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āryavaidyan

लाभानां श्रेय आरोग्यम्

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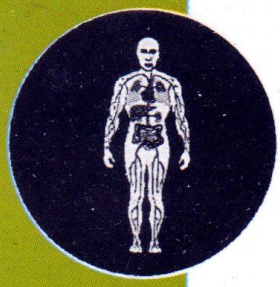
the most precious is health



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VANDANA SHIVA

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Quarterly journal of Arya Vaidya Sala

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From the Editor

Arya Vaidya Sala is entering to a new century, the 101st year of dedicated service. The yearlong centenary celebrations proved more than anything else the trust and confidence the public have bestowed on this pioneer institution. The discourses held in several parts of the country resonated this feeling of love and respect. There were also words of caution regarding the challenges ayurveda has to face in the changing global scenario. Many participants stressed the need for a united approach. They all vested their hopes on Arya Vaidya Sala to take the lead as it had done in the turbulent days of its inception a century ago.

The lecture by Dr. Vandana Shiva in the valedictory session of centenary celebrations was especially stimulating. Sharing her anxiety on the survival of traditional knowledge with the intellectual community, the renowned scientist enlisted three major threats – overexploitation of medicinal plants, the appropriation and patenting of ayurvedic knowledge and the risk of intellectual stagnation. Her clarion call was to fight against these tendencies lest the products survive and practitioners disappear in ayurveda. The full text of the lecture is given in this issue.

We are grateful to all who have ignited our thoughts during the seminar sessions.

Kottakkal
31.01.2003

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FROM THE PAGES OF VAGBHATA - LX

N.V.K. Varier

Abstract: Various types of *yantra*s, their shape, uses, etc. has been mentioned in this Chapter.

अथातो यन्त्रविधिमध्यायं व्याख्यस्याम: ।
इति ह स्माहुरात्रेयादयो महर्षय: ।

(*Athato yantravidhimadhyayam*
vyakhyasyamah ।
Iti ha smahuratreyadayo
maharshayah ।)

Then we begin to narrate the chapter titled *yantravidhi* (instruction on the usage of instruments); thus said the sages Atreya and others.

नानाविधानां शल्यानां नानादेशप्रबाधिनाम् ।
आहृतावभ्युपायो यस्तद्यन्त्रं यश्च दर्शने ।। १ ।।
अर्शोभगन्दरादीनां शस्त्रक्षाराग्नियोजने ।
शेषाङ्गपरिरक्षायां तथा वस्त्यादिकर्मणि ।। २ ।।
घटिकालाबुशृङ्गं च जाम्बवौष्ठादिकानि च

(*Nanavidhanam salyanam*
nanadesaprabadhinam ।
ahritavabhyupayo yastad-
yantram yascha darsane ।। 1 ।।
Arsobhagandaradeenam
sastraksharagniyojane ।
seshangaparirakshayam
tatha vastyadikarmani ।। 2 ।।
Ghatikalabusringam cha
jambavaushtadikani cha ।)

Yantras are the instruments used to draw out *salya*s (foreign substances lodged in the body and creating troubles which are of various forms affecting different parts of the body). Those devices used for looking at piles, fistula, etc., those for protecting the body parts nearer to the site of *sastrakarma* (surgery), *ksharakarma* (application of caustic alkali) and *agnikarma* (cauterization with fire), those for performing *vasti*, etc. are *yantra*s. Also, the devices like *ghatika* (small pot), *alabu* (gourd), *sringa* (horn) and *jambavoshta* (a rod like instrument with its tip shaped like the jamun fruit) are *yantra*s.

अनेकरूपकार्याणि यन्त्राणि विविधान्यत: ।। ३ ।।
विकल्प कल्पयेद्बुध्या

(*anekaroopakaryani*
yantrani vividhanyatah ।। 3 ।।
Vikalpa kalpayedbudhya)

Since the forms and mode of actions are of diverse nature, the *yantra*s also have to be made variously as per the needs.

यथास्थूलं तु वक्ष्यते ।
तुल्यानि कङ्कसिंहर्क्षकाकादिमृगपक्षिणाम् ।। ४ ।।
मुखैर्मुखानि यन्त्राणां कुर्यात्तत्संज्ञकानि च ।
अष्टादशाङ्गुलायामान्यायसानि च भूरिश: ।। ५ ।।

मसूराकारपर्यन्तैः कण्ठे बद्धानि कीलकैः ।
विद्यात्स्वस्तिकयन्त्राणि मुलेऽङ्कुशनतानि च ।। ६ ।।
तैर्दृढैरस्थिसंलग्नशल्याहरणमिष्यते ।

(*yathasthoolam tu vakshyate* ।
tulyani kankasimharksha-
kakadimrigapakshinam ।। 4 ।।
Mukhairmukhani yantranam
kuryattadsamnjakani cha ।
ashtadasangulayamanya-
yasani cha bhoorisah ।। 5 ।।
Masoorakaraparyantaih
kanthe baddhani keelakaih ।
vidyatsvastikayantrani
mulesngusanatani cha ।। 6 ।।
Tairdridhairastisamlagna-
salyaharanamishyate ।)

They are described here in outline as examples. Generally, they are of six groups – i.e. *svastika*, *sandamsa*, *tala*, *nadee*, *salaka* and *anuyantra*s. *Svastika yantra*s are to be made with their tips shaped like the faces of birds and animals as *kanka* (heron), *simha* (lion), *riksha* (bear), *kaka* (crow), etc. and names are given as per their forms. They are to be eighteen fingers long and most of them are made of iron. They are joined together with *keelaka*s (wedges) shaped like *masoora*s (lentils) at their neck part, and at base, they are curved like a hook. These strong instruments are to pull out the *salya*s, which are stuck up in the bone.

कीलबद्धविमुक्ताग्रौ सन्दंशौ षोडशाङ्गुलौ ।। ७ ।।
त्वक्सिरास्नायुपिशितलग्नशल्यापकर्षणौ ।

(*keelabaddhavimuktagrau*
sandamsau shodasangulau ।। 7 ।।
Tvaksirasnayupisitalagna-
salyapakarshanau ।)

*Sandamsa yantra*s are sixteen *angula*s long, and are of two types. One with its lips fixed with wedges and the other not fixed. They are for pulling out the *salya*s, which are stuck up to the skin, veins, tendons and muscles.

षडङ्गुलोऽन्यो हरणे सूक्ष्मशल्योपपक्ष्मणाम् ।। ८ ।।

(*shadangulosnyo harane*
sookshmasalyopapakshmanam ।। 8 ।।)

There is another one, which is of six *angula*s in length, intended to pull out very minute *salya*s, and curved ciliae from the eye lashes.

मुचुण्डी सूक्ष्मदन्तर्जुर्मूले रुचकभूषणा ।
गम्भीरव्रणमांसानामर्मणः शेषितस्य च ।। ९ ।।

(*Muchundee sookshmadantar-*
jurmoole ruchakabhooshana ।
gambheeravranamamsana-
marmanah seshitasya cha ।। 9 ।।)

Muchundee is with minute teeth in its tips and straight. It is adorned with a ring at the base, and is used for pulling out fleshy stuff from deep wounds, and the remains of cut *arma*.

द्वे द्वादशाङ्गुले मत्स्यतालवत् द्व्येकतालके ।
तालयन्त्रे स्मृते कर्णनाडीशल्यापहारिणी ।। १० ।।

(*Dve dvadasangule matsya-*
talavat dvyekatalake ।
talayantre smrite karnanadee-
salyapaharinee ।। 10 ।।)

There are two types of *tala yantra*s – *ekatalaka* and *dvitalaka*, both are twelve *angula*s long. *Ekatalaka* means, one rod with its tip shaped like the mouth of a fish; such two rods fixed together at their base, is *dvitalaka*. Both these *yantra*s are used for drawing out the foreign matters from the orifice of the ears.

नाडीयन्त्राणि सुषिराण्येकानेकमुखानि च ।

स्रोतोगतानां शल्यानामामयानां च दर्शने ।। ११
क्रियाणां सुकरत्वाय कुर्यादाचूषणाय च ।
ताद्विस्तारपरीणाहदैर्घ्यं स्रोतोनुरोधत: ।। १२ ।।

(*Nadeeyantrani sushiranyeka-*
nekamukhani cha ।
srotogatanam salyana-
mamayanam cha darsane ।। 11 ।।
Kriyanam sukaratvaya
kuryadachooshanaya cha ।
tadvistarapareenaha-
dairghyam srotonurodhatah ।। 12 ।।)

*Nadeeyantra*s are tubular instruments with one or more opening. Their usage is to detect and examine the *salya*s (foreign bodies), diseases localized in the tubular parts of the body as the throat, ears, etc. and for easy performance of surgery, cauterization and suction – their breadth, circumference and length are to be directed according to the channels and needs.

दशाङ्गुलाऽर्धनाहाऽन्त:कण्ठशल्यावलोकिनी ।
नाडी

(*Dasangulaऽrdhanahaऽntah-*
kanthasalyavalokinee ।
nadee -)

The *nadeeyantra* for examining the *salya* in the throat should be ten *angula*s long and five *angula*s in circumference.

– पञ्चमुखच्छिद्रा चतुष्कर्णस्य संग्रहे ।। १३ ।।
वारङ्गस्य, द्विकर्णस्य त्रिच्छिद्रा तत्प्रमाणत: ।

(- *panchamukhacchidra*
chatushkarnasya sangrahe ।। 13 ।।
Varangasya, dvikarnasya
tricchidra tatpramanatah ।)

For grasping and handling an arrow with four faces, a five-faced tubular instrument has to be used. Similarly, in the case of two-faced arrow, the instrument should be three faced. So the forms are decided as per the type of *salya*.

वारङ्गकर्णसंस्थानानाहदैर्घ्यानुरोधत: ।। १४ ।।
नाडीरेवंविधाश्चान्या द्रष्टुं शल्यानि कारयेत् ।

(*varangakarnasamsthana-*
nahadairghyanurodhatah ।। 14 ।।
Nadeerevamvidhaschanya
drashtum salyani karayet ।)

Many other suitable forms of *nadeeyantra*s can be prepared to observe the *salya*s as per the size, girth and length of the feather-like ears of the arrow.

पद्मकर्णिकया मूर्ध्नि सदृशी द्वादशाङ्गुला ।। १५ ।।
चतुर्थसुषिरा नाडी शल्यनिर्घातिनी मता ।

(*Padmakarnikaya moordhni*
sadrisee dvadasangula ।। 15 ।।
chaturthasushira nadee
salyanirghatinee mata ।)

The *nadee* termed *salyanirghatini* (that which removes *salya*) is with its top shaped like the pericarp of lotus (the round flat central part of the lotus studded with small holes). This instrument is twelve *angula*s long; its hollow is one-fourth of the length or three *angula*s.

अर्शसां गोस्तनाकारं यन्त्रकं चतुरङ्गुलम् ।। १६ ।।
नाहे पञ्चाङ्गुलं पुंसां प्रमदानां षडङ्गुलम् ।
द्विच्छिद्रं दर्शने व्याधेरेकच्छिद्रं तु कर्मणि ।। १७ ।।
मध्येऽस्य त्र्यङ्गुलं छिद्रमङ्गुष्टोदरविस्तृतम् ।
अर्धाङ्गुलोच्छ्रितोद्वृत्तकर्णिकं च तदूर्ध्वत: ।। १८ ।।

(*arsasam gostanakaram*
yantrakam chaturangulam ।। 16 ।।
Nahe panchangulam pumsam
pramadanam shadangulam ।

dvicchidram darsane vyadhe-
rekacchidram tu karmani ।। 17 ।।
Madhyesya tryangulam chidra-
mangushtodaravistrutam ।
Ardhangulocchritodvritta-
karnikam cha tadoordhvatah ।। 18 ।।)

The *yantra* to examine the piles is to be shaped like the nipple of the cow. It should be of four *angula*s in length. In circumference, it should be of five *angula*s for men and of six *angula*s for women. It should be with two slits on each side. This slit is to be at the centre, three *angulas* in length, and in width equal to the size of the middle portion of the thumb, and there should be a rim also having an elevation of half *angula*.

शम्याख्यं तादृगच्छिद्रं यन्त्रमर्शः प्रपीडनम् ।

(*Samyakhyam tadrgacchidram*
yantramarsah prapeedanam ।)

The instrument for pressing the piles is called *sameeyantra*. This is without holes.

सर्वथाऽपनयेदोष्ठं छिद्रादूर्ध्वं भगन्दरे ।। १९ ।।

(*sarvathaspanayedoshtham*
chidradoordhvam bhagandare ।। 19 ।।)

In *bhagandara yantra* (the instrument for dealing with fistula in ano) the lip take away above orifice.

घ्राणार्बुदार्शसामेकच्छिद्रा नाड्यङ्गुलद्वया ।
प्रदेशिनीपरीणाहा स्याद्भगन्दरयन्त्रवत् ।। २० ।।

(*Ghranarbudarsameka-*
cchidra nadyanguladvaya ।
pradesineepareenaha syad-
bhagandarayantravat ।। 20 ।।)

The *yantra* for dealing with *nasarbuda* (nasal tumor in the nose) and *nasarsas* (nasal polyp) is to be with one orifice of two *angula*s in length, and in circumference equal to the girth of the middle finger. It is similar to the *bhagandara yantra* i.e. without the lip.

अङ्गुलित्राणकं दान्तं वार्क्षं वा चतुरङ्गुलम् ।
द्विच्छिद्रं गोस्तनाकारं तद्वक्त्रविवृतौ सुखम् ।। २१ ।।

(*Angulitranakam dantam*
varksham va chaturangulam ।
dvicchidram gostanakaram
tadvaktravivritau sukham ।। 21 ।।)

Angulitranaka yantra, the instrument for protecting the fingers, is made with animal tooth (ivory) or wood. It is four *angula*s long, with two orifices, and shaped like the nipple of a cow. It is used to protect the fingers from contact with the teeth and other parts when the mouth has to be opened wide.

योनिव्रणेक्षणं मध्ये सुषिरं षोडशाङ्गुलम् ।
मुद्राबद्धं चतुर्भित्तमम्भोजमुकुलाननम् ।। २२ ।।
चतुःशलाकमाक्रान्तं मूले तद्विकसेन्मुखे ।

(*Yonivranekshanm madhye*
sushiram shodasangulam ।
mudrabaddham chaturbhittama-
mbhojamukulananam ।। 22 ।।
Chatuhsalakamakrantam
moole tadvikasenmukhe ।)

The instrument for examining vaginal ulcers, *yonivranekshana* is one with an orifice in the middle, sixteen *angula*s long and fixed with a seal (ring) at the base. It is with four petals, and so it resembles totally to a lotus-bud. These petals are held tight by the ring. If this *yantra* is pressed in the base, the mouth opens. (Here the term *akranta* means pressed)

यन्त्रे नाडीव्रणाभ्यङ्गक्षाळनाय षडङ्गुले ।। २३ ।।
वस्तियन्त्राकृती मूले मुखेऽङ्गुष्ठकळायखे ।

अग्रतोऽकर्णिके मूले निबद्धमृदुचर्मणी ।। २४ ।।

(*yantre nadeevranabhyanga-*
kshalanaya shadangule ।। 23 ।।
Vastiyantrakritee moole
mukheऽngushthakalayakhe ।
agratoऽkarnike moole
nibaddhamriducharmanee ।। 24 ।।)

Two *yantra*s of six *angula*s in length are for oiling and washing the *nadeevrana*s (fistulas). They are shaped like *vastiyantra*s, having a hole permitting the entry of a thumb at its base, and of a round pea at its top. It has no ridge at its tip, and a soft leather bag is attached with at its base.

द्विद्वारा नळिका पिञ्चनळिका वोदकोदरे ।

(*Dvidvara nalika pincha-*
nalika vodakodare ।)

The *nalika* (tube) with two holes (openings at both ends) or *pinchanalika* (tube of a peacock feather) are the instruments for using in *udakodara* (ascitis).

धूमवस्त्यादियन्त्राणि निर्दिष्टानि यथायथम् ।। २५

(*dhoomavastyadiyantrani*
nirdishtani yathayatham ।। 25 ।।)

The instruments for *dhoomapana* (smoking) and *vasti* (enema) are already described in their contexts.

त्र्यङ्गुलास्यं भवेच्छृङ्गं चूषणेऽष्टादशाङ्गुलम् ।
अग्रे सिद्धार्थकच्छिद्रं सुनद्धं चूचुकाकृति ।। २६ ।।

(*Tryangulasyam bhavechringam*
chooshaneऽshtadasangulam ।
agre siddharthakacchidram
sunaddham choochukakriti ।। 26 ।।)

The *sringa* (horn) is for suction, with an orifice of three *angula*s at the base, and eighteen *angula*s in length. At the tip it is well formed like the nipple of a woman, permitting the passage of a mustard seed. It is used for suction of impure blood from the patient's body. The wider end of the *yantra* is fixed at the side of suction, and the physician draws out the blood through the other end.

स्याद्वादशाङ्गुलोऽलाबुर्नाहे त्वष्टादशाङ्गुलः ।
चतुस्त्र्यङ्गुलवृत्तास्यो दीप्तोऽन्तः श्लेष्मरक्तहृत् ।। २७ ।।

(*Syadvadasangulo*ऽ*laburnahe*
tvashtadasangulah ।
chatustryangulavrittasyo
deeptoऽntah sleshmaraktahrit ।। 27 ।।)

Alabu, the hollowed bottle gourd is to be twelve *angula*s in length and eighteen *angula*s in circumference. Its face has to be round measuring three or four *angula*s with a burning wick placed inside it. It is used to extract *kapha* and *raktha.*

तद्वद्घटी हिता गुल्मविलयोन्नमने च सा ।

(*Tadvadghatee hita gulma-*
vilayonnamane cha sa ।)

Ghateeyantra is similar to *alabu* in its shape and usage. It is also used for dissolution and raising up of *gulma* (refer the usage of *ghatee* in *Gulmachikitsa*, chapter 14 - *Chikitsasthana*).

