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लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health

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FROM THE PAGES OF VĀGBHAṬA - LXXIX

Dr. A. Raghunathan*

Abstract: This chapter deals with the auspicious and inauspicious signs of the messenger who approaches the physician, and omens which are the foreteller of the fate of a treatment and of a patient's health.

अथातो दूतादिविज्ञानीयं शारीरं व्याख्यस्याम: ।
इति ह स्माहुरात्रेयादयो महर्षय: ।।

(Athāto dūtādivijñānīyam
śārīram vyākhyasyāma: ।
iti smāhurātreyādayo maharṣaya: ।।)

Now we shall comment on dūtavijñānīyam, the final chapter of Śārīrasthānam, in which, positive and negative omens appearing as messenger, atmosphere and pathway (to the patient's house) are detailed; thus spoke the sage Ātreya and other ācāryas.

The section of this treatise named Śārāram, comprising all the aspects of a person happening from birth to death, concludes with this chapter. The cause and process of birth, further developments, probable illnesses after the birth, their management, etc. have been highlighted in the first two chapters of Śārīrasthānam. Body development, anatomy as well as physiology of the body, especially in ayurvedic perspective, have been described in the third chapter. Particular stress have been given for vital spots of the body as that are so related to the death; then death predicting details have been emphasized. Apart from these, features seen in imminent death (ariṣṭalakṣaṇas) of a patient or failure in the treatment can be inferred from particular indications from some related aspects also. Being associated with nimitta-śāstra, a sub-branch of vedic literature, āyurveda could develop particular context regarding the fate of a treatment - these are detailed in this chapter.

Out of numerous related aspects of a patient, particular points that can be observed in the messenger of a patient (informant of the disease to the physician) are emphasized first.

पाखण्डाश्रमवर्णानां सवर्णा: कर्मसिद्धये ।
त एव विपरीता: स्युर्दूता: कर्मविपत्तये ।। १ ।।

(Pākhaṇḍāśramavarṇānām
savarṇā: karmasiddhaye ।
ta eva viparītā: syur-
dūtā: karmavipattaye ।। 1 ।।)

The messengers of same class of the patients (for e.g. a pākhaṇḍa class messenger for a patient who belongs to pākhaṇḍa caste), messenger of

*"Amṛtālayam", Thozhupadam (PO), Chelakkara (Via), Thrissur - 680 586, Kerala

same āśrama (particular life styles like brahmacarya, gṛhasthāśrama, etc.) or same varṇa (particular castes such as brāhmaṇa, kṣatriya, etc.) are indicative of success in the treatment. On the contrary, if the messenger belongs to different āśrama or varṇa, indicates failure in the treatment.

[Physician used to assume the prognosis of a disease before attending a case. Particular indicative features seen in the messenger, condition of the physician at the time of hearing the case firstly, features noticeable on the way to the patient's house, objects perceives on entering to the patient's house, etc. are to be taken into consideration in assuming the prognosis of the disease.]

Of features of the messenger, the category is examined first. People in India were categorized into four i.e. brahmacāri (student), gṛhastha (householder) vānaprasthi (nomad) and sanyāsi (monks) according to the life style, and again into four i.e. brāhmaṇa, kṣatriya, etc. according to the duty. The civilized people were included in these groups and the uncivilized were named pākhaṇḍa. A messenger belongs to different class or caste is considered as a negative sign.

दीनं भीतं द्रुतं त्रस्तं रूक्षामङ्गलवादिनम् ।
शस्त्रिणं दण्डिनं षण्डं मुण्डं श्मश्रुजटाधरम् ।। २ ।।
अमङ्गलाह्वयं क्रूरकर्माणं मलिनं स्त्रियम् ।
अनेकं व्याधितं व्यङ्गं रक्तमाल्यानुलेपनम् ।। ३ ।।
तैलपङ्काङ्कितं जीर्णविवर्णाद्रैकवाससम् ।
खरोष्ट्रमहिषारूढं काष्ठलोष्टादिमर्दिनम् ।। ४ ।।
नानुगच्छेद्भिषग्दूतमाह्वयन्तं च दूरत: ।

(Dīnam bhītam drutam trastam
rūkṣāmaṅgalavādinam ।
śastriṇam daṇḍinam ṣaṇḍam
muṇḍam śmaśrujaṭādharam ।। 2 ।।
Amaṅgalāhvayam krūra-
karmāṇam malinam striyam ।
anekam vyādhitam vyaṅgam
raktamālyānulepanam ।। 3 ।।
Tailapaṅkāṅkitam jīrṇa-
vivarṇārdraikavāsasam ।
kharoṣṭramahiṣārūḍham
kāṣṭhaloṣṭādimardinam ।। 4 ।।
Nānugacchedbhiṣagdūta-
māhvayantam ca dūrata: ।)

The physician should not follow a messenger who is feeble, fearful, hyperactive, frightened, speaking bad words, keeping weapons or stick; who is an eunuch or a bald, bearing ugly mustaches and beard, having bad name, doer of cruel activities, ugly by dress, diseased, handicapped, adorned with red garlands and smeared or applied with oil or clay, wearing old or hazy coloured or wet clothes or with a single cloth. If the messenger is a lady, or he/she comes with friends, also a negative mark. The physician should not go with a messenger who rides on a donkey, camel, she-buffalo; who beats own body with stick or clod and calls the physician carelessly from distance.

अशस्तचिन्तावचने नग्ने छिन्दति भिन्दति ।। ५ ।।
जुह्वाने पावकं पिण्डान् पितृभ्यो निर्वपत्यति ।
सुप्ते मुक्तकचेऽभ्यक्ते रुदत्यप्रयते तथा ।। ६ ।।
वैद्ये दूता मनुष्याणामागच्छन्ति मुमूर्षताम् ।

(aśastacintāvacane
nagne chindati bhindati ।। 5 ।।
Juhvāne pāvakam piṇḍān
pitṛbhyo nirvapatyati ।
supte muktakaceऽbhyakte
rudatyaprayate tathā ।। 6 ।।
vaidye dūtā manuṣyāṇām-
āgacchanti mumūrṣatām ।)

When the messenger arrives, if the physician is engaged with inauspicious thoughts or talks; if the physician is naked or engaged with cutting or splitting something; while offering into the fire or doing oblation to forefathers - indicates the impending death of the patient. Likewise, if the messenger comes when physician sleeps, allows his hair untied and applies oil on the body; when he is in anguish mood or indulges in something inauspicious - all these are indicative of untoward condition of the patient.

विकारसामान्यगुणे देशे कालेऽथवा भिषक् ।। ७ ।।
दूतमभ्यागतं दृष्ट्वा नातुरं तमुपाचरेत् ।

(vikārasāmānyaguṇe
deśe kāleऽthavā bhiṣak ।। 7 ।।
Dūtamabhyāgatam dṛṣṭvā
nāturam tamupācaret ।)

The physicians should not treat a patient whose messenger comes from a place or at a time that are having similar traits to the disease.

[For kaphaja diseases, the place (having similar traits of diseases) is ānūpadeśa or site with liquid articles (like ghee, water, etc.), and the time is morning. For paittika diseases, the place is intensely heated places due to fire, etc. and the time is midday. For vātika diseases, the equal place is that with rough and dry articles, and the time is afternoon. For diseases like chardi, atisāra or prameha, place where water is flowing through broken ridge and rainy moment is the respective place and time. Being appraised the features of diseases, a physician should have the idea of the place and time. If a messe-nger comes from such a place and time, it is better to avoid that patient discerning the nega-tive nature of the case.]

