/Husband name	V. venkataramana
3	Gender	male
4	Date of Birth & Age	15-05-1998
5	Aadhar Number	8159 7572 2868
6	Educational qualifications	B.sc (B.Z.C) (M.sc 1st year)
7	Whether SC/ST/General/PW	BC-B
8	Course session applied for	**March to August 2020**
9	Online account payment	**To the Principal A/c No. 2117010055976**
10	Amount Rs.	Free ~~500/-~~
11	Place of studying/working	P.V.K.N Govt degree college chittoor
12	Address for Correspondence	P.V.K.N Govt degree college chittoor
13	Contact number& Email - ID	9381247226, balasubramanyam426@gmail.com
14	Signature of the Applicant	V. Balasubramanyam
	Place	chittoor
	Date	

For Office Use Only

15	Admission Number	
16	Fee details	
17	Signature of the Coordinator	L Mokshu
18	Signature of the Principal	PRINCIPAL P.V.K.N. GOVT. COLLEGE CHITTOOR.