शलाकाख्यानि यन्त्राणि नानाकर्माकृतीनि च ।। २८ ।।
यथायोगप्रमाणानि

(*salakakhyani yantrani*
nanakarmakrteeni cha ।। 28 ।।
Yathayogapramanani -)

The *salakayantra*s are rod-like instruments. They are used for various actions, and so have different shapes and measurements suitable for each particular action.

तेषामेषणकर्मणी ।
उभे गण्डूपदमुखे –

(- *teshameshanakarmanee* ।
ubhe gandoopadamukhe -)

Two of them, meant for probing, are with faces like that of earthworms.

– स्रोतोभ्यः शल्यहारिणी ।। २९ ।।
मसूरदलवक्त्रे द्वे स्यातामष्टनवाङ्गुले ।

(- *srotobhyah salyaharinee* ।। 29 ।।
Masooradalavaktre dve
syatamashtanavangule ।)

Other two are intended for removing foreign substances from body channels. They are with faces resembling *masoora* (lentil). They can be eight or nine *angulas* in length.

शङ्कवः षडुभौ तेषां षोडशद्वादशाङ्गुलौ ।। ३० ।।
व्यूहनेऽहिफणावक्त्रौ –

(*sankavah shadubhau tesham*
shodasadvadasangulau
Vyoohaneऽhiphnavaktrau - ।। 30 ।।)

Sankuyantras are six in number. Two of them are sixteen and twelve *angula*s in length respectively, and their face resembles the hoods of serpents. They are for *vyoohana* – arranging or properly assembling the dispersed flesh and others at their proper sites.

द्वौ दशद्वादशाङ्गुलौ ।
चालने शरपुङ्खास्यौ

(- *dvau dasadvadasangulau* ।
chalane sarapunkhasyau -)

Other two *sankuyantra*s are for *chalana* – for shaking or loosening of the hard and stuck up *salya*s. One of them is ten *angula*s and the other twelve *angula*s in length, and both have their face shaped like *sarapunkha* (the feathered end of an arrow).

– अहार्ये बडिशाकृती ।। ३१ ।।

(- *aharye badisakrtee* ।। 31 ।।)

Other two *sankuyantra*s are shaped like a fishing hook (*badisa*) and they are meant for *aharana* (extracting)

नतोऽग्रे शङ्कुना तुल्यो गर्भशङ्कुरिति स्मृतः ।
अष्टाङ्गुलायतस्तेन मूढगर्भं हरेत् स्त्रियाः ।। ३२ ।।

(*Natoऽgre sankuna tulyo*
garbhasankuriti smritah
ashtangulayatastena
moodhagarbham haret striyah ।। 32 ।।)

The instrument with a curved tip, resembling a hook, is known as *garbhasanku*. It is eight *angulas* long and used to take out the *moodha garbha* (obstructed foetus).

अश्मर्याहरणे सर्पफणावद्वक्रमग्रतः ।

(*Asmaryaharane sarpa-*
phanavadvakramagratah ।)

The *yantra*, for extracting the stone in the bladder has its tip curved like the hood of a serpent, and is termed as *asmaryaharana*.

शरपुङ्खमुखं दन्तपातनं चतुरङ्गुलम् ।। ३३ ।।

(*sarapunkhamukham danta-*
patanam chaturangulam ।। 33 ।।)

The *sarapunkhamukha yantra* is four *angula*s in length, and is used for extracting the teeth. Its face resembles *sarapunkha*.

कार्पासविहितोष्णीषाः शलाकाः षट् प्रमार्जने ।

(*Karpasavihitoshneeshah*
salakah shat pramarjane ।)

Six types of *salakayantra*s, with their tops covered with cotton are for cleaning and wiping of ulcers.

पायावासन्नदूरार्थे द्वे दशद्वादशाङ्गुले ।। ३४ ।।

(*Payavasannadoorarthe*
dve dasadvadasangule ।। 34 ।।)

Two of them – one having ten *angula*s and the other of twelve *angula*s long – are used for cleaning the interior parts of anus, nearer and distant respectively.

द्वे षट्सप्ताङ्गुले घ्राणे, द्वे कर्णेऽष्टनवाङ्गुले ।

(*Dve shatsaptangule ghrane,*
dve karneऽshtanavangule ।)

Two others having six and seven *angula*s long are for cleaning the nose, and another two having eight and nine *angula*s long are meant for ears. Here also the usage is intended as for nearer and distant ends.

कर्णशोधनमश्वत्थपत्रप्रान्तं स्रुवाननम् ।। ३५ ।।

(*karnasodhanamasvatha-*
patraprantam sruvananam ।। 35 ।।)

The instrument for cleaning the ear is with edges shaped like *asvathapatra* (leaf of the religious fiig tree) and face resembling a *sruva* (a sort of laddle).

शलाकाजाम्बवौष्ठानां क्षारेऽग्नौ च पृथक् त्रयम् ।
युञ्ज्यात् स्थूलाणुदीर्घाणां

(*Salakajambavaushthanam*
kshareऽgnau cha prithak trayam ।
yunjyat sthoolanudeerghanam -)

Both *salaka*s and *jambavoshta*s are three in number, thick, thin and long in their forms. They are used for the administration of *kshara* (caustic alkali) and *agni* (fire).

शलाकामन्त्रवर्ध्मनि ।। ३६ ।।
मध्योर्ध्ववृत्तदण्डां च मूले चार्धेन्दुसन्निभाम् ।

(- *salakamantravardhmani*
Madhyordhvavrittadandam cha ।। 36 ।।
moole chardhendusannibham ।)

For *dahakarma* (cauterization) in *antravriddhi* (intestinal hernia in the scortum) the *salaka* should be one with an upper portion rough from the middle onwards and base shaped like a half moon.

कोलास्थिदलतुल्यास्या नासार्शोर्बुददाहकृत् ।। ३७ ।।

(*kolasthidalatulyasya*
nasarsorbudadahakrt ।। 37 ।।)

The *salaka*, for the cauterization of *nasarsa* (nasal polyp) and *nasarbuda* (nasal tumour), is with its face equal to the size of a *kola beeja* (jujube seed).

अष्टाङ्गुला निम्नमुखास्तिस्रः क्षारौषधक्रमे ।
कनीनीमध्यमानामीनखमानसमैर्मुखैः ।। ३८ ।।

(*Ashtangula nimnamukha-*
stisrah ksharaushadhakrame ।
kaneeneemadhyamanamee-
nakhamansamairmukhaih ।। 38 ।।)

Three *salaka*s of eight *angula*s in length and caved face are to be used for the *kshara* application. These caved faces, in their size, should be equal to the nails of little, ring and middle fingers respectively.

स्वंस्वमुक्तानि यन्त्राणि मेढ्रशुद्ध्यञ्जनादिषु ।

(*Svamsvamuktani yantrani*
medhrasuddhyanjanadishu ।)

The instruments for cleansing the penis and for application of *anjana*, are mentioned at their relevant contexts.

अनुयन्त्राण्ययस्कान्तरज्जुवस्त्राश्ममुद्गराः ।। ३९ ।।
वध्रान्त्रजिह्वावालाश्च शाखानखमुखद्विजाः ।
कालः पाकः करः पादो भयं हर्षश्च, तत्क्रियाः ४०

उपायवित्प्रविभजेदालोच्य निपुणं धिया ।। ४० १/२ ।।

(*anuyantranyayaskanta-*
rajjuvastrasmamudgarah ।। 39 ।।
Vadhrantrajihvavalascha
sakhanakhamukhadvijah ।
kalah pakah karah pado bhayam
harshascha, tatkriyah 40
Upayavitpravibhaje-
dalochya nipunam dhiya ।। 40½ ।।)

*Anuyantra*s (accessory instruments) are - magnets, ropes and threads, cloth, stones, hammer, leather straps, intestines of animals, tongue, hair, branches of tree, nails, mouth, teeth, time, maturation, hand, leg, fear and pleasure. The expert physician may judiciously assess the actions and functions of these instruments and make use of them as per the conditions.

निर्घातनोन्मथनपूरणमार्गशुद्धि–
संव्यूहनाहरणबन्धनपीडनानि ।
आचूषणोन्नमननामनचालभङ्ग–
व्यावर्तनर्जुकरणानि च यन्त्रकर्म ।। ४१ १/२ ।।

(*Nirghatanonmathanapooranamargasu-*
dhisamvyoohanaharana bandhana
peedanani ।
achooshanonnamananamanachalabhanga-
vyavartanarjukaranani cha
yantrakarma ।। 41½ ।।)

Nirghatana (forcing out), *unmatana* (pulling out), *poorana* (filling), *marga suddhi* (cleaning the way), *samvyoohana* (assembling), *aharana* (extracting), *bandhana* (bandaging), *peedana* (pressing), *achooshana* (sucking), *unnamana* (raising up), *namana* (pushing down), *chalana* (shaking), *bhanga* (breaking), *vyavartana* (overturning), *rijukarana* (straightening) – all these are the functions of *yantra*s.

विवर्तते साध्ववगाहते च
ग्राह्यं गृहीत्वोद्धरते च यस्मात् ।
यन्त्रेष्वतः कङ्कमुखं प्रधानं
स्थानेषु सर्वेष्वधिकारि यश्च ।। ४२ १/२ ।।

(*Vivartate sadhvavagahate cha*
grahyam griheetvoddharate cha yasmat ।
yantreshvatah kankamukham pradhanam
sthaneshu sarveshvadhikari yascha ।। 42½ ।।)

Among the *yantra*s, *kankamukha* is the most important and authoritative one since it can be employed for turning round, introducing deeply, and catching on the required objects and taking out properly.

इति श्रीवैद्यपतिसिंहगुप्तसूनुश्रीमद्वाग्भटविरचितायामष्टाङ्ग–
हृदयसंहितायां सूत्रस्थाने यन्त्रविधिर्नाम पञ्चविंशोऽध्यायः।।

(*Iti sreevaidyapatisimhaguptasoonu sreemad-*
vagbhatavirachitayamashtangahridaya-
samhitayam sootrasthane yantravidhirnama
panchavimsoऽdhyayah ।।)

Thus ends the chapter *yantravidhi*, the twenty-fifth in the *soothrasthana* of Ashtangahrdaya-samhita, composed by Srimad Vagbhata, son of Vaidyapati Simhagupta.

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AYURVEDIC DRUG RESEARCH

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Abstract: Modern research in the field of ayurvedic drugs is an area gaining importance in the changed global scenario. There are various aspects of drug research, which need particular attention. This paper attempts to take a cursory look at these aspects.

Introduction

Any living science needs constant support from research for its survival and growth. Ayurvedic science and ayurvedic medicines have been in practice for the past several centuries. Presently, there is a rise in the reach of ayurvedic system globally. This makes research all the more important.

Research activities can be in different fields. It could be in the clinical aspects, textual theories, drug formulations, raw materials, etc. Research in relation to ayurvedic drugs is particularly considered here. Here again research can be with reference to different aspects of ayurvedic drugs. The basic objectives in all these efforts should be twofold. Firstly, the general objective should be to revalidate, reinforce and strengthen the existing principles and practices with the support of evidence generated with the use and application of modern science and technology. Secondly, the objective should be to evolve and develop new armaments and new standards. Here again the method will be an appropriate interfacing between traditional knowledge and modern techniques.

Interfacing with modern science

There is a very pertinent question here. Is there a need for rediscovering what is already known and practiced? The answer is that, yes, there is a need with respect to certain aspects of existing practices. The basic aim is to equip this ancient body of knowledge to enable it to play its due role in the new global scenario. If it is not done now in an appropriate manner, this invaluable science of health - care will be overtaken and submerged by various global trends. We must start looking at ayurveda from a global perspective rather than from the limited viewpoint of domestic situation. For this purpose, modern science and its principles and methods are going to be a supporting aid of great use. It should be stressed here that there is no reason for anxiety in the minds of traditional practitioners. If we take a close look at the centuries old history of ayurvedic development, it will be seen that the ancient

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system of ayurveda has displayed a tremendous degree of readiness and preparedness to accept and assimilate inputs from other parallel streams of knowledge at every stage of its development. That is how, fermentation techniques, incineration techniques, various types of cooking, distilling and other processes, etc. have become integral aspects of ayurvedic procedures. Looking from this background, we can see that there is no reason for feeling apprehensive about receiving inputs from modern science and technology for strengthening ayurvedic system. The important point is that, this interfacing should be done in an appropriate manner and by maintaining the fidelity of ayurvedic paradigms. This is with respect to the both the aspects of drug research, that is generation of evidence-based support ground and evolution of new armaments.

Viewed from this angle, five specific areas of drug research can be identified.

1. Evidence generation
2. Process optimisation
3. Standardisation
4. New product development
5. Textual research

The possibilities in each area can be separately examined.

Evidence generation

It is well known that the proof of pudding is in eating. That is to say that the very fact that a wide variety of classical medicines have been in continuous use in different parts of the country for the past several centuries, is itself a kind of validation of their efficacy and utility. The society would have thrown away those which are of no use to it. But at the same time, it must be recognised that for universalising their use, we must generate empirical data corroborating the observations. This is also required in order to confirm all the supporting aspects of drug usage such as efficacy and safety. Objective data of this kind will help the ayurvedic medicines to acquire the status of a drug which can be used worldwide.

For generating such objective data, basically two kinds of research may have to be undertaken. One is related to clinical efficacy and the other is related to standardisation.

The clinical studies should help us to generate data on efficacy, safety, toxicology, etc. Here, there are several hurdles arising from certain unique characteristics of ayurvedic approach and their apparent incompatibility with modern concepts of research methodology. But we have to necessarily overcome these hurdles.

There are clearly defined procedures and protocols while designing a modern clinical study. They involve the establishment of an Institutional Ethical Committee, obtaining informed consent from volunteers, conducting trials on a double blinded placebo model, confirming statistical validity, maintaining a certain minimum sample population, etc. Some of these conditionalities can easily be met in ayurvedic drug research also. But it is not so easy in the case of placebo design and some other aspects. This is because, there are many subjective elements in ayurvedic therapy, and moreover food control and other regimen also play a significant role. Additionally, it is also found that there are instances where biochemical values of assessing efficacy do

not necessarily match with the ayurvedic parameters of symptom modification. There are examples where researchers have attempted this. It is understood that ICMR is engaged in designing appropriate protocols for such trials with ayurvedic drugs. Results coming out of such studies will receive universal acceptance. The question of standardisation will be touched upon a little later.

Under the topic of evidence generation, one may also consider the issue of optimisation of formula composition. The very basic nature of ayurvedic drug is its poly-herbal composition. The progress and expansion of ayurvedic drug industry is going to exert a great stress on natural resources. It is the need of the time that all concerned people and organisations should make all out efforts to trim the ingredients of drugs. There are medicines like *Maharajaprasarani tailam* and *Abhrabhasmam* (*sahasraputi*) which contain more than 100 herbal ingredients. It is not quite clear how we can think of trimming such formulations. One possible way is to attempt to study the expected efficacy both based on the known *rasa - guna - veerya - vipaka - prabhava* characteristics of all the ingredients and make a logical filtration. Alternately, clinical studies could also be attempted. In any case, rationalised use of herbal ingredients is going to become a major area of research in the near future, if the current trend of global appreciation of ayurvedic system continues.

Process optimisation

This area is a natural extension of the above subject. It is generally recognised that there is a great need to frugalise the use of energy and material in the drug preparation. How can one do it without compromising the inherent quality and efficacy of the drug? The only possible way is to develop new processing methods. Can there be better methods of extraction, so that material usage can be restricted? It is understood that National Research Agencies like CSIR and DST extend support to such efforts. For doing such studies, the preliminary step is to set objective parameters of drug characters and then to use them as standards for comparison. By doing so, experimental variations in process conditions can be attempted and it can be ensured that the drug efficacy is not compromised. Ayurvedic drug processing is still largely based on traditional practices of cooking. There are modern pharmaceutical procedures which can usefully be tried for ayurvedic drugs also.

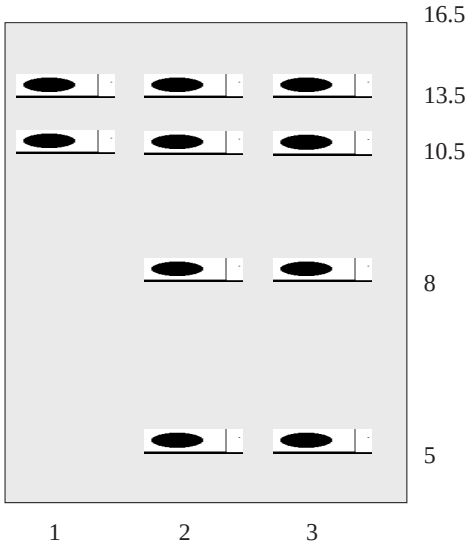
Standardisation

Standardisation related research is an important activity for the worldwide growth of ayurvedic drug, as mentioned earlier. The three basic levels where standardisation efforts should be focused are the material, the process and the product. For all these three components, ayurvedic texts specify traditional methods of standardisation. They have been proved quite effective and useful in the development of this traditional science. There is an element of subjectivity in those standards. Many of them are based on organoleptic parameters. There is nothing wrong in having organoleptic parameters. As is well known, tea industry and brewery make use of subjective quality testing very effectively. But the point is that such organoleptic standards can be and should be supplemented by objective standards with the help of modern scientific methods. Efforts in this direction are progressing in several fronts.