स्पृशन्तो नाभिनासास्यकेशरोमनखद्विजान् ।। ८ ।।
गुह्यपृष्ठस्तनग्रीवाजठरानामिकाङ्गुली: ।
कार्पासबुससीसास्थिकपालमुशलोपलम् ।। ९ ।।
मार्जनीशूर्पचैलान्तभस्माङ्गारदशातुषान् ।
रज्जुपानत्तुलापाशमन्यद्वा भग्नविच्युतम् ।। १० ।।
तत्पूर्वदर्शने दूता व्याहरन्ति मरिष्यताम् ।
तथाऽर्द्धरात्रे मध्याह्ने सन्ध्ययो: पर्ववासरे ।। ११ ।।
षष्ठीचतुर्थीनवमीराहुकेतूदयादिषु ।
भरणीकृत्तिकाऽऽश्लेषापूर्वाऽऽर्द्रापैत्र्यनैर्ऋते ।। १२ ।।

(spṛśanto nābhināsāsya-
keśaromanakhadvijān ।। 8 ।।
Guhyapṛṣṭhastana-
grīvājaṭharānāmikāṅgulī: ।
kārpāsabusasīsāsthi-
kapālamuśalopalam ।। 9 ।।
Mārjanīśūrpacailānta-
bhasmāṅgāradaśātuṣān ।
rajjupānattulāpāśa-
manyadvā bhagnavicyutam ।। 10 ।।
Tatpūrvadarśane dūtā
vyāharanti mariṣyatām ।
tathāऽrddharātre madhyāhne
sandhyayo: parvavāsare ।। 11 ।।
Ṣaṣṭhīcaturthīnavamī-
rāhuketūdayādiṣu ।
bharaṇīkṛttikāऽऽśleṣā-
pūrvāऽऽrdrāpaitryanairṛate ।। 12 ।।)

A messenger, at the time of meeting the physician first time, if touches his own body parts like navel, nostrils, mouth, hairs, nails, teeth; or other private parts, back, breasts, neck, belly, ring finger; or materials like cotton, husk, lead, bone, skull, pestle, stone; or broom, winnowing basket, tip of the cloth, ash, fire-brand, wick, chaff; or rope, wooden footwears, rope for the balance; or materials that are broken or displaced, is to be regarded as the messenger of a patient who is nearing to death.

Similarly, a messenger who comes at midnight, midday, dawn or dusk, full-moon-day or no-moon-day, sixth, fourth month days (of the waxing and waning fortnights of moon), or on inauspicious times like rāhu and ketu when ascendent, or on particular star-days like bharaṇi, kṛttika (kārttika), āśleṣa (āyilyam), pūrva (pūram, pūrāṭam, pūroruṭṭāti), ārdra (tiruvātira), paitrya (makam) and nairṛte (mūlam), is to be regarded as messenger of a dying patient.

यस्मिंश्च दूते ब्रुवति वाक्यमातुरसंश्रयम् ।
पश्येन्निमित्तमशुभं तं च नानुव्रजेद्भिषक् ।। १३ ।।

(Yasmimśca dūte bruvati
vākyamāturasamśrayam ।
paśyennimittamaśubham tam
ca nānuvrajedbhiṣak ।। 13 ।।)

The physician should not accompany a messenger if he finds some ill-omen when the messenger details about the patient.

[The mental state of the physician is considered here as great criterion to infer the prognosis of the disease. Any type of change occurred in the mind of the physician at the time of briefing the case by the messenger will affect the treatment. Some of such examples (ill-omens) are detailed in the coming verses.]

तद्यथा विकल: प्रेत: प्रेतालङ्कार एव वा ।
छिन्नं दग्धं विनष्टं वा तद्वादीनि वचांसि वा ।। १४ ।।
रसो वा कटुकस्तीव्रो गन्धो वा कौणपो महान् ।
स्पर्शो वा विपुल: क्रूरो यद्वाऽन्यदपि तादृशम् ।। १५ ।।
तत्सर्वमभितो वाक्यं वाक्यकालेऽथवा पुन: ।
दूतमभ्यागतं दृष्ट्वा नातुरं तमुपाचरेत् ।। १६ ।।

(Tadyathā vikala: preta:
pretālaṅkāra eva vā ।
chinnam dagdham vinaṣṭam vā
tadvādīni vacāmsi vā ।। 14 ।।
Raso vā kaṭukastīvro
gandho vā kauṇapo mahān ।
sparśo vā vipula: krūro
yadvāऽnyadapi tādṛśam ।। 15 ।।
tatsarvamabhito vākyam
vākyakāleऽthavā puna: ।
dūtamabhyāgatam dṛṣṭvā
nāturam tamupācaret ।। 16 ।।)

A handicapped person, a corpse or someone dressed as corpse, something torn or burned or hearing of such things; intense pungent taste, strong cadaveric smell, unbearable touch, agonising sights or hearing - all these are ill-omens. If the physician percepts such untoward things at the moment when the messenger details about the patient, it is better to avoid that case.

हाहाक्रन्दितमुत्क्रुष्टमाक्रुष्टं स्खलनं क्षुतम् ।
वस्त्रातपत्रपादत्रव्यसनं व्यसनीक्षणम् ।। १७ ।।
चैत्यध्वजानां पात्राणां पूर्णानां च निमज्जनम् ।
हतानिष्टप्रवादाश्च दूषणं भस्मपांसुभि: ।। १८ ।।
पथ:च्छेदोऽहिमार्जारगोधासरठवानरै: ।
दीप्तां प्रति दिशं वाच: क्रूराणां मृगपक्षिणाम् ।। १९ ।।
कृष्णधान्यगुडोदश्विल्लवणासवचर्मणाम् ।
सर्षपाणां वसातैलतृणपङ्केन्धनस्य च ।। २० ।।
क्ळीबक्रूरश्वपाकानां जालवागुरयोरपि ।
छर्दितस्य पुरीषस्य पूतिदुर्दर्शनस्य च ।। २१ ।।
नि:सारस्य व्यवायस्य कार्पासादेरेरपि ।
शयनासनयानानामुत्तानानां च दर्शनम् ।। २२ ।।
न्युब्जानामितरेषां च पात्रादीनामशोभनम् ।

(Hāhākranditamutkruṣṭam
ākruṣṭam skhalanam kṣutam ।
vastrātapatrapādatra-
vyasanam vyasanīkṣaṇam ।। 17 ।।
Caityadhvajānām pātrāṇām
pūrṇānām ca nimajjanam ।

hatāniṣṭapravādāśca
dūṣaṇam bhasmapāmsubhi: ॥ 18 ॥
Patha:cchedoऽhimārjāra-
godhāsaraṭhavānarai: ।
dīptām prati diśam vāca:
krūrāṇām mṛgapakṣiṇām ॥ 19 ॥
Kṛṣṇadhānyaguḍodaśvi-
llavaṇāsavacarmaṇām ।
sarṣapāṇām vasātaila-
tṛṇapaṅkendhanasya ca ॥ 20 ॥
Kḷībakrūraśvapākānām
jālavāgurayorapi ।
charditasya purīṣasya
pūtidurdarśanasya ca ॥ 21 ॥
Ni:sārasya vyavāyasya
kārpāsāderarerapi ।
śayanāsanayānānām-
uttānānām ca darśanam ॥ 22 ॥
Nyubjānāmitareṣām ca
pātrādīnāmaśobhanam ।)

Hearing of weeping sound ha! ha!, wailing, crying; falling, sneezing, slipping; lose of clothes, umbrella or footwear or seeing of sorrowing people due to loss of such articles; damage to holy tree, flags or fulfilled pots; hearing inauspicious words like 'died, killed', etc.; affliction of the body (of physician) with ashes or dust; crossing of snake, cat, iguana, chameleon or monkey on the way; hearing yelping of cruel animals or birds such as fox/ vulture towards the direction at which sunrises; articles such as black sesame, jaggery, buttermilk, salt, alcohol, animal's leather; or mustard, muscle fat, oil, grass, clay, firewood; eunuch, vandal, butcher; fishnet, hunting-net; vomitus, faecal matter, something repugnant with foul smell, hollow articles like bamboo; coitus, cotton, husk, etc. (materials detailed in verses 9 and 10); enemies, materials like bed, chair, vehicles or vessels that are kept in upside-down position - all these are ill-omens.