The government of India has brought out Official Formularies, Pharmacopoeial Standards and Herbal Pharmacopoeia. They have helped in bringing in a certain amount of objectivity.

In the case of raw herbs, several monographs are contained in the Pharmacopoeia, which include organoleptic, botanic and phyto-chemical parameters. It is understood that IICT at Hyderabad has initiated an important work where modern techniques are employed to quantify classical parameters. In the case of products, physico-chemical parameters are set in the Pharmacopoeial standards. For example, the official standards for *Dasamoolarishtam* are given below (Chart I).

It must be mentioned here that these physico-chemical parameters are mostly indicative in nature rather than definitive. At least hypothetically, one can concoct a potion satisfying these parameters at the same time not being *Dasamoolarishtam*. The reason for this is the fact that none of these parameters tells anything about the medicinal efficacy. That is where, there is scope for undertaking major research programmes. By adapting modern chromatographic techniques, it should be possible to characterise a medicine. For example, TLC separation of *Ksheerabala tailam* is given below:



High Performance TLC will help to do similar work more efficiently. The objective can be achieved in two phases. In the first phase, such chromatograms can be used as fingerprints. In the second phase, these characteristic spots or peaks can be identified and quantified.

The ayurvedic drug processing methods also need to be standardised. Efforts can be initiated to quantify the various subjective parameters currently being used as presented here.

Chart I

Official Standard for *Dasamoolarishtam*

Description	:	Fragrant clear liquid with sweet taste
Total solids	:	25 – 35% w/v
Specific gravity	:	1.10 – 1.15
Sugars		
Reducing	:	19 – 25% w/v
Non reducing	:	N.M.T 1% w/v
pH	:	3.5 – 6.0
Alcohol Content	:	4.5-8.5% v/v

New product development

The one area where significant work is proceeding is new product development. There are three possible routes here.

a) Modernisation of presentation form of traditional dosages.

b) Developing new drugs based exclusively on classical texts.
c) Developing new drugs based on modern scientific methods.

All the three areas have their own importance. Some of the classical formulations, as all of us know, are not quite user-compliant. They are bitter in taste and cumbersome to handle. The modern patients, particularly the younger generation, prefer to have more user-friendly drugs. It is in the long-term interest of ayurveda that such modifications are attempted.

As far as developing new drugs on the basis of classical formulations, the deciding criteria may be the so-called new ailments of modern man. The fast life style of modern man and other significant changes that have taken place in the society have opened up new challenges before the health care specialists. Ayurveda must be able to play its due role in this situation by coming up with still untapped knowledge base in the classical texts. For doing this, the classical axiomatic framework of *tridosha*, *panchabhoota*, *saptadhatu* and *shadrasa* will have to be retained.

Another important area is the appropriate application of the principles and tools of modern science to develop new molecules from classical formulations. The apex Governmental Science body of CSIR is currently engaged in a major project of this kind. Prima facie, it may appear as if we are deviating from classical ayurvedic approach. But it is not really so. The point is that we must consider combination formulations instead of single drugs and we must also consider minor molecules in addition to the major bioactive molecule. Such new molecules will be a great contribution from the ancient Indian health care science of ayurveda to the world at large. It must be remembered that classical ayurvedic formulations are not recognised as official drugs in any country other than India.

Textual research.

The vast depository of classical texts in Sanskrit and other Indian languages offer an unfathomable mine of knowledge. The ancient sages had studied, discussed, interpreted and updated that knowledge base. It is now time that the ayurvedic scholars have again taken up such extensive study and interpretation of classical texts. Many of the textual presumptions, database and even the conclusions may need to be revalidated in the light of modern knowledge and changed view of life.

Similarly, it is also time that new texts are written. After the *Samhitas* of more than 2000 years, several other texts were written. They are all recorded documents of human experiences. Yet, newer texts should be written now taking into account new experiences.

Conclusion

In conclusion, it may be stated here that the ayurvedic drug research should be an appropriate blend of classical wisdom and modern expertise. They need not be mutually exclusive. They can play complementary roles. The prime objective should be to enhance the inherent healing ability of ayurvedic drugs in quality and reach.

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PHARMACOGNOSTICAL STUDIES ON *SOLANUM TRILOBATUM* LINN.

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Abstract: *Solanum trilobatum* Linn. is a popular medicinal plant used in the treatment of inflammation, bronchitis, asthma and also in a variety of diseases. In view of its medicinal importance, a study on macroscopic and microscopic characters of leaves, stems and roots have been made and presented.

Introduction

Solanum tribobatum Linn. (Solanaceae) grows as a climbing under-shrub and is widely distributed throughout the State of Andhrapradesh and Tamil Nadu. It is known as *alarka* in Sanskrit, a*larkapatramu* in Telugu, *tuduvalai* in Tamil and *tutavalam* in Malayalam. In India, the entire plant has been used for ages to treat inflammatory conditions and also as an expectorant. It has been well documented in the Indian literature to cure asthma, bronchitis and also for the treatment for tuberculosis.

Materials and methods

The plant material was obtained from Captain Srinivasa Murthy Drug Research Institute of Ayurveda (CSMDRIA), Chennai and its macro, micro and quantitative analysis were carried out. For anatomical work, hand sections and macerated materials were stained and examined under the microscope. Hand sections of the fresh leaf, petiole, stem and root were taken and double stained in alcoholic saffranin (0.5%) and counter stained with 0.25% fast green. This method yields good results for studying the histology of different tissues of the plant organs. All slides, after staining in saffranin, were dehydrated with graded series of ethyl alcohol (30%, 50%, 70%, 90% and absolute alcohol) and stained in fast green, clove oil and xylol alcohol (50:50) then passed through xylol and mounted in DPX-mountant (Johanson 1940)[8].

The vein islet number, stomatal index and palisade ratio were calculated using samples treated in 5% KOH solution for determining stomatal index. Fresh leaves were taken for counting number of stomata and epidermal cells in 1 sq. mm. Stomatal index value is then calculated by using the formula $\frac{E}{E+S} \times 100$ where E and S stand for the number of epidermal cells and number of stomata for unit area respectively. After staining, they were mounted in glycerin. From these, 100 readings were recorded taking 5 counts from each piece to calculate the average number of the palisade

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ratios. The vein islet number is calculated by counting the minute areas of the photo-synthetic tissue encircled by the ultimate divisions of the conducting strands per 1 sq. mm of cleared leaf samples taken from five different leaves. The numerical values mentioned are considered as diagnostic constant and will help in identifying the plant species[11,12].

Macroscopy

Leaves vary with 2.5 - 5.0 cm. long and 2.3 - 8 cm width; ovate in out line sinuate or 3-5 lobed, obtuse, truncate, or sub-cordate at base up to 7.5 in long, 2.5 - 12.5 cm in broad. Petioles with 1.3-3.8 cm long prickly, leaves are green to pale green in colour odourless and bitter in taste. The stem is slender with re-curved prickles and nodes feebly swollen. The tender shoots and inflorescence are covered with sticky stellate hairs. The flowers are ebracteate, ebracteolate, pedicels with 1.3 – 2.5 cm long. Flowers are large and violet to purple in colour with extra auxiliary recemose cymes, calyx cyathiform 3-4 mm long. Ovary ovoid or subglobose, glabrous, androecium consists of 5 free epipetalous stamens. The fruit is green berry with exterior or glabrous fruit wall. Seeds are 3 mm in diameter, slightly pitted. The roots are creamy white in colour with lateral roots[5-7].

Microscopy

T.S. of petiole shows a nearly circular in outline (Fig I. A). The epidermis is single layered followed by a layer of 1 or 2 cells thick chlorechyma (Fig I. B). The ground tissue is composed of large thin walled parenchyma cells with inter cellular spaces and a few cells are packed with crystalline sheath (Fig. I. C). The vascular tissue is represented by central, two small strands one either side of the arc, nearly adaxial in position (Fig I. A). Mid rib is with abaxial and adaxial surfaces (Fig I. D). In parenchyma situated a single shallow, collateral crescentic vascular strand. The foliar chlorenchyma commences where the abaxial and adaxial collenchyma ends. The upper epidermal cells are rectangular in cross section and palisade mesophyll is well represented by single layered columnar cells without intercellular spaces and lower epidermal cells contain more number of the stomata than upper one. (Fig. I. E). The adaxial foliar cells are polygonal surface in view with slightly curved anticlinal walls (Fig. I. F). Stomata are less frequent and predominantly anisocytic (Cruciferous) type. Animocytic (Ranunculaceous) stomata are also intermingled with the aforesaid type. The epidermal cells are moderately wavy with anticlinal walls (Fig. I. G). Unicellular, simple short hairs are seen. Numerous stalked stellate or peltate scales (Fig. I. H) with varied numbers of arms gradually tapered into a point. Stalked glandular hairs with unicellular and multicellular head (Fig. I. I).

T.S of root shows a woodycore, secondary cortex and cork (Fig II. K). The vessels are scattered in woody core without any seriation. The phelloderm is made up of parenchymatous tissue. The cells show crystalline sheath and starch grains (Fig. II. M). T.S. of stem shows epidermis with quite conspicuous heavy cuticle (Fig. II. L). 3-4 cells deep chlorenchyma, collenchyma and 4 to 5 layers of parenchyma (Fig. II. N), pericylic fibres occur singly are in tangential groups of 2 to 7. The vessels are moderately widely lumened and against each

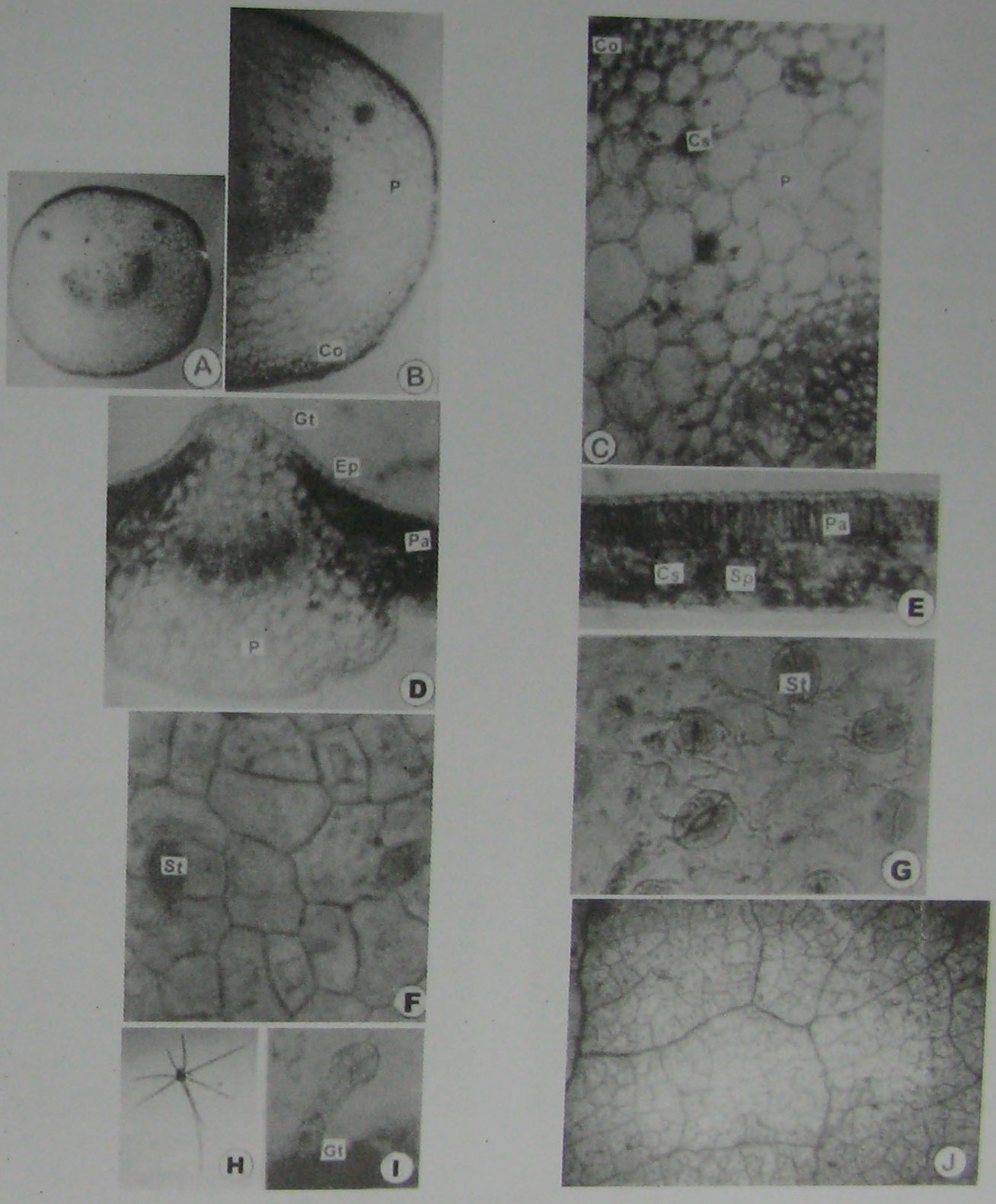
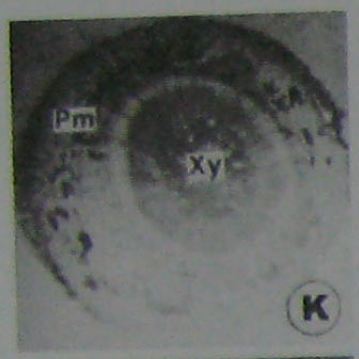
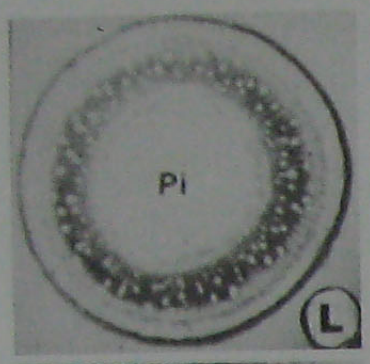


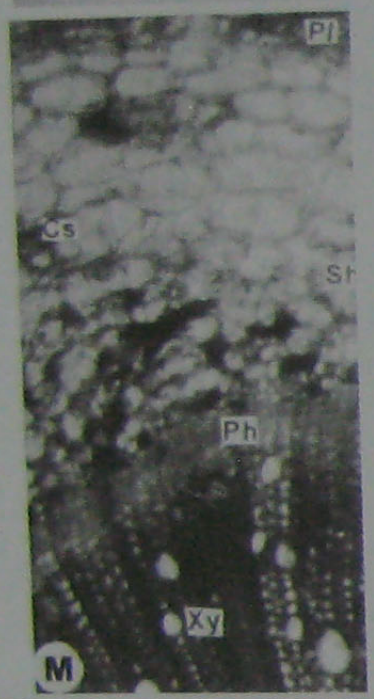
Fig. I. **A - J** *Solanum trilobatum* Linn.

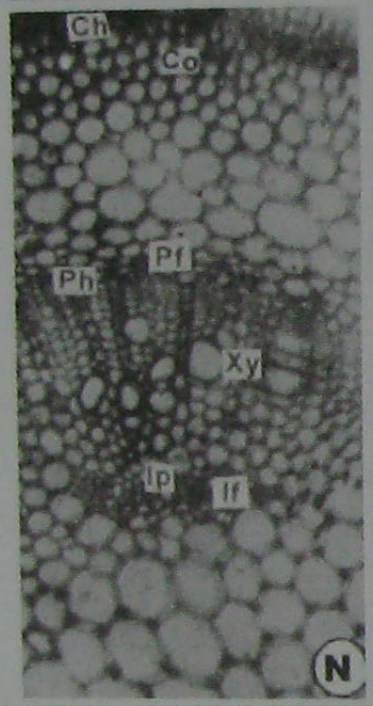
A T.S. of petiole (10X); **B-C** T.S. of petiole - a portion enlarged (45X); **D** T.S. of midrib - a portion enlarged; **E** T.S. of lamina (10X); **F** Adaxial foliar epidermis (45X); **G** Abaxial foliar epidermis (45X); **H** Stellate trichomes (10X); **I** Glandular trichomes (10X); **J** Vein islet (45X)

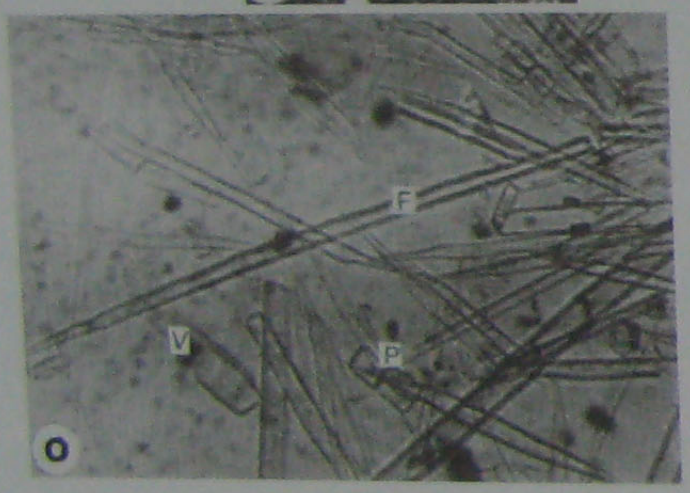
Co. Collenchyma; **Cs**. Crystal sheath; **Ep**. Epidermis; **Gt**. Glandular trichome; **Pa**. Palisade tissue; **Sp**. Spongy tissue; **St**. Stomata.











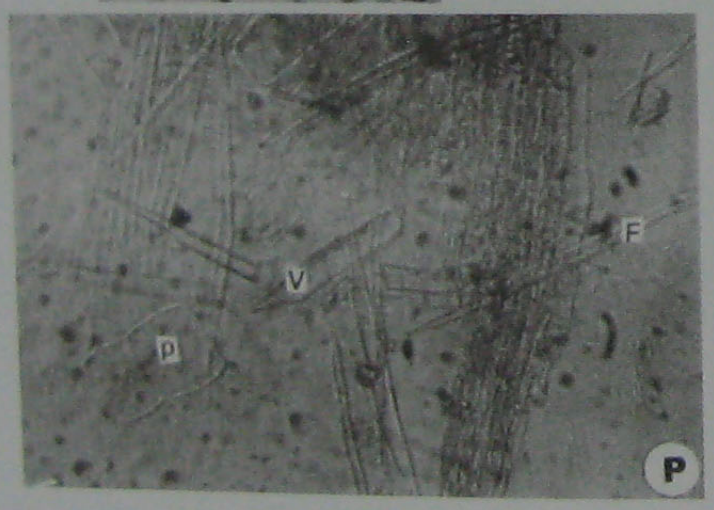


Fig. II. **K - P** *Solanum trilobatum* Linn.

K T.S. of root (10X); **L** T.S. of stem (10X); **M** T.S. of root - a portion enlarged (45X); **N** T.S. of stem - a portion enlarged (45X); **O** Maceration of stem (45X); **P** Maceration of root (45X);

Co. Collenchyma; **Ch**. Chlorenchyma; **F**. Fibre; **Ip**. Internal phloem; **If**. Internal fibre; **P**. Parenchyma; **Ph**. Pholem; **Pi**. Phellem; **Pm**. Phelloderm; **Pf**. Pericyclic fibres; **Sh**. Starch; **V**. Vessels; **Xy**. Xylem.

protoxylem point. The internal phloem occurs in groups of 2 to 12 and associated with phloem inner side of fibers similar, outside of secondary phloem ring. (Fig. II. N), the central pith consists of a solid core of parenchyma with larger cells in the centre. Macerated stem shows narrow and broad varied vessels. The fibres are long with very few pits (Fig. II. O). Maceration of root shows vessels, fibres and parenchymatous cells (Fig. II. P)[8,9,10].

Quantitative values

Quantitative values[11-12] of leaves indicated palisade ratio 4-14-3.5, 4-13-3.5, stomatal number 12-48, 11-44, stomatal index 17.02-32, 22.91-44, 27.27-48, epidermal cells count (upper surface) 220-200, 192, epidermal cells (lower surface) 156, 152, 148 vein islet number, 19-76, 16-64 and vein termination number 12-24, 15-30, 16-32.

Acknowledgement

We thank to Dr. A. Saraswathi and Dr. (Mrs.) Sasikala Ethirajulu, Research Assistants, Capt. Srinivasa Murthy Drug Research Institute for Ayurveda (CSMDRIA), Chennai for their help in photomicrography studies.

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STUDIES ON PERSONALITY CHARACTERISTICS OF THE BREAST CANCER PATIENTS

G.C. Prasad* and Indu Tripathi**

Abstract: Psycho-social factors play an important role in the etiopathogenesis of cancer. This paper attempts to study the physical, environmental, genetic factors of breast cancer based on their *prakrti*s by a self-devised psychological proforma in relation with ayurvedic concept.

Introduction

Many health hazards arise from socio-economic and environmental factors that can be modified only by collective action. It was considered necessary to ascertain that how patients' behaviour and their environment could affect their health, how they cope up such stress phenomenon in their daily lives and make themselves immune to prevent the disease through proper nutrition and other measures. The present study, therefore, is undertaken to assess the psychological changes, which the cancer patients undergoes upon diagnosis and subsequently upon surgical removal of the important part of the body.

The human constitution which is the sum total of the physique, physiology and psychology is dependent upon the predominance of *satva*, *rajas* and *tamas* and also on *vata*, *pitta* and *kapha*.

Prakrti can be defined as the state of the body which is unchangeable and not harmful to the individual concerned throughout the life and develops during fertilization due to some factors. This leads to the constitution of *daihik* and *manasik* as individual entity.

Psycho-social factors play an important role in the etiopathogenesis of cancer and is more likely to develop in melancholic than in sanguine women (Galen), several eminent clinicians have also reported that temperament, depression and life stresses appear to be related in the development and course of cancer. (Kowal, 1951; Leshan & Worthington, 1956)

Method

56 breast cancer patients (benign & malignant) of various sites and stages were taken who admitted in S.S.Hospital, B.H.U., Varanasi. The subjects were from 25 – 67 years of age groups. Several demographic variables like age, sex, occupation, economic status, rural-urban differences were recorded.

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Procedure

Before the administration of the two questionnaires i.e. *Manasik Prakrti Parakh Prasnavali* (mental testing scale) of CCRAS, New Delhi and Tumour Board by Department of *Salya-Salakya*, B.H.U., Varanasi, each subject was individually told about the concept of psychology and *manasik prakrti* in a very simple and colloquial language. The main criterion of this study being psychological behaviour, the initial step was to establish rapport formation with the patients and gain their confidence prior to administration of the questionnaires. After developing rapport, the subjects were individually administered the questionnaires (*manasik prakrti*) and CCRAS questionnaire recorded from patients admission file. The subjects were explained to answer for each item on the five-point scale in the form of strongly agree, agree, uncertain, disagree and strongly disagree. The personality scale is a self-administering inventory, but in the case of illiterate or very weak patients, the statements were read out one by one. The subjects were allowed to have their own time for completing the questionnaires.

Results and discussion

Table 1 shows that the maximum incidence of cancer in *tamasik prakrti* (55.36%) reported in comparison to *rajasik prakrti* (32.14%) and *satvik prakrti* (12.50%) and this was observed between the ages of 41-50 years. It indicates that probably this is the most active age of the life span with grater responsibilities including social, economical, educational and managerial problems for her family itself. Due to overload, lack of time, pace and patience she losses her control and become incapable to cope up with the requirements giving rise to numerous related etiological pathogenesis for many disease like cancer. They rated lower on positive or functional characteristics and rated higher on negative or dysfunctional characteristics. The effect of these special tendencies in psychological features of the cancer patients on their psychology might have been responsible for developing this fatal disease.

It has been observed that the maximum incidence of cancer presented the character of *slaishmik prakrti* in comparison to *vatik* and *paittik prakrti*s. Besides, the maximum incidence of age groups also denotes the predominance of *slaishmik prakrti*. It can be concluded that possibly the patients of *slaishmik prakrti* have lesser immunity for cancer in comparison to other two. The patient

TABLE 1

Fifty-six cases of breast cancer in relation to *manasikprakrti*

Mansikprakrti	Total No. of cases	Percentage	FEMALE		MALE	
			No. of cases	%	No. of cases	%
Satvikprakrti	7	12.50	7	100	-	-
Rajasikprakrti	18	32.14	17	94.44	1	5.56
Tamasikprakrti	31	55.36	31	100	-	-

with *slaishmik prakrti* has some genetic factors, which due to lack of some inhibitory factor, is precipitated in the development of this disease. (Table – 2)

There indicates significant difference between the pre and postoperative stage (Table 3). Cases undergone for surgical procedures showed low scoring rate in terms of patience in comparison to their pre-operative condition because one day before operation, they experienced as a threat to their emotional balance and the patients withdraw into remoteness. They showed lower on tolerance and sleep before operation but rated higher on these characteristics on post-operative period. The mean anger score is more or less the same because women actually threaten on the first occasion and apparently free of such stress at the second time. It may an expression rather than suppression of emotion, which may reduce stress by discharging arousal.

Those patients who showed fighting spirit or grater expression of anger revealed prolonged longevity but also it could be seen that the patients with *rajasik prakrti* has higher mortality rate. Decreased survival period has been observed to be associated with low quantity of social relationship (Table 4).

TABLE 2

Fifty-six cases of breast cancer in relation to *daihikprakrti*

Daihikprakrti	Total No. of cases	Percentage	FEMALE		MALE	
			No. of cases	%	No. of cases	%
Vatikprakrti	3	5.36	3	100	-	-
Paittikprakrti	11	19.64	11	100	-	-
Slaishmikprakrti	42	75.00	41	91.62	1	2.38

TABLE 3

Follow-up study of the patients

Personality characteristics	PRE-OPERATION		POST-OPERATION		
	Mean	S.D.	Mean	SD	t
Tolerance	16.24	3.53	18.52	2.91	3.68
Patience	16.05	2.91	14.74	3.20	4.52
Anger	17.43	4.88	16.25	4.67	5.62
Sleep	16.43	3.57	18.46	4.02	4.51
Anxiety	21.42	3.99	18.31	3.43	5.55
Allurement	18.82	4.97	21.92	3.98	3.13

TABLE 4

Number and percentage of breast cancer patients expired according to *prakrti*

Name of *prakrti*	Total No. of cases	Percentage	No. of cases expired	Percentage
Satvikprakrti	7	12.5	1	14.29
Rajasikprakrti	18	32.14	4	22.22
Tamasikprakrti	31	55.56	6	19.35

These behavioural characteristics with the specific type of *prakrti* could be one of the predisposing etiological factors of this disease when certain other factors are favorable.

Conclusion

The study indicates that patients belonging to *rajasik* and *tamasik* mentality, were more prone to breast cancer. Also, the patients belonging to *slaishmik prakrti* were more to develop breast cancer in comparison to *vatik* and *paittik prakrti*. The data enable us to conclude that the cancer arising from various types of physical, environmental, genetic factors and mental behaviors, the depression and antecedent life stresses playing a part in the aetiology of cancer. Due to strong religious beliefs, some of the *satvik* patients accepted their disease as a punishment of the *poorva janma karma* (previous birth effect).

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ANTIMUTAGENIC PROPERTY OF SELECTED DIETARY INGREDIENTS

N. Ananth*, P. Aparna**, Vivian D'Souza* and D.M. Vasudevan*.

Abstract: The method of detecting carcinogens and mutagens with the *Salmonella* mutagenicity test is a well-known and widely accepted assay. The test has been applied earlier, to detect the mutagenicity of complex environmental components, organic compounds and biologic mixtures. In the present study, the test has been utilized to demonstrate the anti mutagenic property of a few selected dietary ingredients. Our results indicate the potential anti mutagenic property of the test components and could serve as a basis for further characterization of the active principles responsible for the property.

Introduction

The literature on the Salmonella test[1] has been growing enormously with the induction of many new biological and chemical substances into the list of mutagens. A set of Histidine requiring strains is used for the assay. The strains, their designations and the mutations they carry[2] are shown in Table 1.

All the tester strains considered for the study contain the R factor plasmid, pKM 101, TA 102 also carries a multicopy plasmid pAQ1 and a tetracycline resistance gene. These additional mutations greatly increase the ability of the tester strains to detect mutations. The rfa mutation causes partial loss of the lipopolysaccharide barrier that coats the surface of the bacteria and increases the permeability to large molecules such as benzo(a)pyrene[3].

In the present study, extracts were prepared from the dietary ingredients listed in Table 2. The dietary ingredients chosen for the study are components of a typical Indian diet and are constituents of the everyday diet. Our results indicate the anti mutagenic property of these ingredients.

Materials and methods

Salmonella tester strains were obtained from the laboratory of Dr. Bruce Ames, University of California, Berkley, CA 94720, USA. Media components were obtained from Hi Media Laboratories, Mumbai, India. DMSO & Standard positive diagnostic mutagens NPD and NQNO were obtained from SIGMA Inc, USA.

Intimation and instructions about the receipt and storage of the tester strains was received

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TABLE - 1

Specific mutation in the histidine operon in various tester strains

Tester strain	*His* mutation	R factor	Additional
TA 97	*his* 6610/01242	+	rfa △uvr B
TA 98	*his* D 3052	+	rfa △uvr B
TA 100	*his* G 46	+	rfa △uvr B
TA 102	*his* G 428	+	-

one week prior to the dispatch. Preparations for the same were completed following the instructions given. The tester strains were received at out laboratory by freight. The sealing was cut open with the help of sterile scissors and the bacteria were immediately streaked on Minimal Glucose Agar plates enriched with Histidine and Biotin. Ampicillin was added at a concentration of 25 ug/mL. Tetracycline was used for TA 102 at a concentration of 2 ug/mL. The original culture was stored at – 80° C as Frozen Permanents of each strain. Dimethyl Sulfoxide was added as a cryopreservative. The streaked plates were used as Master Plates and were stored in a refrigerator. The master plates were routinely utilized as a source of the organism for day to day experiments.

The genotypes of the tester strains were confirmed at 4 stages of the study[3,4,5]:

TABLE - 2

Dietary ingredients chosen for the study

Scientific name	Common name
Zingiber officinale	Ginger
Coriandrum sativum	Coriander
Glycine max	Soya bean
Mentha piperita	Mint/pudina
Syzygium aromaticum	Clove

a. Immediately after receiving the cultures.

b. When the number of spontaneous revertants per plate fell out of the specified range for each tester strain.

c. When a loss of sensitivity to standard mutagens, NPD and NQNO was observed.

d. When new sets of master plates were prepared.

Reversion of the tester strains to Histidine independent growth was used routinely and the numbers of revertants per plate arising out of a 48-hour incubation were counted. The internationally accepted ranges for the spontaneous reversion of each strain[6] are shown in Table 3.

TABLE - 3

Acceptable ranges for number of spontaneous revertants/plate

Tester strain	No. of spontaneous revertants	
	Standard	Obtained
TA 97	90 - 180	128
TA 98	30 - 50	36
TA 100	120 - 200	183
TA 102	240 - 320	281

The master plates were discarded after 2 months or even earlier and fresh ones prepared when the number of spontaneous revartants per plate fell out of the specified range for each tester strain.

Crude extracts were prepared from the ingredients considered for the study using HPLC grade organic solvents. The extracts thus obtained were used for the assay following the spot test protocol[6]. Plates for the Mutagenicity assay contained 30 ml of Minimal Glucose agar medium consisting of 2% of glucose in Vogel Bonner medium E. Positive mutagenic controls

were routinely included in every assay to confirm the genotype specificity and tester strain properties[6].

Results and discussion

It is clear that number of His $^{+}$ revertants with the addition of test substance alone are higher than those in the controls used for spontaneous reversion. (Table 4)

Diet has been inducted in both etiology and prevention of cancer. Emphasis on the diet related aspects of cancer and its prevention have taken an important position in studies related to nutrition and cancer therapy, particularly in health sciences allied to allopathy. The present study was undertaken in that direction. The dietary ingredients used in the above study are common ingredients of a typical South Indian recipe.

Reports of Indian populations in the US carrying less risk of colonic cancer were earlier attributed to high dietary fiber content. However, the antibacterial and anti mutagenic effects of turmeric and garlic provided a new clue to the understanding of the "anti cancer" property of the South Indian diet[7,8]. Turmeric and garlic have proved to be anti mutagenic and many more such compounds are being inducted into this list. Garlic has been found effective against gastric carcinomas[8]. Turmeric is known to mediate its effect by its influence on several oncogenes and oncosuppressors[9].

In our preliminary study, the selected dietary ingredients exhibit the antimutagenic property they possess. Among the test substances, ginger seemed to have maximum antimutagenic property, followed by coriander, mint, clove and soybean in that order. However, coriander extract failed to revert mutation in TA 100 to the extent observed with the other strains, a finding that we have not been able to explain.

Much need to be done before labeling the activity as anticancerous, since *in vivo* conditions considerably differ from those *in vitro* and the fact mutagenesis as an isolated cause of carcinogenesis in a given instance is still variable. Experiments on animal models could provide a great deal of information on *in vivo* effects. Isolation and purification of the active principles by using techniques of Organic Chemistry and Biochemistry such as organic

TABLE 4

Number of reverted colonies expressed as number/plate with the test compounds

Test Compound	TA 97	TA 98	TA 100	TA 102
Ginger	214 (86)	76 (40)	286 (103)	364 (83)
Coriander	202 (74)	84 (48)	193 (10)	368 (87)
Mint	226 (98)	82 (46)	229 (46)	312 (39)
Soya bean	197 (69)	68 (32)	174 (49)	258 (23)
Clove	264 (136)	89 (53)	238 (55)	326 (45)

Values represent mean of 5 trials conducted. Values obtained after substracting number of spontaneous revertants on control plates are shown in brackets.

extraction, derivatisation, HPLC and GC can provide a better understanding of the molecules responsible for the property.

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STUDIES ON THE ANTIDIABETIC ACTIVITY OF THE ENZYME FRACTION OF *MOMORDICA CHARANTIA* FRUITS

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Abstract: The enzyme fraction isolated from the unripe fruits of *Momordica charantia* Linn (Cucurbitaceae) was screened for its hypoglycemic and anti-hyperglycemic activity in normal and alloxan induced diabetic rats respectively. The enzyme extract 25 mg/ml and 50 mg/ml produced effective hyper glycemic activity in alloxan induced diabetic rats and showed very less hypoglycemic effect in normal fasting rats. Glibanclamide (1mg/ml) was used as a synthetic reference drug.

Introduction

Mamordica charantia is a slender stemmed tendril climber of the Cucurbitaceae family. Literature survey indicated the use of its fruit, seed, leaf extracts as anti-diabetic agent in traditional system of medicine.[2,3] Olaniyi (1975)[4] reported that the hot water extract of its fruits having effective anthelminitic and anti-diabetic property. Jain and Sharma (1967)[5] also reported about the anti-diabetic property of the hot water extract of dry fruits. Singh et al. (1989)[6] observed the anti-diabetic activity of acetone extract of its whole fruit powder in alloxan induced diabetes. Lei et al. **(**1985)[7] reported the curing effect of the protein fraction of the dried fruit on diabetic induced mice. Welihinda et al. (1982)[8] studied the insulin release enhancing activity of pancreatic islets by the water extract of fresh unripe fruits in cell culture at a concentration of 1.0 mg/ml.