पुंसंज्ञा: पक्षिणो वामा: स्त्रीसंज्ञा दक्षिणा: शुभा: ।। २३
प्रदक्षिणं खगमृगा यान्तो, नैवं श्वजम्बुका: ।
अयुग्माश्च मृगा: शस्ता: शस्ता: नित्यं च दर्शने ।। २४
चाषभासभरद्वाजनकुलच्छागबर्हिण: ।
अशुभं सर्वथोलूकबिडालसरठेक्षणम् ।। २५ ।।

(puṁsañjñā: pakṣiṇo vāmā:
strīsañjñā dakṣiṇā: śubhā: ॥ 23 ॥
Pradakṣiṇaṁ khagamṛgā
yānto, naivaṁ śvajambukā: ।
ayugmāśca mṛgā: śastā:
śastā: nityaṁ darśane ॥ 24 ॥
Cāṣabhāsabharadvāja-
nakulacchāgabarhiṇa: ।
aśubhaṁ sarvatholūka-
biḍālasaraṭhekṣaṇam ॥ 25 ॥)

Alighting and sitting of masculine type of birds (e.g. varttaka - quail) on the left side of the physician (who moves to the patient's house) or those with feminine gender (e.g. śārika -mynah) on the right side are good omens. Circumambulation (moving from left to right direction) of birds or animals to the physician, or moving of animals like dog or fox just opposite direction (from right to left) are considered as good-omen. Group of animals in odd numbers is a good sign. Cāṣa (blue jay), bhāsa (white- vulture), bharadvāja (skylark), mongoose, goat and peacock are always good omens; whereas, the sight of owl, cat and chameleon are always inauspicious.

प्रशस्ता: कीर्तने कोलगोधाहिशशजाहका: ।
न दर्शने न विरुते, वानरर्क्षावतोऽन्यथा ।। २६ ।।

(Praśastā: kīrtane kola-
godhāhiśaśajāhakā: ।

na darśane na virute,
vānararkṣāvatoऽnyathā ।। 26 ।।)

Hearing about the animals like boar, iguana, snake, rabbit and weasel is good, and on contrary, the sight or hearing their sound is inauspicious. It is just opposite in the case of monkey and bear; hearing about these animals is inauspicious but seeing them or hearing their sound are good.

धनुरैन्द्रं च लालाटमशुभं, शुभमन्यतः ।
अग्नीपूर्णानि पात्राणि भिन्नानि विशिखानि च ।। २७ ।।

(Dhanuraindram ca lālāṭa-
maśubham, śubhamanyata: ।
agnīpūrṇāni pātrāṇi
bhinnāni viśikhāni ca ।। 27 ।।)

Seeing rainbow in the front direction is inauspicious and in the back is propitious; seeing vessels with full of fire which are broken or of such vessels setting off the fire are inauspicious.

दध्यक्षतादि निर्गच्छद्वक्ष्यमाणं च मङ्गलम् ।
वैद्यो मरिष्यतां वेश्म प्रविशन्नेव पश्यति ।। २८ ।।

(Dadhyakṣatādi nirgacchad-
vakṣyamāṇam ca maṅgalam ।
vaidyo mariṣyatām veśma ।। 28 ।।)

While entering to the patient's house, if the physician sees auspicious materials (which are going to be detailed in the coming verses) like dadhi, akṣata, etc. are taking out from that home, it indicates the death of the patient.

दूताद्यसाधु दृष्ट्वैवं त्यजेतार्तमतोऽन्यथा ।
करुणाशुद्धसन्तानो यत्नतस्तमुपाचरेत् ।। २९ ।।

(Dūtādyasādhu dṛṣṭvaivam
tyajetārtamatoऽnyathā ।
karuṇāśuddhasantāno
yatnatastamupācaret ।। 29 ।।)

So, if the physician happens to notice inauspicious indications in messenger or sees ill-omens, it is better to avoid that patient. If it is on the contrary, i.e. on seeing auspicious signs, he should put all the efforts to heal the disease with a spotless conscience enriched by compassion. In other words, he should not worsen the condition of the patient for avaricious means.

Now, a list of auspicious articles is narrated to infer the positive nature of the attending case, which is famous as good omens that lead one for good health.

दध्यक्षतेक्षुनिष्पावप्रियङ्गुमधुसर्पिषाम् ।
यावकाञ्जनभृङ्गारघण्टादीपसरोरुहाम् ।। ३० ।।
दूर्वार्द्रमत्स्यमांसानां लाजानां फलभक्ष्ययोः ।
रत्नेभपूर्णकुम्भानां कन्याया: स्यन्दनस्य च ।। ३१ ।।
नरस्य वर्द्धमानस्य देवतानां नृपस्य च ।
शुक्लानां सुमनोवालचामराम्बरवाजिनाम् ।। ३२ ।।
शङ्खसाधुद्विजोष्णीषतोरणस्वस्तीकस्य च ।
भूमेः समुद्धतायाश्च वह्नेः प्रज्वलितस्य च ।। ३३ ।।
मनोज्ञस्यान्नपानस्य पूर्णस्य शकटस्य च ।
नृभिर्धेन्वा: सवत्साया: बडवाया: स्त्रिया अपि ।। ३४
जीवञ्जीवकसारङ्गसारसप्रियवादिनाम् ।
हंसानां शतपत्राणां बद्धस्यैक पशोस्तथा ।। ३५ ।।
रुचकादर्शसिद्धार्थरोचनानां च दर्शनम् ।
गन्धः सुसुरभिर्वर्णः सुशुक्लो मधुरो रसः ।। ३६ ।।
गोपतेरनुकूलस्य स्वनस्तद्वद्गवामपि ।
मृगपक्षिनराणां च शोभिनां शोभना गिरः ।। ३७ ।।
छत्रध्वजपताकानामुत्क्षेपणमभिष्टुतिः ।
भेरीमृदङ्गशङ्खानां शब्दाः पुण्याहनिःस्वनाः ।। ३८ ।।
वेदाध्ययनशब्दाश्च सुखो वायुः प्रदक्षिणः ।
पथि वेश्मप्रवेशे च विद्यादारोग्यलक्षणम् ।। ३९ ।।
इत्युक्तं दूतशकुनं .....।

(Dadhyakṣatekṣunisṕāva-
priyaṅgumadhusarpiṣām ।
yāvakāñjanabhṛṅgāra-
ghaṇṭādīpasaroruhām ॥ 30 ॥
Dūrvārdramatsyamāmsānām
lājānām phalabhakṣyayo: ।
ratnebhapūrṇakumbhānām
kanyāyā: syandanasya ca ॥ 31 ॥
Narasya varddhamānasya
devatānām nṛpasya ca ।
śukḷānām sumanovāla-
cāmarāmbaravājinām ॥ 32 ॥
Śaṅkhasādhudvijoṣṇīṣa-
toraṇasvastīkasya ca ।
bhūme: samuddhatāyāśca
vahne: prajvalitasya ca ॥ 33 ॥
Manojñasyānnapānasya
pūrṇasya śakaṭasya ca ।
nṛbhirdhenvā: savatsāyā:
baḍavāyā: striyā api ॥ 34 ॥
Jīvañjīvakasāraṅga-
sārasapriyavādinām ।
hamsānām śatapatrāṇām
baddhasyaika paśostathā ॥ 35 ॥
Rucakādarśasiddhārtha-
rocanānām ca darśanam ।
gandha: susurabhirvarṇa:
suśukḷo madhuro rasa: ॥ 36 ॥
Gopateranukūlasya
svanastadvadgavāmapi ।
mṛgapakṣinarāṇām ca
śobhinām śobhanā gira: ॥ 37 ॥
Chatradhvajapatākānām-
utkṣepaṇamabhiṣṭuti: ।
bherīmṛdaṅgaśaṅkhānām
śabdā: puṇyāhani:svanā: ॥ 38 ॥
Vedādhyayanaśabdāśca
sukho vāyu: pradakṣiṇa: ।
pathi veśmapraveśe ca
vidyādārogyalakṣaṇam ॥ 39 ॥
Ityuktam dūtaśakunam..... ।)

Curd, akṣata (rice-grains used for holy rites), ikṣu (sugarcane), niṣpāva (*Lablab purpureus*), priyaṅgu (*Sataria italica*), honey, ghee; lākṣā-rasa (*Laccifer lacca*). añjana (antimony) golden beaker, bell, lamp, lotus flower; dūrva (*Cynodon dactylon*), fresh fish or meat; no-cake, fruits, edible dishes; gems, elephant, full pot (used to adorn holy rites); maid, chariot, prosperous gods or goddesses, kings, white flowers, cāmaram (a royal fan made of white hair), white clothes, white horse; conch, ascetics, turban, garland, svastika; mud (being carried as load), well ignited fire, attractive foods and drinks, vehicle with full of persons, cow with its calf, she-horse with its kid, lady with her child, jīvajīvaka (partridge), deer, sārasa (crane) śārika (mynah); swans, lotuses, solitary animal that is being tied, bangles, mirror, mustard, gorocana - all these are auspicious in sight.

Pleasant smell, pure white colour, sweet taste, bellowing of bull or cow which are pleasant to hear, pleasing words/sounds from nice animals, birds and human beings, stretched umbrellas, hoisted flags, hanged ensigns; sounds of kettle-drum, cymbal, conch, sacred incantations, uttering of vedic hymns; pleasant circumambulating breeze - all these are propitious signs appeared to the physician on the way or on entering to patient's residence that indicate good health of the patient.

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COMPARISON OF LUPEOL CONTENT IN *AERVA LANATA* AND *ROTULA AQUATICA* BY HPLC METHOD

G. V. Srinivasan[1], K. T. Geetha devi[2] and Indira Balachandran[1]

Abstract: A simple HPLC technique was developed to compare lupeol content in the aerial part (leaves, stem and flowers) of *Aerva lanata* (L.) Juss. ex Schult. and the roots of *Rotula aquatica* Lour. Chloroform extract of both species were taken for comparison. The concentration of lupeol in the chloroform extract was determined using a C-18 reverse phase column with a mobile phase of methanol: water (55:45 v/v) at a flow rate of 1.0 ml min^{-1} and with UV detection at 240 nm. HPLC analysis revealed that lupeol content is higher in the aerial part of *Aerva lanata*.

Introduction

Aerva lanata belonging to the family Amaranthaceae is a member of daśapuṣpa group of plants, which is supposed to cure wounds, ulcers and fevers caused by the derangement of the three doṣas - vāta, pitta and kapha[1]. *Aerva lanata* is used as a specific remedy against kidney and bladder calculi in some parts of South India[2]. It is used as an ingredient of preparations like Bhadrādi Kaṣāyam, Mānasa-mitravaṭakam, Valiya Marmaguḷika and Vastyā-mayāntakaghṛtam. The major chemical compounds reported from this plant are â-sitosterol, α-amyrin, betulin, hentriacontane[3], lupeol, â-amyrin, daucosterol, kaempferol, kaempferol-3-galactoside[1] and alkaloids such as canthin-6-one, aervoside and aervolanine[4-6].

Rotula aquatica, known as pāṣāṇabheda in Sanskrit belongs to the family Boraginaceae, is considered a specific remedy against kidney and bladder calculi. Etymologically, the name pāṣāṇabhedah means that which break or destroy calculi.

Root is the officinal part and is reported to be diuretic, useful in cough, cardiac disorders, dysuria, blood disorders, piles, fever, poison, ulcers, uterine disorders and diseases caused by the morbidity of the three doṣas.

The drug enters into the composition of preparations like Pūtikarañjāsavam, Traikaṇṭaka ghṛtam, Valiya Marmaguḷika, etc[2]. The major chemical compounds reported from this plant are allantoin, rhabdiol[7], lupeol, etc. The diuretic action of the root is attributed to the presence of allantoin[8].

In the study to quantify and compare lupeol content in the aerial part of *Aerva lanata* and roots of *Rotula aquatica* by HPLC method,

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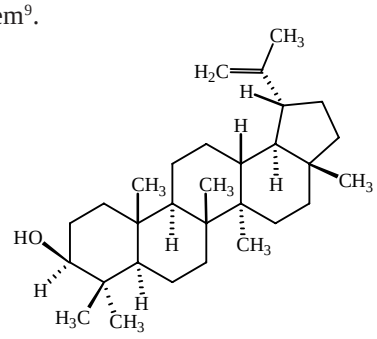
lupeol, a pentacyclic triterpene, showed antihyperglycaemic and hypotensive activities. It also showed antitumour activity and found active against the Walker carcinoma 256 tumour system[9].



Lupeol

Materials and methods

Plant material

The aerial part of *Aerva lanata* was collected from CMPR campus, Kottakkal, Kerala during December 2006. Roots of *Rotula aquatica* were purchased from the local market. The collected samples were authenticated by the Botany Department of the centre. The plant materials were dried in the shade and coarsely powdered in a mixer grinder.

Chemicals and instruments

Solvents used were of GR and HPLC grade (E Merck). Millipore water was used for HPLC system. Standard lupeol was purchased from Sigma Aldrich Co. Ltd., Bangalore. The mobile phase was passed through 0.45 ì m PVDF filter and degassed before use. Test solutions were filtered through 0.20 µm nylon-6, 6 membrane before injection. All analyses were run in triplicate and averaged.

The Shimadzu (Kyoto, Japan) HPLC system consisted of LC - 10AT VP pump, SPD- M10A VP photodiode array detector, SCL-10 A system controller, CLASS-VP 6.12 SP5 integration software and a Rheodyne model 7725 i syringe-loading sample injector fitted with a 20 ìl injection loop, was used for the analysis. Baseline resolution of lupeol was obtained at 25 ± 2°C using a Phenomenex Luna C-18 column (250 x 4.6 mm i.d; 5ì m) and Phenomenex guard column (4 x 2 mm i.d; 5ì m).

Experimental

Extraction

Accurately weighed 2 g of the dried root of *R. aquatica* and aerial part of *A. lanata* were refluxed with 100 ml $CHCl_3$ at its boiling point for about 10 min. and kept at room temperature for about 12 hr. with intermittent shaking. It was then filtered and repeated the process twice. All the three extracts were pooled together and the solvent removed under suction. The weights of the extracts were noted.

Standard solutions

0.34 mg ml^{-1} of standard lupeol solution was prepared in $CHCl_3$. The dried extracts of *A. lanata* and *R. aquatica* were redisolved in $CHCl_3$ and made up to 10 ml in volumetric flasks.

HPLC conditions

Solvent system: methanol - water (55:45 v/v) at a flow rate of 1.0 ml min^{-1}. Detector used: PDA detector at 240 nm. Column temperature: 25°C. Volume injection: 20 ì l.

Estimation of lupeol

20 ì l of $CHCl_3$ extract of *A. lanata* was injected into HPLC column and eluted with methanol: water (55:45 v/v) solvent system by binary gradient method and peaks were detected at 240 nm. The flow rate was set at 1.0 ml min^{-1}. The analysis was repeated thrice and average retention time (RT) of lupeol was taken. Similarly HPLC chromatogram of $CHCl_3$ extract of *R. aquatica* was developed using the same method. The HPLC chromatogram of standard