Reports showed that its fruits contain a lot of medicinally active compounds like diosgenin, insulin, gamma amino butyric acid, P-insulin, V-Insulin □-sitosterol, Stigmasterol, the enzyme peroxidase, various amino acid like phenyl alanine, serine, omithine and glycosides like momordicosides H,I,J,K & L.[9]

The anti-diabetic activity of the crude enzyme extract of the fresh unripe fruits in alloxan induced diabetic rats was investigated in view of the above facts.

Materials and methods

Plant material

The unripe fruits were collected from a vegetable farm in Coimbatore and authenticated at the horticulture department, Tamil Nadu Agricultural University, Coimbatore. Voucher specimen was deposited in the herbarium of the pharmacognosy laboratory, College of Pharmacy, SRIPMS, Combatore.

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Preparation of the enzyme extract

1 kg of the unripe fruits was extracted with 500 ml of ice-cold 10mm calcium chloride solution at room temperature for a period of 4 hrs. The extract was centrifuged at 54,000g at 4°C for 20 minutes. The supernatant solution was used as the enzyme source and designated as CET (Crude Enzyme Extract). The yield obtained was 0.8232 mg/g of crude drug[10].

Protein content determination

The crude enzyme extract evaluated for its protein content by Folin-Lowry method[11, 12]. 0.1-1 mg/ml of egg albumin solution were used to prepare a standard curve, where absorbance is plotted against concentration of protein at 540 nm. The absorbance for CET was extrapolated on the concentration in x-axis of the standard curve to obtain the amount of protein present in the extract. The results obtained are detailed in Table 1.

Hypoglycemic activity of CET in fasting rats

Wistar albino rats of either sex (100 - 150g) were used for this evalution[13]. The animals were divided into four groups of five each. All the animals were fasted for 18 hrs. before giving the drugs but water was freely permitted. Two drug concentrations - 25 mg/ml and 50 mg/ml - were prepared for CET. One group was kept as the Control and was given solvent vehicle (0.5% cmc). Blood samples collected from the orbital sinuses bleeding method before and after two hours of drug administration. The blood glucose level estimated using Pulsatum blood gluco monitor (Table 1).

Anti hyperglycemic activity studies of CET on alloxan induced diabetic rats[14]

Alloxan 100 mg/kg i.p. was used to induce diabetes under fasting state of rats. Wistar albino rats of either sex (150 - 180g) were selected and divided into four groups of five each. Rats fed with normal feed and water. After an interval of 48 hours, those rats exhibiting blood glucose concentration above the normal range were declared diabetic[15] (>135 mg/dl). The CET at concentrations of 25 mg/kg and 50mg/kg administered for 48 hours after the alloxan injection. Glibemclamide at a dose of 1 mg/kg was administered orally and kept as the standard reference drug. The standard drug was administered to the rats by using 0.5%

TABLE 1

Effect of CET on blood glucose level of normal fasting rats

Groups	Dose	Fasting blood sugar level before drug administration mg/dl	Blood sugar level 2 hrs after drug administration mg/dl	Reduction in blood sugar level mg/dl
CET_{25}	25mg/kg	73.00 + 1.816	71.6 + 0.374	1.4
CET_{50}	50mg/kg	74.74 + 0.332	74.1 + 1.113	0.64
Solvent vehicle	Distilled water	70.7 + 0.60	70.4 + 0.489	0.30

CET - Crude Enzyme Extract. n=5

concentration of the solvent vehicle. Blood sugar measured by Pulsatum blood glucometer after 2, 4 and 6 hours of drug administration (Table2)

Statistical analysis

The mean + SD values calculated for each group for finding significance of inter-group difference. The blood glucose values for different drug group were analyzed separately by student 't' test. P values less than 0.05 were considered significant.

Results and discussions

In the present work, the protein content in the crude enzyme extract was found to be 0.98 mg/ml and the yield of the enzyme obtained was 0.823 mg/g of crude drug. CET at dose levels of 25 mg/ml and 50gm/ml produced effective reduction in blood glucose level in alloxan induced diabetic rats, but in normal fasting rats the enzyme extract showed very less change in the blood glucose level.

The anti-diabetic effect of CET may be partially due to the presence of insulin like peptides (insulin V and insulin P)[9] in the fruit juices. It is already reported that the water extract of the fresh unripe fruits of *Momordica charantia* induced the production of insulin by activating pancreatic islets[8]. Another report indicate that plant extracts possessing anti-diabetic effect, promote regeneration of □⇄cell of langerhans in pancreas[17]. Further studies are to be carried out to reveal the exact mechanism of action of this enzyme extract as an anti-diabetic agent.

Acknowledgment

The authors are thankful to Dr. T.K. Ravi, Principal, College of Pharmacy, SRIPMS, Coimbatore for providing necessary facilities for this research project and to Mrs. Uma Maheswari, Lecturer, Department of Pharmacology for the help extended to us for the anti-diabetic screening studies.

TABLE 2

Effect of CET on blood glucose level of alloxan induced diabetic rats

Groups	Dose mg/ml	Fasting blood sugar level before drug admn. mg/dl	BLOOD SUGAR LEVEL AFTER DRUG ADMN. (mg/dl)			Reduction in blood sugar level mg/dl
			After 2 hrs.	After 4 hrs.	After 6 hrs.	
CET_{25}	25	194.1 + 1.36	189.8 + 0.748	178.9 + 2.2	157.8 + 2.2	36.3
CET_{50}	50	199.0 + 2.607	164.08 + 2.744	151.0 + 2.0	126.4 + 4.915	72.6
Glibanclamide	1.0	207.6 + 4.498	178.6 + 2.059	147.2 + 3.709	133.2 + 3.969	74.4
Solvent vehicle	0.5% CMC	197.6 + 5.678	195.8 + 1.166	195.0 + 0.632	194.2 + 0.748	3.4

Student 't' test P value <0.05; <0.01; n=5

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PHARMACO-DYNAMIC STUDIES OF *TINOSPORA CORDIFOLIA* STEM EXTRACTS

S.R. Rajurkar and V.P. Vadlamudi*

Abstract: The aqueous and ethyl acetate extracts of *Tinospora cordifolia* were assessed for their effects on dog blood pressure and respiration, frog heart and rabbit duodenum. The aqueous extract had no effect on blood pressure and respiration of anaesthetized dog. But showed depressant effects on frog heart (0.1 to 0.4 ml) and rabbit duodenum (0.2 to 5.0 ml). However, its ethyl acetate extract showed depressant effect on spontaneous motor activity as observed from lowered SMA (500 and 1000 mg/kg, orally) and analgesic activity (500 and 1000 mg/kg, orally) in Swiss mice.

Introduction

Tinospora cordifolia is a common plant found all over India. Powder or decoction of the stem is used as an astringent, anti-emetic, anthelmintic and analgesic. It is also used in cough, fever, flatulence, indigestion, anemia, skin diseases, cardiac debility, asthma, spleen and kidney affections and in seminal weakness. The extract of the plant commonly known as *gudoocheesatva* is a choice of drug in gastric affections. The present investigation reports the pharmacodynamic studies of aqueous and ethyl acetate extracts of *Tinospora cordifolia* stem.

Materials and methods

Fresh stem collected and 10 percent aqueous and ethyl acetate extract was prepared. The aqueous extract was subjected to study its effects on blood pressure and respiration of anaesthetized dog, frog heart and rabbit intestine. However, the ethyl acetate extract was subjected to note its effect on spontaneous motor activity and to assess the analgesic activity.

Dog blood pressure and respiration

The effect of sterile aqueous extract on blood pressure and respiration of anaesthetized dog was studied using research kymograph. Extract administered at the dose rate of 10, 20, 50, and 100 mg/kg i.v. in two male and two female healthy mongrel dogs fasted overnight.

Frog heart

Effect of aqueous extract on perfused heart studied as per the method suggested by Burn (1952). The extract infused at the dose level of 0.1, 0.2 and 0.4 ml.

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Rabbit intestine

For this study, preparation of isolated rabbit duodenum was employed as per the method suggested by Sheth et al. (1972). Two healthy adult Newzeland rabbits, fasted overnight were used for the study. Extract was placed in 20 ml tissue bath at 0.1, 0.2, 0.4, 1.0, 2.0, and 5.0 ml levels.

Spontaneous motor activity

The ethyl acetate extract was assessed for its effect on spontaneous motor activity (SMA) in mice. 24 healthy Swiss mice of either sex with the body weight of about 25 gm were divided in to four groups each containing 3 male and 3 female mice. The ethyl acetate extract dissolved in propylene glycol and administered at the dose rate of 500, 1000, and 2000 mg/kg body weight in group II, III, IV respectively. However, group I animals served as control and were administered with the propylene glycol. The extract was administered orally with gastric needle in volume not exceeding 0.6 ml per mouse.

Analgesic activity

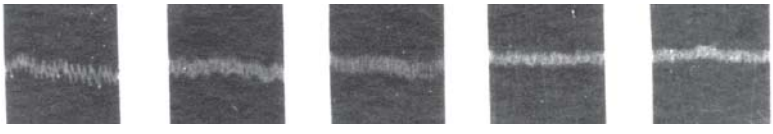
Analgesic activity of ethyl acetate extract was assessed using Eddy's hot plate as per the method suggested by Sheth et al. (1972). 24 Swiss mice weighing about 25 gm were divided in three groups, each containing four male and four female mice. Group I served as control and administered with propylene glycol. The ethyl acetate extract dissolved in propylene glycol was administered at the dose rate of 500 and 1000-mg/kg-body weight in-group II, and III respectively. The extract administered orally with gastric needle in volume not exceeding 0.6 ml per mouse.

Result and discussion

The effect of aqueous extract of *Tinospora cordifolia* on dog blood pressure and respiration is shown in Fig. 1 & 2. From the figures it is evident that the extract corresponding to 10 – 100 mg/kg (iv) did not alter the blood pressure recording and also no change in both the force and rate of respiration was observed.

Fig. 1

Effect of aqueous extract of *Tinospora cordifolia* stem (10%) on blood pressure of anaesthetized dog.



A Normal; **B** @ 10 mg/kg; **C** @ 20 mg/kg; **D** @ 50 mg/kg; **E** @ 100 mg/kg

Fig. 3 shows the effect of aqueous extract of *Tinospora cordifolia* stem on perfused frog heart. The extract at 0.1,0.2 and 0.4 ml dose levels progressively decreased the force of contraction of heart where the effect was maximum at 0.4 ml dose.

Fig. 4 shows the effect of aqueous extract of *Tinospora cordifolia* stem on isolated rabbit duodenum. The extract at 0.1 ml dose (20ml bath) had no effect on intestinal motility. Slight decrease in the tone of intestine was observed at 0.2 to 2.0 ml dose levels. However, at 5.0 ml dose complete blockade of intestinal motility was observed.

The effect of ethyl acetate extract of *Tinospora cordifolia* stem on Spontaneous Motor Activity (SMA) in Swiss mice is detailed in Table 1. From the data it is evident that the SMA varied from 57 to 5 percent and 35 to 0 percent among the mice orally dosed at 500 and 1000 mg/kg respectively during 30 minutes for 6 hr. post administration. At 12 hr. of post treatment SMA in 500 mg/kg treated mice was 62 percent. The SMA in 1000 mg/kg treated mice was not recorded at 12 hr. post treatment due to mortality.

In control animals, which were treated with

Fig. 2

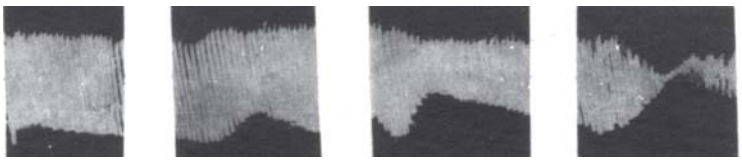
Effect of aqueous extract of *Tinospora cordifolia* stem (10%) on respiration of anaesthetized dog

A B C D E

A Normal; **B** @ 10 mg/kg; **C** @ 20 mg/kg; **D** @ 50 mg/kg; **E** @ 100 mg/kg

Fig. 3

Effect of aqueous extract of *Tinospora cordifolia* stem (10%) on perfused frog heart

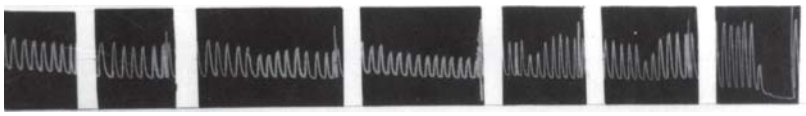


A B C D

A Normal; **B** @ 0.1 ml; **C** @ 0.2 ml; **D** @ 0.4 ml

Fig. 4

Effect of aqueous extract of *Tinospora cordifolia* stem (10%) on isolated rabbit duodenum (20 ml bath)



A B C D E F G

A Normal; **B** @ 0.1 ml; **C** @ 0.2 ml; **D** @ 0.4 ml; **E** @ 1.0 ml; **F** @ 2.0 ml; **G** @ 5.0 ml

TABLE 1

Effect of ethyl acetate extract of *Tinospora cordifolia* on spontaneous motor activity (SMA) of mice

Time	SMA	Propylene glycol (Control)	Dose of extract mg/kg orally		Correction factor
			500	1000	
Before treatment	Observed	370	310	471	-
	Percent	100	100	100	-
After treatment (30 min.)	Observed	303	215	206	0.82
	Corrected	-	176	169	-
	Percent	82	57	35	-
1 hour	Observed	275	40	45	0.74
	Corrected	-	30	33	-
	Percent	74	10	7	-
2 hours	Observed	286	18	12	0.77
	Corrected	-	14	9	-
	Percent	77	5	2	-
4 hours	Observed	255	11	0	0.69
	Corrected	-	8	-	-
	Percent	69	3	-	-
6 hours	Observed	325	16	-	0.88
	Corrected	-	14	-	-
	Per cent	88	5	-	-
12 hours	Observed	405	177	not recorded	1.09
	Corrected	-	193		
	Percent	109	62		

vehicle propylene glycol, the SMA varied between 74 and 88 percent during post treatment period. However, there was slight increase in SMA (109%) at 12 hr. post administration period.

Table 2 shows the observation of analgesic activity of ethyl acetate extract of *Tinospora cordifolia* stem. The mice treated with 500 and 1000 mg/kg doses showed mean readings ranging from 41.80 + 0.10 to 72.40 + 0.02 and 42.00 + 0.10 to 58.10 + 0.14 between 30 min. and 24 hr. of treatment respectively. Which were significantly lower than pretreatment readings (79.33 + 0.28 and 98.33 + 0.36 respectively). Values in both the groups during 4 to 12 hr. post treatment were statistically similar to their respective pretreatment readings. Values of pretreatment and different post-treatment intervals among the control group were statistically similar ranged between 68.50 + 0.18 and 101.00 + 0.39.

Conclusion

From the present experiment it is evident that the aqueous extract of *Tinospora cordifolia* stem had no effect on blood pressure and respiration of anaesthetized dog and produced depressant effect on amphibian heart and rabbit duodenum. However, ethyl acetate extract exhibited depressant effects on CNS of mice as observed from lowered SMA and analgesic activity.

TABLE 2

Analgestic activity ethyl acetate extract of *Tinospora cordifolia* in mice

Group	Dose of extract	MEAN READING OF ANALGESIOMETER						
		Pre-treatment	30 min.	1 hr.	2 hrs.	4 hrs.	6 hrs.	12 hrs.
I	0 mg/kg (Control)	91.83 (0.34)	77.66 (0.21)	86 (0.29)	94 (0.30)	74.5 (0.15)	68.5 (0.18)	101 (0.39)
II	500 mg/kg	79.33 (0.28)	65.16* (0.19)	53.2* (0.16)	41.80** (0.10)	72.4 (0.20)	76.4 (0.21)	73.25 (0.20)
III	1000 mg/kg	98.33 (0.36)	58.18* (0.14)	43.18** (0.11)	42.00** (0.10)	56 (0.14)	93.06 (0.29)	82.16 (0.23)

Figures in paranthesis refer to SE; * (P0.05); ** (P<0.01)

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EXCERPTS FROM CHIKITSAMANJARI – XXXIX

Unnikrishnan, P.*

Abstract: The treatment of *jalakoorma* and *mahodara* is explained in detail in this issue.

TREATMENT OF *JALAKOORMA*

Jalakoorma is a disease caused by *kapha* deranged by *vata* resulting in edema on the left or right side of the trunk and it's characteristic features are hard, painful, space occupying lesion that is convex in appearance like the dorsum of a turtle. Weakness of legs, pallor and debility are other symptoms. The treatment should be based on normalizing the vitiated *dosha*s i.e. *vata* and *kapha* and the treatments indicated in splenomegaly (*pleehavriddhi*) and flatulence (*gulma*) are effective in this condition. Unction, sudation, purgation and other treatments indicated in splenomegaly that are suitable to the patient can be done.

Gandharvahastadi kashaya detailed below, mixed with 10 to 15 ml of *Hingutrigunataila* shall be consumed. Irrigation with and immersion in *kati* (first washing of rice), consumption of *Pulinkuzhampu*, and treatments to reduce *kapha* and normalize *vata* are indicated in this condition.

Gandharvahasta	*Ricinus communis*
Chirivilva	*Holoptelea integrifolia*
Hutasa	*Plumbago indica*
Visva	*Zingiber officinale*
Pathya	*Terminalia chebula*
Punarnava	*Boerhaavia diffusa*
Yavashaka	*Tragia involucrata*
Bhoomitala	*Curculigo orchioides*

Hingutriguna taila:

Hingu	*Ferula asafoetida*	1 part
Saindhava	Rock salt	3 parts
Erandatailam	Castor oil	9 parts
Rasonarasa	*Allium sativum* (juice)	27 parts

Milk mixed with castor oil shall be consumed for a consecutive period of one month.