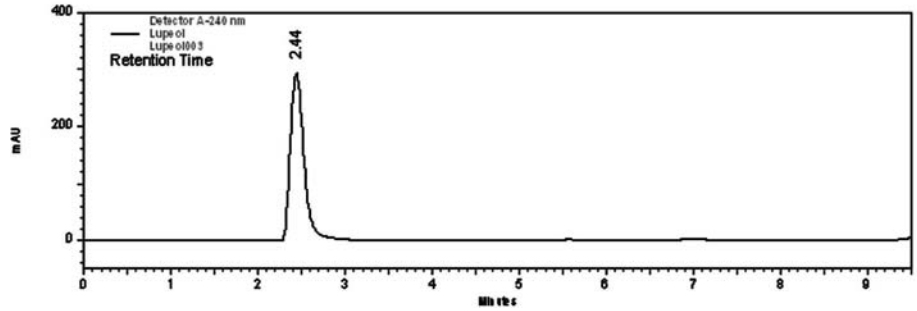


Fig. I. HPLC chromatogram of lupeol

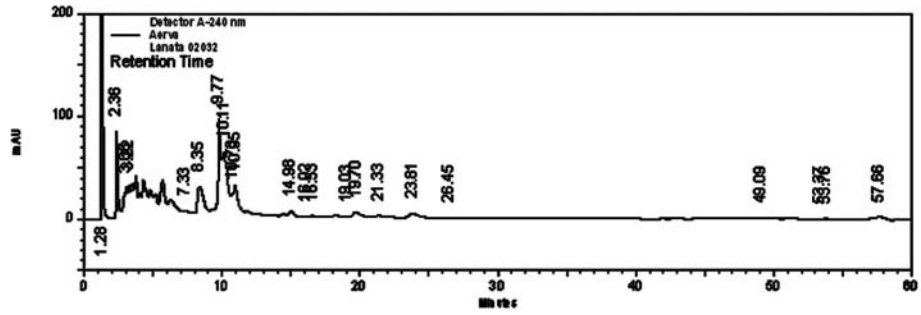


Fig. II. HPLC chromatogram of $CHCl_3$ extract of *Aerva lanata*

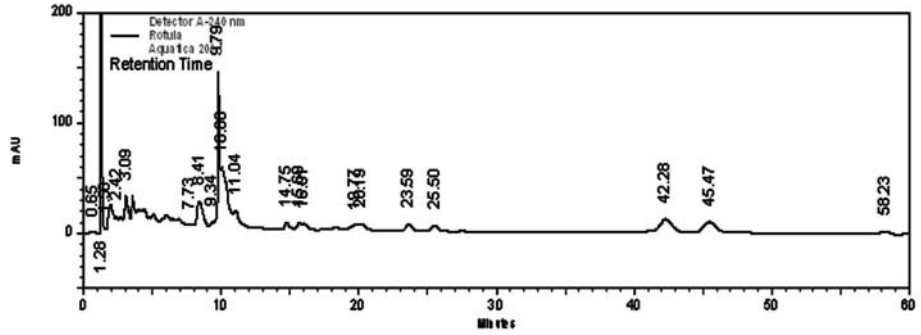


Fig. III. HPLC chromatogram of $CHCl_3$ extract of *Rotula aquatica*

lupeol was developed and its RT was compared with that obtained from other two extracts. From the peak area of lupeol in the standard and those present in the extracts, its amount in the whole of the material was calculated (dry weight basis).

Results and discussion

In view of the potential therapeutic importance of the drug pāṣāṇabheda, an HPLC method was developed in order to quantify lupeol. Satisfactory retention times and good resolution of lupeol were achieved using reverse phase C-18 column. A retention time of 2.42 min. was obtained for standard lupeol (Table 1). Typical HPLC chromatograms of lupeol and $CHCl_3$ extracts of *A. lanata* and *R. aquatica* are shown in figures I to III. The concentration of lupeol in the aerial part of *A. lanata* and the roots of *R. aquatica* were found to be 0.7318 % and 0.2010 % (w/w) respectively (Table 2).

The study revealed that lupeol content in the aerial part of *A. lanata* and the roots of *R. aquatica* show marked variation, the former having higher lupeol concentration. Hence it can be concluded that among the two species, *Aerva lanata*, owing to its higher lupeol content can be effectively used for hyperglycaemic and hypertensive conditions over the roots of *Rotula aquatica*.

TABLE 1

RT of lupeol in different samples

Sample	RT of lupeol (min)			Average RT (min)
	1	2	3	
Std. lupeol	2.44	2.42	2.42	2.42
A. lanata	2.41	2.43	2.36	2.40
R. aquatica	2.42	2.41	2.42	2.41

TABLE 2

Concentration of lupeol in different samples

Sample	Conc. of lupeol (%)			Average con. (%)
	1	2	3	
A. lanata	0.7322	0.7318	0.7316	0.7318
R. aquatica	0.2008	0.2007	0.2016	0.2010

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PHYSICOCHEMICAL AND PHYTOCHEMICAL STUDIES ON DETOXIFICATION EFFECT OF BHALLĀTAKA SEEDS

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Abstract: Bhallātaka (*Semecarpus anacardium*) or Marking nut is a known toxic drug being used in āyurvedic medicine for various therapeutic effects. Since it is a toxic drug, it is advised to use it after proper purification. Śodhana is a preliminary treatment procedure to reduce toxicity, enhance therapeutic effects and to impart additional pharmacodynamic properties. This paper deals with the śodhana (detoxification) of the seeds of bhallātaka and its preliminary physicochemical and phytochemical characters.

Introduction

In āyurvedic pharmacopoeia, many toxic drugs are referred to be used in different formulations. Though these drugs are of immense therapeutic value, they produce toxic effects when used in unpurified form. Hence, they ought to be purified or detoxified before they are put to use. It is claimed that the process of śodhana not only reduces the toxic effects but also enhances the therapeutic effect of the drugs and at times, imparts additional qualities also. Ācārya Caraka has described that a poisonous drug could be transmuted into a safe and effective drug with the art and skill of the formulation[1].

Bhallātaka or marking nut is a well known toxic drug and it has been advocated for purification by systematic methods as per āyurvedic classics. The pharmacodynamic properties of this drug are: kaṭu in rasa, laghu in guṇa, uṣṇa in vīrya, madhura in vipāka. It pacifies vāta and kapha doṣas, improves medha (memory) and agni (metobolism). It is indicated in kuṣṭham (skin diseases), gulmam (abdominal tumours), krimi (worm infestation), arśas (haemorrhoids), āmavāta (rheumatism), etc. Bhallātaka is an important ingredient in many significant āyurvedic formulations such as Bhallātaka Rasāyana, Bhallātaka modaka, Amṛtabhallātaka Leha, Sañjīvanivaṭi, Bhallātakaghṛta and Bhallātaka avaleha, etc.

The pericarp of the fruit contains a bitter and powerful astringent principle. The black corrosive juice of the pericarp has tarry oil consisting of 90% of an oxy-acid named *Anacardiac acid* and 10% of a higher non-volatile alcohol called *Cardol*[2]. The crude extracts were found to be very toxic, and after purification, the toxicity was found to increase

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as evident from LD50 values[3]. After purification, it has shown reduction in toxicity with a maintained efficacy in āyurvedic method of administration[4]. In order to verify the beneficial effect of śodhana, a preliminary study on the effect of śodhana on the bhallātaka seeds have been undertaken. Physicochemical and phytochemical changes of the drug before and after śodhana with comparative studies and detoxified findings were also examined.

Materials and methods

Materials used:- ballātaka seeds - 1 kg; gomūṭṛa (cow's urine) - Q.S.; godugdha (cow's milk)) - Q.S.; iṣṭikācūrṇa (brick powder) - Q.S. for gharṣaṇa; jala (water) - Q.S. for kṣāḷaṇa; earthen pot (5 litre capacity); laddle and lid

Purification method:- In the first stage of śodhana, the thalamus part of the bhallātaka seeds was removed and soaked in gomūtra (cow's urine) in an earthen pot for seven days. The gomūtra was changed every day and the content was stirred with a laddle. After a specified period, the liquid was decanted and the seeds were dried in shade.

TABLE 1
Physicochemical analysis

Parameters	SEED		
	Bp*	Pcu*	Pcm*
Ash content (%)	1.88	1.63	5.16
Water soluble ash	0.69	0.64	1.31
Acid insoluble ash	0.50	0.57	0.73
Solubility in ethanol	10.50	13.65	15.10
Solubility in water	4.35	5.83	6.30

*Bp - Before purification; Pcu - Purified in cow's urine; Pcm - Purified in cow's milk

In the second stage, the dried seeds were soaked again in fresh godugdha (cow's milk) for seven days; the milk was changed daily and the content was stirred. The processed seeds were taken out, dried in shade and put in a bag containing coarse brick powder; and they were rubbed thoroughly to remove the tarry oil content. The purified seeds then washed in water and dried in shade[5].