A pill or tablet prepared from the fine powder of the following, when consumed with honey relieves flatulence (*gulma*), splenomegaly (*pleehavriddhi*), and growths (*asteela*). These medicines are very potent purgatives that relieve accumulated and vitiated *dosha*s in the gut.

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Pathya	*Terminalia chebula*
Vyosha	*Piper nigrum* *Zingiber officinale* *Piper longum*
Abda	*Cyperus rotundus*
Patra	*Cinnamomum tamala*
Tvak	*Cinnamomum veram*
Vilanga	*Embelia ribes*
Aamalaka	*Emblica officinalis*

1 part each

Trivrita	*Operculina turpethum*	3 parts
Danti	*Baliospermum montanum*	3 parts
Sita	Sugar	6 parts

A fine powder prepared from the following drugs, mixed with an equal quantity of sugar consumed with honey causes purgation. All treatments detailed in the chapter *treatment of gulma* (flatulence) can also be done depending upon the stage of the disease and condition of the patient

Vyosha	*Zingiber officinale* *Piper nigrum* *Piper longum*
Trijata	*Elettaria cardamomum* *Cinnamomum verum* *Cinnamomum tamala*
Ambhoda	*Cyperus rotundus*
Krimigna	*Embelia ribes*
Amalaka	*Emblica officinalis*

2 *kazhanju** each

Trikolppa-kkonna	*Operculina turpethum* 36 *kazhanju*
Nagadantiver	*Baliospermum montanum* 12 *kazhanju*
Sugar	6 *kazhanju*

Ghee medicated with eight parts of expressed juice of *pattoora* (*Alternanthera sessilis*), four parts of ghee, milk and one part finely powdered of the following as *kalka* shall be used.

Panchakola	*Piper longum* *Piper longum* (root) *Piper brachystachyum* *Plumbago indica* *Zingiber officinale*
Chirivilva	*Holoptelea integrifolia*
Dipya	*Trachyspermum ammi*
Punarnava	*Boerhaavia diffusa*

A medicated ghee shall be prepared from the following.

Kashaya of:

Punarnava	*Boerhaavia diffusa*	100 *palam***
Chitraka	*Plumbago indica*	50 ”
Lasuna-kanda	*Allium sativum* (bulb)	50 ”
Kulattha	*Macrotyloma uniflorum*	1 *adhaka****
Sundhi	*Zingiber officinale*	
Grandhika	*Piper brachystachyum*	
Putika	*Holoptelea integrifolia*	

2 *palam* each

Pippalidvayam	*Piper longum* *Piper longum* (root)

2 *palam* each

Gokshura	*Tribulus terrestris*
Trivrit	*Operculina turpethum*
Danti	*Baliospermum montanum*
Vacha	*Acorus calamus*
Chavya	*Piper brachystachyum*
Gavaksha	*Cucumis trigonus*
Sigru	*Moringa oleifera*
Morata	*Chonemorpha fragrans*

2 *palam* each

*1 *kazhanju* = 4 g; ** 1 *palam* = 0.048 kg; ***1 *adhaka* = 3.073 kg.

The above drugs should be boiled in four *drona* (49.168 lit.) of water and reduced to one eighth (6.146 lit.). One *adhaka* (3.073 lit.) of ghee along with two *adhakas* (6.146 lit.) of milk and fine powder of *Hinguadi* (ref. A.H., *Gulmachikitsitam*) should be added to it as *kalka*. Consumption of the ghee so prepared cures *jalakoorma*.

Administration of purgatives is an important curative measure in *jalakoorma*.

TREATMENT OF *MAHODARA*

Mahodara is a disease where the abdominal cavity is extended or remains inflated due to various reasons. The term *maha* means large and *udara* means abdomen or abdominal cavity. Enlarged or protruding abdomen is the characteristic feature of this disease. Common synonyms of this disease are *udara* and *jadhara.*

Mahodara is caused by the vitiation of *vata*, *pitta* or *kapha*, a combination of all the three *dosha*s (*sannipathika* or *tridoshaja*), enlargement of spleen (*pleehodara*), enlargement of abdomen due to blockade in the gut (*baddhodara*), enlargement secondary to injury (*kshatodara*) and ascitis (*udakodara*). Individuals having decreased appetite are more prone to the disease, especially those who consume incompatible food. Accumulation of *dosha*s due to the blockade in excretory channels constitutes the basic pathology of this disease and hence purgation is to be done on a daily basis.

Castor oil mixed with cow's urine or milk is indicated in patients who desire elimination of vitiated *dosha*s. This purgative procedure is also indicated in conditions where the patient is dry (*rooksha*) and *vata* is exceedingly vitiated.

Medicated ghee that provides unction and are capable to relieve distention of abdomen is to be consumed.

The medicated ghee detailed below cures *mahodara* through purgation.

Expressed juice of –

Trayanti Bacopa monnieri	1 *nazhi**
Coconut milk	”
Ghee	”
Milk	”
Kallippal Euphorbia ligularia (milky latex)	1 *pilavila***

The total quantity of ghee so prepared should be divided into twelve doses and each dose is to be taken early morning, lukewarm. In cases of heavy purgation, consume on alternate days. *Misrakasneham* (A. H.) shall be consumed.

A *kashaya* prepared from the following relieves *mahodara* and flatulence.

Punarnavanghri	*Boerhaavia diffusa* (root)
Konnatol	*Cassia fistula* (bark)
Aaviltol	*Holoptelea integrifolia* (bark)
Pathya	*Terminalia chebula*
Chundaver	*Solanum indicum* (root)

The following medicinal ash – *Panaviraladi bhasmam* - mixed in porridge when consumed relieves edema through diuresis.

Panaviral	*Borassus flabellifer* (inflorescence)
Katalati	*Achyranthus aspera*
Chulli	*Hygrophyla auriculata*
Rambha	*Musa paradisiaca*

1 part each

*1 *nazhi* = 384 ml; **1 *pilavila* = 30 ml

These drugs put in an earth pot should be converted to ash by placing the pot in fire. The ash dissolved in water - 6 *nazhi* - should be filtered several times and the filtrate mixed with *nazhuri* (450 ml) of milk is to be reduced to half. This medicated milk can be used to prepare the *kanji* with proper quantity of rice.

A *kashaya*, prepared from the following, when consumed with the addition of a small quantity (1.25 g to 2.5 g) of finely powdered rock salt and *pippali* (*Piper longum*) relieves *mahodara*.

Chukku	*Zingiber officinale*	1 part
Kariveppu	*Murraya koenigii*	3 parts
Patola	*Trichosanthes lobata*	4 parts
Pathya	*Terminalia chebula*	4 parts

If this *kashaya* consumes in the night, it should be before supper.

A *kashaya* prepared from *parinatatumbeelata* (dried plant of *Lagenaria siceraria*) should be used to prepare a *kanji* or *vilepi* (dense form of *kanji*). This preparation can cure piles and edema.

The following drugs, finely powdered, should be used to prepare a pill. This pill, termed *Manibhadram gulika* (ref. A H. Ch. 19 - *Manibhadraleha Kushthachikitsitam*), when consumed on alternate days, relieves *mahodara* through purgation.

Vidan-gasara	*Embelia ribes*	1	*palam*
Amalaka	*Emblica officinalis*	1	”
Abhaya	*Terminalia chebula*	1	”
Kumbha	*Operculina turpethum*	3	”
Guda	Jaggery	12	”

A *kashaya* prepared from the following relieves *mahodara* through purging.

Trivrit	*Operculina turpethum*
Vrischeeva	*Heliotropium indicum*
Vijaya	*Terminalia chebula*
Samyaka	*Cassia fistula*
Erandamoola	*Ricinus communis* (root)
Pootipallava	*Holoptelea integrifolia* (tender leaves)

Castor oil may be added to this *kashaya* in case the purgation is unsatisfactory.

Five hundred *katukka* (*Terminalia chebula*) should be boiled in cow’s urine to which, three *kudabas* (576 ml) each of sesame oil and a *kashaya* prepared from *chitraka* (*Plumbago indica*) and the following should be added to this.

Patu	Rock salt	1	*karsha*
Yavani	*Trachyspermum ammi*	1	”
Hingu	*Ferula asafoetida*	1	”
Trivrita	*Operculina turpethum*	4	”

Liquid jaggery (*phanita*) medicated with the above should be taken with sour buttermilk (*takra*) for the rudimentary cure of edema and *mahodara*.

Gandharvahastadi kashaya with *trikolppa-konna* (*Operculina turpethum*) instead of *kotuveli* (*Plumbago indica*) is to be consumed with the addition of a small quantity of rock salt, jaggery and castor oil 10 to 15 ml. *Dasamoolam kashayam* shall be taken in the evening. These medicines are to be consumed for a period of twenty- one days.

Alternately, *Gandharvahastadi kashaya* shall be taken with the addition of castor oil on alternate days. *Chukkonnumoonnadi kashaya*, detailed earlier (ref. *sloka* 8) can also be consumed in the morning. *Ardhavilvam kashayam* shall be taken in the evening.

Ardhavivam Kashayam:

Chukku	*Zingiber officinale*	1.5 *kazhanju*

Chunda	*Solanum indicum*	1.5 *kazhanju*
Katalati	*Achyranthus aspera*	”
Toova	*Tragia involucrata*	”
Tavizhama	*Boerhaavia diffusa*	6 *kazhanju*

This *kashaya* relieves edema and constipation.

It is desirable to administer medicines followed by milk, as milk stabilizes the *dhatu*s, relieves accumulated *dosha*s, and is like ambrosia for those who are debilitated.

Fresh milk is to be taken in the morning; milk diluted (with four-times water) and boiled, at noon and a *kashaya* prepared from *pathya* (*Terminalia chebula*) in the evening. This regimen should be followed for fifteen days. The patient should be purged on the next day. It is said that such a patient lives for a hundred years, free from *udararoga*. The *kashaya* of *pathya* (*Terminalia chebula*) should contain only six *kazhanju.*

A *kashaya* prepared from the following cures chronic *mahodara*.

Kumizhinver	*Gmelina arborea*
Koovalaver	*Aegle marmelos*
Patiriver	*Stereospermum colais*
Palaka-ppayyanaver	*Oroxylum indicum*
Munjaver	*Premna corymbosa*
Cheruvazhutina	*Solanum indicum*
Velvazhutina	*Solanum xanthocarpum*
Orilaver	*Desmodium gangeticum*
Moovilaver	*Pseudarthria viscida*
Nerinjil	*Tribulus terrestris*
Tippali	*Piper longum*
Kattutippaliver	*Piper longum* (wild var.)
Kattumulakinver	*Piper brachystachyum* (root)
Kotuveli-kizhangu	*Plumbago indica* (tuberous root)
Chukku	*Zingiber officinale*
Katukka	*Terminalia chebula*
Nellikka	*Emblica officinalis*
Tannikka	*Terminalia bellirica*
Danti	*Baliospermum montanum*
Trivrit	*Operculina turpethum*

Saptasaram kashayam with a little variation, as given below, shall be drunk.

Varshabhoo	*Boerhaavia verticillata*
Vilva	*Aegle marmelos*
Khalva	*Macrotyloma uniflorum*
Oorubooka	*Ricinus communis*
Sahachara	*Nilgirianthus ciliatus*
Sundhi	*Zingiber officinale*
Agnimandha	*Premna corymbosa*
Katukka	*Terminalia chebula*
Trikolppakonna	*Operculina turpethum*

Consumption of this *kashaya* with castor oil, a small quantity of rock salt and jaggery relieves *udara*.

A medicated ghee, prepared from the following, consumed in the morning relieves *udara*. In cases of excess purgation, the quantity of ghee should be reduced.

Trikolppa-konna	*Operculina turpethum*
Nagadantiver	*Baliospermum montanum* (root)
Katukka	*Terminalia chebula*
Nellikka	*Emblica officinalis*
Tannikka	*Terminalia bellirica*
Konnatoli	*Cassia fistula* (bark)
Kampippalaver-meltoli	*Mallotus philippensis* (root bark)

1.5 *pala* each

A *kashaya* prepared from the above in eight *edangazhi* (6.144 lit.) water and reduced to two

edangazhi (1.536 lit) should be added with two *nazhi* (768 ml) each of milk and ghee (768 ml) and one *pilavila* (30 ml) of *kallippal* (milky latex of *Euphorbia ligularia*).

All drugs detailed above as *kalka*, castor oil and ghee used as *sneha* and a small quantity of (30 ml) *kallippal* as *drava*; a ghee so prepared causes purgation and relieves *udara*.

A *kashaya* prepared from *konnatol* (bark of *Cassia fistula*) and *avanakkinver* (root of *Ricinus communis*) should be used to prepare a medicated ghee in which cow's urine is to be added as *drava* and fine powder of the following as *kalka*.

Varshabhoo	*Boerhaavia verticillata*
Vilva	*Aegle marmelos*
Khalva	*Macrotyloma uniflorum*
Oorubooka	*Ricinus communis*
Sahachara	*Nilgirianthus ciliatus*
Sundhi	*Zingiber officinale*
Agnimandha	*Premna corymbosa*

Castor oil medicated with the *kashaya* of *nagadanti* (*Baliospermum montanum*) one part, cow's urine one part and milk two parts, shall be consumed with the addition of rock salt.

A *kashaya* prepared with *nagadantiver* (root of *Baliospermum montanum*) six *pala*, *trikolppakonna* (*Operculina turpethum*) three *pala* and *katukka* (*Terminalia chebula*) three *pala* shall be consumed with the addition of castor oil and ghee. Ghee added shall be one third of the quantity of castor oil. This *kashaya* relieves *udara*.

A *kashaya* prepared from the following shall be consumed in the morning with the addition of castor oil and *Ardhavilvam kashayam* (detailed earlier in this chapter) shall be taken in the evening.

Pathya	*Terminalia chebula*
Kulastha	*Macrotyloma uniflorum*
Varshabhoo	*Boerhaavia verticillata*
Trivrit	*Operculina turpethum*

The *kashaya* (*Punarnavadi)* prepared from the following drugs cures dropsy, *udara*, cough, colic, dyspnoea and anaemia.

Punarnava	*Boerhaavia diffusa*
Nimba	*Azadirachta indica*
Patola	*Trichosanthes lobata*
Sundhi	*Zingiber officinale*
Tikta	*Andrographis paniculata*
Amrita	*Tinospora cordifolia*
Darvi	*Coscinium fenestratum*
Abhaya	*Terminalia chebula*

All equal parts

A slight variation of the above *kashaya* i.e. *punarnava* half the quantity and other seven drugs altogether in half quantity is also effective. Castor oil shall be added to the *kashaya* if necessary.

Milk medicated with *snuheeksheera* (milky latex of *Euphorbia ligularia*) added with a small quantity of sour buttermilk is to be kept overnight and churned to get butter. This butter should be taken for the relief of *udara*.

The ghee prepared from the butter, medicated with milk, cow's urine, goat's urine, meat soup, buttermilk and milky latex of *svarnaksheeri* (*Argemone mexicana*) shall be consumed in small quantities for the relief of *udara*.

Consumption of cow's ghee one *patra* (3.073 lit), medicated with *kashaya* of *trivrit* (*Operculina turpethum*) three *patra* (9.219 lit.) and cow's urine relieves flatulence (*udavarta* and *gulma*) anorexia (*arochaka*) and colic (*soola*).

Sixteen *pala* of *trikolppakonna* (*Operculina turpetum*) should be boiled in sixteen *edangazhi* of water and reduced to four *edangazhi*. One *edangazhi* of cow's urine, two *nazhi* of castor oil, and two *nazhi* ghee are to be added to it. Fine powder of *jeeraka* (*Cuminum cyminum*) is to be added as *kalka* and medicated ghee prepared. The ghee should be consumed in small quantities.

In the above detailed medicated ghee, the quantity of castor oil may be increased to three *nazhi* and ghee reduced to one *nazhi* for better purgation.

A *kashaya* prepared from the following shall be used for irrigation of the distended abdomen.

Vrischikali	*Heliotropium indicum*
Vacha	*Acorus calamus*
Kushta	*Saussurea lappa*
Panchamoola	*Aegle marmelos*
	Gmelina arborea
	Stereospermum colais
	Oroxylum indicum
	Premna corymbosa
Punarnava	*Boerhaavia diffusa*
Varshabhoo	*Boerhaavia verticillata*
Nagara	*Zingiber officinale*
Dhanyam	*Coriandrum sativum*
Rambhagram	*Musa paradisiaca* (inflorescence)
Talaphalam	*Borassus flabellifer* (fruits)
Apamarga	*Achyranthus aspera*
Ikshuram	*Hygrophyla auriculata*

Dhanyamla boiled with *amlavarga* (A.H.) or lukewarm rice washing (*kati*) can also be used for irrigation. Expressed juice from the leaves of *puli* (*Tamarindus indica*) mixed and boiled with rice washing, sufficiently warm can also be used for irrigation.

The above irrigation should be done continuously for three days. Then, the patient should be purged and irrigated on alternate days. This process shall be continued for nine or fourteen days. On days when irrigation is done, the head should be irrigated with milk. Irrigation of the head is not compulsory on days of purgation.

Arukaladi tailam or *Triphaladi tailam* prepared with the addition of milk as additional fluid component (*drava*) shall be applied on the head. The following medicated oil called *Pulienna* shall be applied on the head.

Pulienna

Expressed juice from the following, *dhanyamla* and curd mixed together shall be used to prepare a medicated oil with *punarnavanghri* (root of *Boerhaavia diffusa*) as *kalka*.

Puliyila	*Tamarindus indica*
Nerinjanpuliyila	*Solena amplexicaulis*
Ampazhatila	*Spondias pinnata*
Narakatila	*Citrus lemon*
Parichikam	*Hibiscus aculeatus*
Mridukunchika	*Physalis minima*
Varshabhoo	*Boerhaavia verticillata*
Avanakkila	*Ricinus communis*
Avilila	*Holoptelea integrifolia*
Ungila	*Pongamia pinnata*
Muringatoli	*Moringa oleifera*

This medicated oil relieves edema and *udara*.

Those who suffer from edema or *udara* shall not be subjected to unction for long periods. External application of oils for prolonged period is also forbidden. The shoot of *karanja* (*Pongamia glabra*) should be fixed in *yamaka sneha* and fried rice powder may be shivered over it. This should be taken before meals. All treatments indicated in dropsy are beneficial.

Fine powder of the following, shall be ground in the *kashaya* of *vara* [*chukku* (*Zingiber officinale*), *kurumulaku* (*Piper nigrum*) and *tippali* (*Piper longum*)] continuously for three days. This paste, mixed with jaggery shall be taken followed by cold water. This purgative preparation very quickly relieves edema, flatulence (*gulma, asteela*) and splenomegaly.

Maricha	*Piper nigrum*	1 part
Tankanam	Borax	2 parts
Paradam	Mercury	3 parts
Gandhakam	Sulphur	4 parts
Mahaushadham	*Zingiber officinale*	4 parts
Jamphalasti	*Croton tiglium*	16 parts

Fine powder of the following when consumed with jaggery reduces even greatly distended abdomen.

Induppu	Rock salt	1 part
Tippali	*Piper longum*	1 part
Vizhalari	*Embelia ribes*	1 part
Chukku	*Zingiber officinale*	1 part
Deepya	*Trachyspermum ammi*	1 part
Kotuttuva	*Tragia involucrata*	5 parts
Trivrit	*Operculina turpethum*	5 parts

Mahodara is a disease that can be fatal. When constipation, disurea, edema, hiccough, fever, vertigo, vomiting and purging are associated with the disease, the patient is on his way to death. The patient's eye appears dry, genitals shrunken and skin oily. His flatulence is not relieved in spite of purgation. All the above features present in the patient forecast death.

●

RESEARCH CORNER

Arya Vaidya Sala has always been in the forefront in developing innovatve methods in manufacturing ayurvedic medicines. A century ago, at a time when nobody could dream of, Vaidyaratnam P.S. Varier implemented novel techniques for producing and preserving medicines in the form of *kashaya, ghrta,* etc.

Things have changed now. The high rate of mobility among people makes it imperative to transform them to conveniently portable size. For the convenient of the public, Arya Vaidya Sala successfully converted *kashayas* and *gulikas* into tablets. Now Arya Vaidya Sala has developed the technique to encapsulate the *bhasmas* (*rasaushadhis*) without loss to their purity and efficacy.

The following *bhasmas* are now converted to capsules:

1. *Svarnabhasmam* capsule 50 mg
2. *Rajatabhasmam* capsule 100 mg
3. *Sidhamakaradhvajam* capsule 100 mg
4. *Kanmadabhasmam* capsule 250 mg
5. *Pravalabhasmam* capsule 200 mg
6. *Rasasindooram* capsule 100 mg

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Book Review

A TEXT BOOK OF OPTHALMOLOGY IN AYURVEDA

Author : Dr. P.K. Santhakumari
Reader, Govt. Ayurveda College
Thiruvananthapuram

Published by : Author
Price : Rs. 350/-
No. of pages : 420
Ist Edition : 2002

P.K. Warrier*

Dr. P.K. Santhakumari was a student of Vaidyaratnam P.S. Varier Ayurveda College, Kottakkal in her degree classes. She then took post-graduate degree in ayurvedic ophthalmology. She has been working as a teacher of ayurveda, concentrating on ayurvedic ophthalmology for the last twenty years. As an inquisitive student and sensitive teacher, she has now earned full grasp of the problems of teaching ophthalmology as presented in the ayurvedic texts now in vogue, the confusion they create, and inadequacies from which they suffer. So she rightly realizes the need for a new work comprising the teachings of the classical texts but modified with additions and clarifications from the advanced scientific studies of the modern texts. This is the premise the author tells humbly, that prompted her for the composition of a new text on ayurvedic ophthalmology particularly designed as a class text for student.

I have gone through this text carefully and when I finished it my first urge was to congratulate this young author for her brilliant work. I am sure that readers, who peruse this text, will agree with me that Dr. Santhakumari's scholarly analysis provides an unparallel model to all who work in this field and to all who yearn for the promotion of ayurveda as per the needs of the time. As such, the work is of high value useful not only to the students but to the community of physicians as a whole.

The work in eighteen chapters contains the details from *netrarachana* and *kriya sareeram* to prevention of eye diseases. Although this is a textbook primarily intended for students, author's vision regarding the arrangement of the topics works as guidance to all. It shows the extreme care taken not to deviate from the ayurvedic premise, but to build up the whole edifice on the foundation of ayurvedic anatomy and physiology. But some topics, which are not explained in classical texts, are presented as separate entities. The terms used are introduced in the beginning of each chapter. Examination methods are primarily intended to help diagnosis in the ayurvedic way itself. Modern technologies are also given wherever necessary.

Managing Trustee & Chief Physician, Arya Vaidya Sala, Kottakkal.

To cite an example, in dealing with the eye discharges (*netrasrava*s) the author first analyses them on *dosha* basis, as due to *pitta, rakta, kapha* and *vata*. Then proceeds to describe the colour and nature of the discharges as per the causative organism, as bluish due to pyocyanea bacillus; creamy - staphylococcus, and streptococcus; watery - allergic, viral infection; muco-purulent – mild bacterial and chlamydial infection; purulent – TB Bacillus and severe acute bacterial infection.

When I completed reading, the wise words of our late great professor Kumarakam Parameswaran Pillai resound in my ear. While addressing a seminar here, he had reminded us –

> "If the teachers in the ayurvedic colleges take sufficient interest to work up on their own teaching notes and try to elaborate them to suit needs of the times, our dearth of adequate literature in ayurveda is sure to be remedied."

I once again congratulate Dr. Santhakumari for having brought out this timely production, which is very useful. She has taken up the work with devotion and fulfilled it with extreme care. I recommend this work not only to students but to all who are interested in ayurvedic studies.

P.S. Varier Memorial Lecture delivered on 30.01.2003 in connection with the valedictory function of centenary celebrations held at Kottakkal.

KEEPING ALIVE THE SCIENCE OF LIFE IN THE FACE OF BIOPIRACY

VANDANA SHIVA

'If Gandhi gave to us the Charkha as a symbol of economic or *arthic svaraj*, P.S.Varier's setting up of the Arya Vaidya Sala was a gift of knowledge or *gyan svaraj*. Making our own medicine on the basis of our indigenous knowledge systems and spinning our own cloth were both crucial to our independence and freedom.'

Dr. Vandana Shiva, one of the world's most prominent radical scientists, is Director, Research Foundation for Science, Technology and Natural Resource Policy, New Delhi. She is a world renowned environmental thinker and activist who has devoted her life to fighting for the rights of the ordinary people of India. She has often been described as a burst of creative energy and intellectual power. Ms. Vandana Shiva has shared the Alternative Nobel Peace Prize in 1993. Dr. Vandana Shiva is the author of many books of international reputation.

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KEEPING ALIVE THE SCIENCE OF LIFE IN THE FACE OF BIOPIRACY

Vandana Siva

I am grateful to have the opportunity to pay a personal tribute to Vaidyaratnam P.S. Varier through the *P.S. Varier Memorial Lecture*.

A century ago when Vaidyaratnam P.S. Varier established the Arya Vaidya Sala, he saved ayurveda from marginalisation, degeneration and neglect. He gave it dignity, contemporary relevance and integrity. He did not wait for government – at that time a colonial government – to recognize and institutionalize our indigenous medical tradition. He took the initiative himself. If Gandhi gave to us the Charkha as a symbol of economic or *arthic svaraj*, P.S.Varier's setting up of the Arya Vaidya Sala was a gift of Knowledge or *gyan svaraj*. Making our own medicine on the basis of our indigenous knowledge systems and spinning our own cloth were both crucial to our independence and freedom. He has left us a legacy to build on – a legacy of intellectual decolonisation, of constant improvement of what we have received from our past to keep it relevant in the present and vibrant for the future. What will be the future of health care and healing? Will medicine be reduced to a market place of risky therapies denying health to those who have no purchasing power and to those who can buy costly health care but are not guaranteed health? In the U.S. of the GDP goes to health care, but one in three Americans are turning to ayurveda and other systems. In India, 70% people continue to get health care outside the Western allopathic system.

If in P.S. Varier's time, the threat ayurveda faced was from marginalisation through neglect, today's threat comes from marginalisation through its commercial success and popularity.

Today, thanks to efforts of people like Vaidyaratnam P.S. Varier; ayurveda has been transformed from a marginalised tradition in its own land to a much sought after system of healing worldwide. A century ago Cartesian reductionism prevented indigenous knowledge systems from being accepted as scientific. Today science has evolved to accept complexity, complementarity, indeterminacy and holistic relational knowledge as part of science, not outside it.

However, while scientific paradigms have become more holistic and the principles of the latest scientific traditions converge with principles of ancient sciences like ayurveda, new rules of trade

and intellectual property are attempting to push back into colonial arrangements in which we become providers of raw material and consumers of finished products, not producers of our needs and creators of our knowledge. If in P.S. Varier's time, the threat ayurveda faced was from marginalisation through neglect, today's threat comes from marginalisation through its commercial success and popularity. The sudden popularity of ayurveda poses three forms of threats to its integrity as a knowledge system and system of healing.

Biodiversity

Biodiversity of medicinal plants is the basis of ayurvedic healing. As the *Rigvedic* poem on healing plants show, ayurvedic healing is a partnership between plants that heal and the healer.

Mothers, you have a hundred forms
and a thousand growths.
You who have a hundred ways of working,
make this man whole for me.
Be joyful, your plants that bear flowers
and those that bear fruit.
Like mares that win the race together,
the growing plants will carry us across.
You mothers who are called plants, I say
to you who are goddesses:
let me win a horse, a cow, a robe – and
your very life, O man.
When I take these plants in my hand,
yearning for the victory prize,
The life of the disease vanishes as if before
a hunter grasping at his life.
He through whom your plants creep
limb by limb, joint by joint,
you banish disease from him like a huge man
coming between fighters.
Fly away, disease, along with the
blue jay and the jay;
disappear with the howl of the wind,
with the rainstorm.
Let one of you help the other;
let one stand by the other
All of you working together, help
this speech of mine to succeed.

Over-exploitation of medicinal plants is becoming a major threat to the future of authentic ayurvedic medicine.

Biopiracy

The appropriation and patenting of ayurvedic knowledge is another threat to the free flourishing of ayurveda in the future. The patenting of *nimba* (*Azadirachta indica*), *haridra* (*Curcuma longa*), *asvagandha* (*Withania somnifera*), *maricha* (*Piper nigrum*), *ardraka* (*Zingiber officinale*), *karavellam* (*Momordica charantia*)..... is not just an assault on the collective, cumulative innovations over millennia embodied in ayurveda. As Vaidyaratnam P.S. Varier has said when he founded the Vaidya Sala -

> *To be so lazy that instead of increasing, even marginally, this wealth that our forefathers have amassed after the hard work of many years – a wealth that is extremely useful and essential for all of us in so many ways that we cannot ignore it, no matter what age we are – we allow it to be squandered away from day to day; to endure without any apparent emotion the ridicule thrown at this system by those who are envious of it or who misunderstand it by attributing to it numerous drawbacks which in fact do not exist: I do not think there is anything more shameful than this.*

A third threat that comes from one-sided commercial success and commercial development is the risk of intellectual stagnation of the system and paradigm.

Major changes are taking place in the biological sciences, especially in genetic engineering and biotechnology, which have far reaching impacts on health and living processes. However, ayurveda, the ancient science of life has yet to make an ethical and epistemic response to the *new life sciences*. What according to ayurveda are the implications for health and life of genetic engineering of plants with genes for antibiotic resistance, herbicide resistance and toxins such as Bt? Will milk products from genetically engineered cows have the same properties as indigenous cows? Cows have recently been cloned to produce more cheese. What does this imply in the *tridosha* theory of balance?

We need to evolve a uniquely ayurvedic perspective on bio-safety and genetic engineering, not just because a non-reductionist perspective on genetic engineering is necessary for holistic health but also because addressing these scientific challenges from the paradigm of ayurveda is necessary to keep the paradigm dynamic, contemporary and vibrant.

Protecting and conserving biodiversity

Biodiversity conservation is the material basis of ayurveda's intellectual heritage. This needs four levels of action simultaneously.

1. Protection of our rich but fragile ecosystems such as the Himalayas and Western Ghats which are the home of medicinal plants biodiversity. Over-exploitation of the medicinal plants and destruction of habitat are pushing our rich bio-diversity to extinction.

2. Propagation of these medicinal plants which can be cultivated and which do not loose their medicinal properties under cultivation. When Vaidyaratnam started the Arya Vaidya Sala, one of his anxieties was the gap between those who prescribed ayurvedic medicine and those who made it.

   Since outsiders to the system are thus being given total responsibility and *vaidyan*s themselves refuse to take any, not only do people think that the *phalasruti* (that part of the formulation that describes the various indications for using a particular drug and its efficacy if so used) is only a series of wordy embellishments, *vaidyan*s themselves are the process of losing all acquaintance with the medicines they prescribe. In other words, a *vaidya* must be a bio-diversity expert. The erosion of biodiversity in the wild has created yet another gap in knowledge between those who know the plants, their methods of propagation and the difference in properties of plants when grown in different habitats and ecological conditions. Our famous Dehra Dun *basmati* looses its aroma when grown outside the sub-Himalayan region. Holistic science tells us that properties are a product of interaction between the ecosystem and the living organism. They are not inert or fixed. They are complex, dynamic and potential. Since the erosion of biodiversity necessitates cultivation and propagation, a body of knowledge that is waiting to be evolved is the appropriate climates, soils and methods of cultivation for different medicinal plants.

3. Traditional systems of collection of medicinal plants had strict regulation on access. Plants were treated as divinities which heal. They were invoked for healing. Their permission was taken before collection. The rejuvenation and regeneration of medicinal plants was ensured by not collecting in the wrong season, and not over-exploiting the biodiversity. Today, the traditional culture of regulation of access has given way to total de-regulation of access. I have witnessed the Himalayas raped for its medicinal plant wealth. The new Biodiversity Act was supposed to contribute to conservation of regulating, but, just as forest departments became exploiters of forest-wealth rather than protectors of forests, the biodiversity authorities and committees could emerge as the new *auction houses* for our dwindling biodiversity if people are not awakened to be vigilant custodians of their collective wealth.

4. Biodiversity will only be conserved if the local communities continue to benefit from it and are its keepers, custodians and conservers. Unlike minerals, biodiversity is living. Its governance and conservation cannot be achieved through non-local remote authorities. It needs local control and self-regulation to ensure its conservation. That is why we have started the Living Democracy Movement (*Jaiva Panchayat*s) to ensure community control over biodiversity conservation, sustainable utilisation and equitable sharing of our biodiversity.

- Living democracy is true freedom of all life forms to exist on this earth,
- Living democracy is true respect for life, through equitable sharing of the earth's resources with all those who live on the planet.

- Living democracy is the strong and continual articulation of such democratic principles in everyday life and activity.
- Living democracy is using democratic institutions rather than centralised institutions to articulate democratic principles.

The *jaiva panchayat*

Living Democracy Movement was launched on the World Environment Day on 5th June 1999, by more than 2000 people at the village Agastyamuni in Rudraprayag District, Garhwal, U.P. in Northern India. The purpose behind the formation of *jaiva panchayats* is to conserve our heritage and to establish the rights of community over the biodiversity of their areas.

On behalf of the people, the block *pradhan* (the head of the local administration), an elected woman representative of 192 villages, Shaila Rani Rawat, declared the people's fundamental rights over the biological resources of the region and the establishment of first *jaiva panchayat* in the village Agastyamuni. The text of this declaration, named after the river on the bank of which the Declaration was made *The Mandakini Milan Declaration* translated into English from the local Garhwali language is reproduced below. [The declaration was read in Garhwali by the block *pradhan*]

Mandakini Milan Declaration

5th June, 1999
Agastyamuni, Dist. Rudraprayag
Garhwal, Uttar Pradesh

Today, on 5th June, 1999, on the auspicious occasion of World Environment Day, we the people of Agastyamuni, take the solemn pledge that we will continue to protect our plants, trees, animals, cattle and our entire diverse biological wealth, as a revered gift and our ancestral heritage.

This pledge assumes more significance as it is being taken in Agastyamuni, the sacred land of *rishi Agastya* who through his dedication and research stabilized the mighty Himalayan mountains (therefore the name *Agastya* – the stabilizing force). Both humanity and nature have greatly benefited from the diligent research of *maharshi* Agastya. *maharshi* Jamadagni, *rishi* Atri, *mata* Anasuya and other saints. Their work has contributed to the conservation and sustainable use of all kinds of medicinal plants and floral wealth and other precious

biodiversity of these mountains. The research was further enriched by *maharshi* Charaka and other saints and health practitioners who compiled the volumes of *Samhita* and *Nighantu* detailing the uses and properties of our biological resources. These volumes were bestowed to the community for well-being and continue to live through the Ayurveda.

Cows, buffaloes, goats, sheep, lions, tigers and, in fact, all animals, birds, plants, trees, precious medicinal plants and manure, water, soil, seeds are all our biological resources and we shall not let any outsider exercise any control over them through patents or destroy it through genetic engineering.