Physicochemical analysis

All the three samples of seeds i.e a) unpurified, b) purified in cow's urine and c) purified in cow's milk, were powdered and used for the chemical analysis. Physicochemical and preliminary

Fig. I. Bhallataka seeds before and after purification

a Unpurified form (of wave length 365 nm) **b** Purified in cow's urine (of wave length 245 nm) **c** Purified in cow's milk (of wave length 245 nm)

phytochemical analysis of the samples were carried out by following WHO's procedure (1996) (Table 1). Thin layer chromatographic studies (TLC) were carried out following Icon and Stahl (1969) (Table 2). All the reagents used for the chemical analysis were of GPR grade.

Observation and results

Before purification, the bhallātaka seeds were brownish-black in colour and very hard in consistency. After śodhana in gomūtra, the seeds became brown in colour, it turned to a dull black colour after the process in godugdha. After the treatment with both gomūtra and godugdha the seeds were thoroughly rubbed with brick powder to remove the corrosive oil from the seeds, and it was noted that about 30-40% oil deposited could be removed from the seed (w/w). The purified seeds are to be used in powdered form.

All the three samples had variable gradation in their physicochemical characters. Purified sample in cow's milk had more moisture content, ash content, water soluble ash and acid insoluble ash than the other two samples (Table-1). The methanol extracts of all the three samples were brown in colour. These extracts were spotted in pre coated TLC plates for trial of various solvent systems. The best separation achieved was in the mobile phase of Toluene: Ethyl acetate (93:7) The Rf values are tabulated in Table-2. The TLC pattern observed under

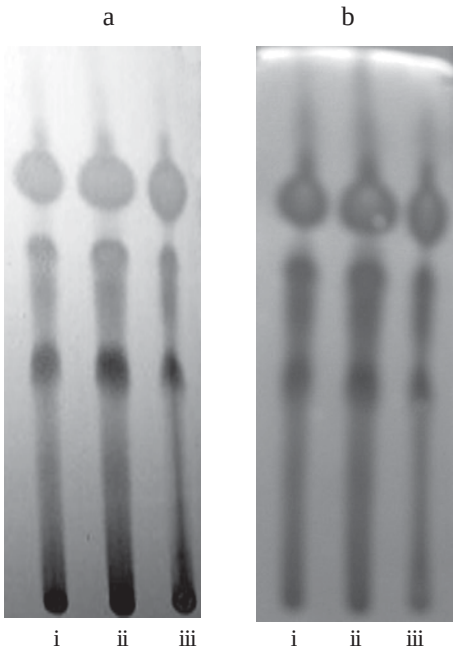

Fig. IIa&b. TLC pattern of three samples

a. Short wave length (245nm) - greenish grey; **b**. Long-wave length (465nm) - dark brown: i. Crude sample ii. Purified in cow's urine iii. Purified in cow's milk.

U-V light showed a gradual decrease in the intensity of the spots from crude sample to the sample purified in cow's milk. All the spots were greenish grey in short wave length (245nm) and dark brown in long wave length (365nm) (Fig. I & II). No changes were observed in any physicochemical compounds with the

TABLE 2
T L C studies of three samples

Sl.No	Methanol extract	Solvent system	Rf value
1	Fresh seed (Before purification)	Toluene: Ethyl acetate (93:7)	0.38,0.51,0.59,0.72,0.79,0.89
2	Purified sample in cow's urine	Toluene: Ethyl acetate (93:7)	0.38,0.51,0.59,0.72,0.79,0.89
3	Purified sampleIn cow's milk	Toluene: Ethyl acetate (93:7)	0.38,0.51,0.59,0.72,0.79,0.89

detoxification of the drug. The studies revealed that gomūtra and godhugda as a liquid media in the detoxification of bhallātaka seeds has a significant role.

Discussion and conclusion

Śodhana (detoxification) procedure performed is considered as a standard method in the laboratory level. The above study reveals that our ancient ācāryas were aware of the toxic nature of certain drugs and had developed many simple methods for their detoxification. The present study reveals that bhallātaka seeds subjected to śodhana are quite effective and reduces the toxic contents of the drug. Moreover this type of treatment removes external and internal doṣas (impurities) and makes the material more potent, effective, safe, assailable and homogeneous without any adverse effects.

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BĀLAŚOṢA: A COMMON DISORDER IN THE CHILDHOOD - A CLINICAL STUDY

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Abstract: Bālaśoṣa (protein energy malnutrition in children) is a common problem in childhood. It is a primary cause of morbidity and mortality of children in the developing countries. According to āyurveda, abnormal accumulation of kapha obstructs rasavāhiśrotas and hampers the nutrition. This paper clinically evaluates the efficacy of an āyurvedic compound in the management of bālaśoṣa.

Introduction

Bālaśoṣa (malnutrition in children) is a multifactoral health problem in India. Poor socio-economic status, early or late weaning, customs and traditional beliefs, illiteracy, low birth spacing, lack of environmental sanitation and personal hygiene are the major predisposing factors of bālaśoṣa.

Aṣṭāṅgasamgraha refers to bālaśoṣa as a disease of infancy and childhood. Āyurveda considers that abnormal accumulated kapha obstructs the rasavāhi śrotas and hampers the nutrition and development of further dhātus like rakta, māmsa and meda[a]. As a result, the growth of a child become retarded and various symptoms related to inadequacy of nutrition and resultant lowered immunity are produced.

Protein-energy malnutrition (PEM) accounts for death (7%) and is an underlying cause of death (46%) of children below 5 years of age. As per the recent National Family Health survey, the most common age of PEM is in between 6 month and 2 years, and around 50-60% of children will be malnourished by 2 years. In the developing countries, malnutrition is the primary cause of morbidity and mortality; it also acts as a complicating factor for other illness. Children become more prone to infections due to low immunity status caused by malnutrition.

WHO defines PEM as a range of pathological condition arising from the varying proportion of protein and calories. Two major problems come under PEM are kwashiorkor and marasmus. Kwashiorkor (Red boy) is a protein-related disease discovered by Cicely D William in Ghana, West Africa. Failure to thrive, muscle wasting, hypoalbuminimia and oedema are peculiar features of kwashiorkor. Marasmus is a disease caused by caloric deficiency. Emaciation (without oedema) is the pathognomonic feature of this disease. Marasmus is also referred to as athrepsia or infantile atrophy. Wasting of muscle

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and subcutaneous fat, wizened and shriveled face, irritability at initial stage and craving for food are other associated features of marasmus.

Nidāna:- According to Vāgbhaṭa, the causes of bālaśoṣa are excessive sleep in the day time, intake of cold water and use of kapha-vitiated breast-milk[b].

Rūpa and pūrvarūpa:- The prodromal and clinical features of bālaśoṣa are anorexia, nasal catarrh, jvara and cough and emaciation, oily and pale appearance to face and eyes[c]. Caraka and Suśruta also refer to it while describing rasakṣaya.

Samprāpti:- While dealing with bālaśoṣa, kapha doṣa at its initial stage is to be counted. As Vāgbhaṭa says, the use of cold fluids, sleep in day-time and use of kapha-vitiated breast milk disturbs the balance state of doṣa of the child. Kaphadoṣa predominates blocking the rasavāhi śrotas and thus inhibits the nourishment of other dhātus[d].

It is clear that from rasa to other dhatus - i.e. rakta, māmsa and meda - are formed or take their required nutrient elements from āhāra rasa. Due to blockage, there will be no circulation of āhārarasa and these dhātus will not get proper nourishment, as a result, they become less active, which causes emaciation of the child. The immunity of child becomes poor and he will be more prone to diseases.

Clinical study

Management of bālaśoṣa includes dietary advise and nutritional supplements in accordance with the illness of the child. Āyurvedic approach towards illness is a holistic and it emphasizes upon the correction of agni to harmonizes the tridoṣa and ultimately production of praśasta (vital) dhātus.

Selection

Children up to the age group of 6 months to 6 years were included in the study. The cases were registered on the basis of clinical examination and investigation from National Institute of Ayurveda Hospital, Jaipur.

Inclusion criteria

- Mild to moderate grade of PEM
- 1st degree (mild) weight between 80 and 70% of expected weight
- 2nd degree (moderate) weight between 70 and 60% at expected weight

Exclusion criteria

- Acute and severe diarrhoea
- Tuberculosis and other infectious diseases
- Endocrine disorders and other acute illnesses

The study was carried out in 30 patients divided into two groups i.e. Group A & Group B. Group A comprised of 10 patients and were treated with prescribing standard diet only. Group B, consisted of 20 patients, treated with test drug along with diet prescription.

Drug

The trial drug, an āyurvedic compound (with the following ingredients), was used in the form of avaleha for easy administration and palatability to the children. The drug was continued for 2 months at 200 mg/kg of body weight - twice a day.

- Aśvagandha — *Withania somnifera*
- Śatāvari — *Asparagus racemosus*
- Śaṅkhapuṣpī — *Convolubus pluricanlis*
- Yaṣṭīmadhu — *Glycyrrhiza glabra*
- Pippali — *Piper longum*
- Viḍaṅga — *Embelia ribes*
- Balā — *Sida cordifolia*
- Guḍūci — *Tinospora cordifolia*

- Muktāśukti Shell of pearl oyster
- Maṇḍūrabhasma Ferric oxide

Diet: - Standard diet was prescribed according to the age and need of protein and calories.

Diagnostic criteria:- I.A.P. criteria for diagnosis of PEM was adopted.

Assessment criteria

The assessment of efficacy of the drug was done according to the anthropometric reading before and after the treatment and clinical recovery of related features along with laboratory parameters like Hb%, TLC, DLC, ESR and Serum protein were investigated. The clinical evaluation of patients was done by subjective and objective assessment.

Observation and result

Observation related to the age-group indicated that maximum cases were under the age group of 2 to 4 years in both the groups. Sex-wise study indicated that female children were more victims to PEM due to presence of disparity between male and female child in the society.

Patient belonging to low socio-economic status were found with higher incidence of bālaśoṣa. The study revealed that majority of case, 60% in group A and 65% in group B, found to have mandāgni (low digestive power). This explains the role agnimāndya in the etiopathogenesis of bālaśoṣa.

Regarding the grade of malnutrition, 3 patients of grade I, 4 of grade II and 3 patients of grade III in the group A before the treatment, came out from the grade of malnutrition after the treatment; whereas in group B, 5 patients of grade I, 11 of grade II and 4 patients of grade III came out from the grade of malnutrition after the treatment. The remaining patients were 11 of grade I and 5 of grade II, but no patient under III and IV grade of malnutrition was recorded.

Regarding the body weight, majority of cases

TABLE 1
Incidence of relief on the basis of sign & symptom in Group A & B

Features	GROUP 'A'				GROUP 'B'			
	No. of patients		Relief		No. of patients		Relief	
	BT	AT	Total	%	BT	AT	Total	%
Arocaka	10	05	05	50.00	20	07	13	65.00
Pratiśyāya	09	06	03	33.33	11	06	05	45.00
Jvara	08	06	02	25.00	14	04	10	71.00
Kāsa	09	08	01	11.11	20	08	12	60.00
Mukhasnigdhata	10	08	02	20.00	20	09	11	55.00
Netrasnigdhata	10	10	00	00.00	20	19	01	05.00
Mukhaśukḷata	10	08	02	20.00	20	08	12	60.00
Netraśukḷata	10	09	01	10.00	20	18	02	10.00
Śuṣkata	10	08	02	20.00	20	08	12	60.00
Śvāsa	04	02	02	50.00	16	03	13	81.00

Statistical analysis: Group A:- Mean diff. 22.22%; SD 1.33; SE 0.421; 't' value 4.74; p value <0.001
Group B:- Mean diff. 50.00; SD 4.62; SE 1.46; 't' value 6.21; p value <0.001

were recorded weight range between 6 to 9 kg and 10 to 12 kg before and after the treatment respectively in both groups. 50% cases obtained 500 to 1000 g weight gain in the group A whereas 60% cases were recorded weight gain between 500 to 1000g in the group B. Remarkable weight gain observed in both the groups, but it was slightly more in group B perhaps due to the efficacy of the drug.

No remarkable improvement was observed in MAC (mid-arm circumference), chest circumference and in height of patients. Regarding clinical features, partial remission observed in complications such as arocaka, pratiśyāya and kāsa in group A after the treatment; whereas in the group B, complete remission of complications like arocaka, pratiśyāya, jvara, kāsa, mukhasnigdhata and śvāsa was recorded. It was observed that clinical features were more subsided in group B than group A due to the properties like dīpana (digestive) and pācana (carminative) of the drug (Table 1).

Laboratory investigation of total serum protein levels revealed that patients belonging to a serum protein range from 6.5% to 8.0 gm/dl were increased from 30% to 50% in group A, whereas 20 to 65% increase was observed in group B. The percentage increase in total serum protein in the group B compared to group A shows the efficacy of the test drug helping in rising the serum protein (Table 2).

TABLE 2
Total Serum protein before and after the treatment

Total Sp* (gm/dl) range	Group 'A'				Group 'B'			
	BT		AT		BT		AT	
	No	%	No	%	No	%	No	%
3.5 to 5.5	05	50	02	20	08	40	02	10
5.5 to 6.5	02	20	03	30	08	40	05	25
6.5 to 8.0	03	30	05	50	04	20	13	65
Total	10	100	10	100	20	100	20	100

*Serum protein

Conclusion

The improvement achieved in the treated group corroborates the efficacy of the āyurvedic compound in the management of PEM. It might be due to the various properties like dīpana (digestive), pācana (carminative), balya (strengthening), rasāyana (immuno-modulator), adaptogenic, etc. of the constituent of the āyurvedic compound that caused the positive result in the management of PEM.

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ANTIMICROBIAL ACTIVITY OF ĀRAGVADHA, RASONĀDI AND GOKṢURA ON ISOLATED URINARY TRACT PATHOGENS

N. Thamizh Selvam *et al**

Abstract: Urinary tract infection (UTI) is the most common bacterial infection in all age groups. The commonly available antibacterial agents often fail in the treatment of UTI due to development of resistance by bacteria. In āyurveda, even though there are a lot of medicines for UTI, few scientific studies have been carried out to evaluate their action. The present study evaluates the antibacterial activity of āragvadha (*Cassia fistula*), rasonādi (formulation) and gokṣura (*Tribulus terrestris*) on UTI pathogens through *in vitro* method.

Introduction

Urinary Tract Infection (UTI) is an inflammation usually caused by bacteria attacking kidneys, bladder or urethra. The normal urinary tract is sterile and very resistant to bacterial colonization. UTI is the most common bacterial infection in all age groups and highly prevalent in female. *Escherichia coli* is the most common bacterium isolated and accounts for about 80% of community acquired infections, and *Staphylococcus saprophyticus* for about 10%[1]. In hospitalized patients, *E.coli* accounts for 50% and the Gram negative species *Klebsiella, Proteus, Enterobacter* and *Serratia* for about 40% and the Gram-positive cocci, *Enterococcus faecalis* and *Staphylococcus sp (Saprophyticus aureus)* for the 10%[1].

The infectious bacteria responsible for UTI often originate from the faecal and perineal flora[2,3]. Under normal circumstances, these bacteria are cleared from the urinary system by effective protective mechanisms[3].

The discovery and development of drugs that are able to prevent and cure bacterial infection have been a major contributions towards improving longevity and quality of life. Antibacterial agents are among the most commonly prescribed drugs. Some bacteria are intrinsically resistant to certain classes of antibacterial agents. The bacteria that are ordinarily susceptible to antibacterial agents can acquire resistance by prolonged use[4]. Resistance can develop by mutation of resistant-genes or by acquisition of new genes[5]. Even though there are several reports on the antimicrobial activity of medicinal plants[6-10], very few scientific reports are available in āyurveda exclusively on UTI pathogens and action of drugs.