From our forefathers we have inherited the right to protect the biodiversity of our Himalayan region and also the corresponding duty to utilise these biological resources for the good of all people. Therefore, we pledge, by way of this declaration, that we shall not let any destructive elements unjustly exploit and monopolise these precious resources through illegal means. So that in our communities and country we can truly establish a living people's democracy wherein each and every individual can associate herself with the conservation, sustainable and just use of these biological resources in her/his everyday practical living. This tradition of sharing shall be kept alive through the *jaiva panchayat* – the living democracy. The *jaiva panchayat* will decide on all matters pertaining to biodiversity. Through such decentralised democratic decision-making we will make real the democracy for life.

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As a community, we shall together be the guardians of our biological heritage.

From 9th August 1999 onwards, hundreds of village communities organised as *jaiva panchayat* served notices to Mr. Mike Moore, Director General of WTO, as part of their campaign against biopiracy. The text of the letter is reproduced below:

Mr. Mike Moore
Director General
World Trade Organisation
Centre William Rappard
Rue de Lausanne
154, Case postale
CH – 1211 Geneve 21

Dear Mr. Moore,

Sub: Biopiracy and WTO

India is a country which has centuries' old indigenous knowledge systems based on its rich biodiversity which the Indian people have conserved through their traditional lifestyles and local economies. Two-thirds of our population even today is directly dependent on the biological resources and the indigenous knowledge. These resources and knowledge are used in an ethic of sharing so that the livelihoods and needs of the poorest are met. This is in direct contradiction with the ethics (or the lack of it) perpetrated by the World Trade Organisation through the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs). TRIPs has globalised and legalised a perverse and unethical intellectual property rights system which encourages the piracy of our indigenous knowledge and subverts our decentralised democratic system.

India and its Laws recognise the jurisdiction of local communities over the biodiversity in their area. As per the amendment in the Constitution of India, inserted by the Constitution (seventy-third amendment) Act, 1992, the *Panchayati Raj System* for decentralised democracy for the rural areas has been reinforced. As per a further Amendment in 1996, the *Grama Sabha* (the village community) is the highest competent authority to take decisions on natural resources at the grassroots' level. Our national government has also reiterated this by declaring the year 1992-2000 as the *Year of the Grama Sabha*. The jurisdiction

of the *gramasabha* on the biodiversity and the biodiversity-related knowledge are inalienable.

The convention of Biological Diversity (CBD) to recognises the sovereign rights of the local communities, India has ratified CBD and endeavours to provide for the sovereign rights recognised therein. These rights over biodiversity and biodiversity-related knowledge are inalienable.

However, it is brought to your notice that these rights are infringed by the law and policy perpetrated by the WTO, especially the TRIPs. TRIPs is infringing on the Common Property Rights (CPRs) to biodiversity and biodiversity-related knowledge by recognizing only the private property rights are enshrined in the culturally based system of the Western industrial states. TRIPs is enabling bio-piracy. We enclose a short list of biopirates and how they have wrongfully claimed to have invented and created knowledge that has been part of our culture and economy for centuries.

We wish to inform you that we will not allow you to take decisions on matters that fall exclusively within our jurisdiction through our decentralised democratic system. On the basis of our inalienable rights that are recognised by our Constitution and the CBD, we will not permit WTO to undermine our rights and protect those who steal our knowledge and our biodiversity.

According to the mandate of the WTO, TRIPs is to be reviewed this year. We ask you to immediately amend TRIPs and exclude biodiversity from your global IPR regime acknowledging our local rights to make laws, determine ownership, and use patterns and to settle disputes.

As the competent authority, members of the following *grama sabhas*, we expect you to report to us on:

a) steps you are taking to amend the TRIPs
b) what you re doing to appropriately revamp the DSM

In particular, we ask for the dispute of US – India to be reopened taking democratic decentralised rights into account. In any case, we will be carrying out local public hearings to resolve these issues in our way at our level.

Anticipating your co-operations,

Yours truly,

Rejuvenating knowledge and Asserting community rights

The Community Biodiversity Register (CBR) is a register to document the resources and knowledge of biological resources of local communities at local, regional and national levels by the people themselves for the purpose of rejuvenating the knowledge and conserving the biodiversity.

The erosion of biological resources and the knowledge about these resources developed by the communities and freely exchanged by them makes it imperative to document the knowledge. The people who actually share their everyday life with these resources can only do this best. Thus, the CBR is a tool for keeping the biodiversity knowledge alive in the community.

The US and EU suggest that documentation of biodiversity-related knowledge be done by WIP on computer databases. This will erode and push to extinction of oral knowledge and it will further disempower local communities and those who actually generate and carry knowledge. It will create a bioprospecting technocracy and a documentation of knowledge by experts and it will be not use for sustainable production.

CBRs on the other hand, help remembers to rejuvenate dying traditions. They help recognise women, peasants and tribal people as knowledge creators and carriers of knowledge traditions. CBRs act a guard for the guardians. CBRs also help in keeping the indigenous knowledge into use for sustainable living. They are a tool for local people asserting local rights, hence a means for empowerment. They help keep the knowledge alive as a living tradition for future generation.

The CBR is also a political tool for making people more aware of their rights vis-à-vis biodiversity and more empowered to challenge biopiracy and resist patents that erode their right to seed, food and medicine. It provides a means to assert rightful sovereign control over what is their own and better equips the community with bargaining power. The CBR is thus a means of building self-rule in the management of biodiversity.

The CBRs are a declaration of people's right and will be a tool in the hands of *jaiva panchayat* to counter patents on biodiversity and indigenous knowledge.

Recognition of traditional knowledge, innovations and practices are of importance to the conservation of biological diversity and that of indigenous and the local communities who have close and traditional dependency on biological resources. Their livelihood and lifestyle often depends upon and is shaped by these resources.

Under the new political climate of liberalisation, it has become necessary to define biodiversity property rights through the sovereign rights of local communities and traditional practitioners. These sovereign biodiversity property rights, embodying both biological and intellectual heritage of communities are collectively known as Community Intellectual Property Rights – CIPRs. CIPRs have to be formalised and protected as existing prior to IPRs. The latter can exist only where they do not infringe on the former, otherwise it becomes an infringement and violation of sovereignty.

The system based on CIPRs would safeguard against original collective owners of biodiversity and knowledge being reduced to biodiversity caretakers while ownership rights under the system based on IPRs are transferred to corporations. All the communities have the rights to their resource base, to their knowledge and to their innovations driven from this knowledge. This right is collective and not individual and is inherent in the collective persona of communities rather than in the state, and cannot be adjured and relinquished by any one community, or any individual of any community, or the state on behalf of any community. Further, since communities unlike individuals exist in perpetuity, the right is also perpetual in nature.

A system recognizing CIPRs would recognise creativity and protect the livelihoods of diverse communities setting limits and boundaries on the domain of monopoly protection shaped by IPRs.

Under Article 27.3 (b) of the TRIPs agreement, it is mandated that -

> .....Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof,

Since neither *plant varieties* nor *sue generis* has been defined, countries are free to interpret plant varieties as all plants and *sue generis* as a system uniquely adapted to the biodiversity endowment and knowledge heritage of the country.

Protecting our intellectual heritage from biopiracy

Spreading the knowledge of ayurveda while ensuring its vitality and authenticity is what Vaidyaratnam P.S. Varier dedicated his life to. Today, an opposite trend has emerged which we call biopiracy – the piracy and patenting of traditional knowledge. A patent is an exclusive right granted to an inventor to make, sell, use, and distribute a patented product or products made by a patented process. Patents on traditional ayurvedic knowledge are doubly wrong – first, traditional knowledge is by its very nature not novel, it is not an invention. It should hence lie beyond the purview of patentability. Secondly, exclusive rights and monopolies go against the spirit of ayurveda which treats healing as a gift, not a commodity. When ayurvedic physicians do keep their knowledge secret till they find a good student and disciple, it is to prevent its commercial exploitation and misuse.

Patents on traditional ayurvedic knowledge are doubly wrong - first, traditional knowledge is by its very nature not novel, it is not an invention. It should hence lie beyond the purview of patentability. Secondly, exclusive rights and monopolies go against the spirit of ayurveda which treats healing as a gift, not a commodity.

Ayurveda and other indigenous health traditions need to be protected as our collective, cumulative heritage through a *sui generis* system suited to its ethical values and its epistemic tradition. This work is still waiting to be done. I would be happy to evolve a work programme with the Arya Vaidya Sala to develop a *sui generis* system for the protection of its intellectual tradition as a legacy of its practitioners.

There is a third reason why patents on ayurvedic medicine are undesirable. Ayurveda and indigenous knowledge systems have continued to serve 70% of India which could not afford the costly Western medicine. Patents make medicines more costly. The AIDS drugs that CIPLA can make for $200 cost $20,000 when made as patented drugs in the US. This is why committees want essential drugs necessary for dealing with public health emergencies out of patent monopolies. This has become the most controversial issue in TRIPs in WTO. Since patents have such a high cost in denying people access to medicine, and the value of patents has not been resolved even for Western medicine, it would be foolhardy to all patents to enter the domain of ayurveda and indigenous system.

As Yusuf Haied of CIPLA has stated,

> Our fight is against the monopoly caused by pharmaceutical patents resulting in high and reasonable pricing of drugs. Our fight is against denial of drugs to the masses at affordable prices.

There are currently two schools of thought on Intellectual Property Rights and Traditional Knowledge including ayurvedic, folk traditions, farmers breeding, etc.

The school to which I belong seeks to defend the collective, cumulative heritage we have received and improve our collective social capacity to continuously evolve, stay a creative and vibrant society and improve our intellectual capacities. I see knowledge as living. I do not see an epistemic divide between ancient traditions which have evolved and are today called *traditional knowledge* or recent traditions which are called *modern.* All contemporary traditions are modern, and ayurveda an indigenous health systems and agriculture systems are modern because they are relevant to the present and necessary for the future.

I do not see an epistemic divide between ancient traditions which have evolved and are today called traditional knowledge or recent traditions which are called modern.

This ancient heritage in its contemporary form is a result of collective and cumulative innovation and improvement. It cannot be individually owned. It cannot be privatized.

The other school seeks to privatize and commodify traditional knowledge through exclusive patents. Those who claim patents are rarely the traditional ayurvedic practitioners. They are usually western corporations or institutes. Through the blatant, false and arrogant claim of *inventing* an ancient tradition, they acquire an exclusive right to use the knowledge, which, if not stopped now would translate into a future right to prevent the authentic practitioners from practising ayurveda. Ayurvedic medicines as patented medicine will sell through the giant pharmaceutical industry, but ayurveda as a living tradition of healing and healthy living will die. After the British learnt about small pox vaccines from Indian healers, they declared it their *invention* and then banned traditional healers from vaccinating. After patenting the seed, the MNCs prevent farmers from saving and exchanging seed. A patent is a right to prevent others from the use of patented knowledge. *A patent on traditional knowledge is by definition a right to prevent traditional practitioners from*

practice of ayurveda. That is why we must create alternative *sui generis* system at the national and international levels to the dominant IPR and patent models to defend the integrity of our traditions, the rights of ayurvedic practitioners and their future evolution of knowledge and practice.

There are two misguided responses to biopiracy. One is the often-used argument that it is our fault, we should document our knowledge, and a digital library of traditional knowledge will solve the problem of biopiracy. I believe this is a wrong response because most ayurvedic knowledge is already documented in our texts. In fact, the pirated patent claims have used documented knowledge. Secondly, even oral knowledge is *prior art* and its piracy cannot be the basis of a false claim to invention. In any case, a patent is a legal right. Preventing illegitimate patent claims based on biopiracy requires clearly articulate legal rights of traditional knowledge practitioners and clearly defined limits of what is not patentable and cannot be owned as intellectual property. In the review of TRIPs, our government has asked for exclusion of living resources such seeds and medicinal plants from patentability. It has also called for stopping biopiracy by preventing the patenting of traditional knowledge. However, it has failed to evolve a *sui generis* system for the protection of our intellectual and biological heritage.

The second distorted response to biopiracy is the so-called *benefit sharing.* India has shared the benefit of ayurveda over millennia; she has shared its benefits freely across the world. The new discourse on benefit sharing is predicted on patent monopolies over traditional knowledge with a small percentage of profits from patent monopolies going to *traditional knowledge provides.* This concept is distorted at many levels.

Firstly, a patent based on traditional knowledge violates both the traditional knowledge and the criteria of novelty on which patents are based.

Secondly, a patent as an exclusive prevents sharing of the benefits of ayurveda – it is an instrument to prevent sharing of knowledge and health benefits.

Thirdly, with whom will the monetary percentage of profits from patent monopolies be shared with – Gurukul Kangu in Haridvar or Arya Vaidya Sala in Kottakkal?; a *vaidya* in Tamil Nadu or a *guru* in Rajasthan? Will this not put ayurvedic institutions and practitioners against each other in a fight over a bait which essentially robs them of their right to practice ayurveda? Is not a better way to proceed to defend the collective intellectual rights of all ayurvedic and indigenous knowledge practitioners, which would prevent patenting and piracy by commercial interests, would defend the right to practise of traditional healers and would create a mechanism to collect royalties and return from commercial interests wanting to use traditional knowledge? This is benefit sharing based on protecting of the integrity of our knowledge systems and the inalienable birthright to practise health care based on traditional knowledge.

Since ayurveda is a science of life and way of living, our deeper values of sharing and defending the common good needs to guide the future of healthcare in India and worldwide. Ayurveda will no longer be ayurveda if it is reduced to costly patented pills sold by global MNCs. It will not be ayurveda if the product survives but practitioners disappear. Ayurveda is after all *the way*, not just a *product*. Defending the way ayurveda is necessary for our cultural, intellectual, social and economic survival as a society – a civilization.

It will not be ayurveda if the product survives but practitioners disappear. Ayurveda is after all the way, not just a product.

And diversity, pluralism and inclusiveness to me stand out as the distinctive ways of ayurveda and indigenous knowledge traditions. Vaidyaratnam P.S. Varier's life deepened this respect for diversity. He created an institution of learning without caste and religious barriers. And when religious conflicts broke out during the Moplah rebellion, the Vaidya Sala gave sanctuary to the Hindu, the Muslim, and even the functionaries of the British Government.

May each one of us defend this legacy of protecting diversity in these days when wiping out diversity has become the distinctive characteristic of dominant systems of technology, economics and politics. May we walk in the footsteps of our rich heritage of diversity and keep it alive as a path for the future.

Thank you

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'My idea in raising this issue here is to demonstrate the future role of law and legal institutions in managing our precious natural resources including ayurveda and bio-diversity in the context of highly competitive, cruelly commercialized world where rule of law and human rights hopefully shall govern.

On my part I would like to assure the Board of Trustees of this great institution that myself and my colleagues in West Bengal National University of Juridical Sciences will be more than willing to extend whatever legal support services we are capable of in advancing the mission of Vaidyaratnam P.S. Varier. Arya Vaidya Sala has to assume a pro-active and lead role in this critical juncture. If such a plan of action is readied and put in place by the Board of Trustees, I believe it will be the greatest tribute that we can offer to the Founder, the one and only Vaidyaratnam P.S. Varier.'

Prof. (Dr.) N.R. Madhava Menon,
Vice Chancellor, National University of Juridical Sciences, Kolkata.

Read the full text of the lecture in the next issue of *Aryavaidyan*

.....the year that passed

Arya Vaidya Sala, Kottakkal founded by the visionary Vaidyaratnam P.S. Varier on October 12, 1902 completed hundred years of its service to humanity. The yearlong centenary celebrations were inaugurated by Prof. Murli Manohar Joshi, Union Minister for Human Resource Development and Science & Technology in February, 2002 at Kottakkal.

The 56th Plenary Session of the All India Ayurvedic Congress and the technical seminars with national participation of more than 2000 delegates on Stress related diseases, Research scenario in clinical aspects, Traditional knowledge – its strength in health care, Ayurvedic drug industry, etc. provided an excellent forum for interaction among the scientists.

The *kudumbasangamam* of the employees in May was a memorable event. The Zonal meetings held at Thiruvananthapuram, Ernakulam, Palakkad, Kozhikode, Kolkata and Kannur strengthened the relation Arya Vaidya Sala had maintained with the medical fraternity and the public at large.

AVS started several innovative programmes during the year. It took a quantum jump in the field of research by establishing a centre for medicinal plants. Commencement of a *Gene Plasm Bank*, opening of tissue culture lab laying foundation stone for Centre for Medicinal Plants Research were some of the landmarks of the year. As part of the environmental friendly activity, AVS started making organic manure from herbal residue. Launching of new tablets and up-gradation of production, holding HRD activities like Creative Leadership and CME programmes, participating in national and international seminars were included in the activities for the year. AVS participated in a big way at the World Ayurveda Meet at Kochi. AVS website visited by one lakh persons every month is being reset as a reference model. Process of computerization of the departments is on its final stage. Many patients utilize the facility of our on-line consultation. A health-care information system is installed in the Ayurvedic Hospital & Research Centre.

Works for P.S. Varier Memorial Museum and Medical Library are in progress. AVS is launching a hospital at Kolkata also. AVS launched several public health awareness programmes during the year. The Asianet capsules *ayurarogyasoukhyam* at 8:50 am on Sundays have evoked enthusiastic response from the Public. Ten major publications, including a souvenir in three volumes, were brought out during the centenary year. On the cultural front, *PSV Natyasangham* organized several programmes and the largely attended appreciation classes for *Kathakali* were widely welcomed.

Govt. of India, recognizing the pioneering efforts, released a Postal Stamp on AVS and its founder on 12th October; the day the institution completed hundred years.

The national press and the public acclaimed the services of AVS by publishing special features, interviews, etc. *Grandhalokam* the official organ of the Kerala State Library Council devoted its October issue for AVS. The year-long programmes showed the love and affection the people have bestowed on this institution.

It makes the Arya Vaidya Sala more humble to re-dedicate to the service of humanity.