The present study has been designed to evaluate the antimicrobial activity of different

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solvent fractions of three āyurvedic drugs āragvadha (*Cassia fistula*), Rasonādi (formulation) and gokṣura (*Tribulus terrestris*) on Urinary Tract Pathogens by *in vitro* method.

Materials and methods

Solvent extraction

The 25 gm of dry material of drugs āragvadha, Rasonādi and gokṣura were weighed and packed individually in the cellulose thimble for solvent extraction in the Soxhlet unit. The four different solvents of various polarities like methanol, petroleum ether, chloroform and acetone were used for the extraction. Each solvent extraction was carried out individually using fresh material each time. This extraction procedure was carried out for 12 hours continuously. At the end of the extraction procedure, the solvent was removed by distillation and the Solvent-free dried extract was dissolved in dimethyl formamide and it was used at the concentration of 10 mg/ml. The water extract decoction was prepared as per Ayurvedic Formulary of India. The filtered portion of decoction was used for the present study.

Sample collection

Clean-voided-mid-stream urine sample was collected from the Urinary Tract Infection suspected cases of Out Patients ward of Central Research Institute (Ayurveda), Cheruthuruthy, Kerala as per the procedure[11]. The samples were collected in sterile, dry, wide necked, leak proof container. Nearly 25 ml of sample was collected and the culturing was carried out on the same day.

Isolation of bacteria

The pathogenic bacterial strains of *E.coli, Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*, were isolated from the urine samples of UTI patients. The selective mediums were used for specific culture of *E.coli*, *Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus*. The isolates were confirmed by specific biochemical tests. The stock cultures were prepared and stored in Nutrient-Agar medium at 4^0C.

Inoculation

Optimally, within 15 minutes after adjusting the turbidity of the inoculum suspension to contain approximately 1-2 x 10^8 CFU/ml, a sterile cotton swab was dipped into the adjusted suspension and pressed firmly on the inside wall of the tube above the fluid level to remove excess inoculums from the swab. The dried surface of Mueller-Hinton agar plate was inoculated by streaking the swab over the entire sterile agar surface. The procedure was repeated by streaking two more times, rotating the plate approximately 60^0 each time to ensure an even distribution of inoculum and as a final step, the rim of the agar was swabbed.

Preparation of discs

The circular discs of 6mm diameter were prepared from Whatmann No.1. filter paper, sterilized and used. The discs were found to have 25µl holding capacity.

Disc diffusion method: - The Kirby-Bauer's Disc Diffusion method (as recommended by NCCLS[12,13]) was used in the study to determine the antimicrobial susceptibility of test samples. The clear labeling of samples was marked on the plate. The plates were then inverted and incubated at 37^0C for 24 hours.

Zone of inhibition: - The zone of inhibition was obtained by measuring the clear zone around each disc by Zone Reader. The values were noted in millimeter. The statistical analysis was carried out.

Results and discussion

The overall study shows that the various solvent fractions of āragvadha, Rasonādi and

gokṣura contain significant antibacterial activity on different Gram-positive and Gram-negative pathogens causing urinary tract infections.

Extraction efficiency

The extraction efficiency of polar solvents methanol and acetone and non polar solvents chloroform and petroleum ether on the three āyurvedic drugs/formulation are shown in Table 1. The extract quantity obtained through polar solvents was very high while comparing with non-polar fraction in all the three drugs.

Āragvadha

The methanolic extract of āragvadha showed antibacterial activity against all the micro-organisms used our studies like *E.coli, Klebsiella pneumoniae, S.aureus* and *Psuedomonas aeruginosa.* The acetone fraction showed highest activity on *Klebsiella pneumoniae* (18.3±0.65) and low activity on *E.coli* and *Klebsiella pneumoniae.* Chloroform and petroleum extracts did not have the activity on *E.coli* but on other micro-organisms. The āragvadha decoction showed zone of inhibition of 11.16±0.76 against *Klebsiella pneumoniae* but no activity on *E.coli, S.aureus,* and *Pseudomonas aeruginosa* (Table 2).

Rasonādi

The overall, extraction efficiency was 22.51% for Rasonādi. The methanolic extract showed very high zone of inhibition against *S.aureus* (21.0 ± 1.0) and high activity on *Klebsiella pneumoniae* and *E.coli* (16.16±1.04; 15.0±0.71). The activity against *Pseudomonas aeruginosa* was moderate (Table 2). The acetone extract of Rasonādi showed antibacterial activity against all the microbes taken for our present study. The chloroform extract was ineffective on *E.coli* but moderate to high activity on rest of the microbes. The zone of inhibition was 22.5±2.29 and 10.0±0.76 on *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* respectively for the petroleum ether extract of Rasonādi and there was no activity against *E.coli* and *S. aureus.* The Rasonādi decoction showed moderate to high activity on *Psuedomonas aeruginosa* and *Klebsiella pneumoniae* but not effective against *E.coli* and *S.aureus*. In other way, the study reveals that methanolic extract of Rasonādi has highest activity against *E.coli*, *S.aureus* and *Pseudomonas aeruginosa* and the petroleum ether extract exhibits highest activity on *Klebsiella pneumoniae*.

TABLE 1
Extraction efficiency of the drugs/formulation using solvent extraction method

Solvent	Extract obtained (in %)		
	Arg.	Ras.	Gok.
Methanol	33.12	10.12	6.08
Acetone	14.88	4.31	3.08
Chloroform	0.53	6.40	2.90
Petroleum ether	0.29	1.68	3.04
Unextractable portion	51.18	77.49	84.9

Arg.- Āragvadha; Ras.- Rasonādi; Gok.- Gokṣura

Gokṣura

The methanolic extract was having high activity on *E.coli* (15.1±0.76) and low activity on *Psuedomonas aeruginosa* (9.8±0.28) but did not have activity on *Klebsiella pneumoniae* and *S.aureus.* The acetone fraction has moderate activity in all the organism verses *E.coli, Klebsiella pneumoniae, S. aureus* and *Psuedomonas aeruginosa* (Table 2). The chloroform and petroleum ether extracts of gokṣura were ineffective on *E.coli* but showed low to moderate activity on other microbes *Klebsiella pneumoniae, S.aureus* and *Pseudomonas aeruginosa.* The decoction did not show the zone of inhibition against any of the organisms. The reason may be due to the dominance of other non-functional molecules

like rich of carbohydrates such as polysaccharides, fibers, and rich of pigments present in the decoction that makes the availability of functional molecules like lignans, heterocyclic compounds and other low molecular weight molecules to the extent of very low or nil at 250 µg/disc level. The other reason suspected here is physiochemical nature of active molecules possessing the antibacterial activity may be less polar in nature since they are not coming in the decoction that is polar nature.

Even though the function and usage of these drugs in āyurvedic system of medicine is found to be useful in the treatment of various other chronic diseases, the possible secondary activity and property of drugs are being proved by the present study. The extraction efficiency of drug highlighted the physicochemical nature of inherent molecules of drugs. The study made to understand that even though the decoction does not have the antibacterial property, but fractionation of drug by suitable solvent would have the property. Further purification of these extracts/fractions through various advanced scientific methodology may bring out variety of novel molecules that are present in the

TABLE 2
Antimicrobial activity of different solvent extractions of āragvadha, Rasonādi and gokṣura at 250 µg/disc concentration

Drug	Sample/extract	Zone of Inhibition (in mm) on urinary tract pathogens			
		E.coli	*K. pneumoniae*	*S.aureus*	*P. aeruginosa*
1. Āragvadha					
	- Methanol	15.0 ± 1.04	16.2 ± 0.28	11.6 ± 0.25	9.0 ± 0.5
	- Acetone	10.6 ± 0.70	18.3 ± 0.65	Nil	10.7 ± 0.76
	- Chloroform	Nil	11.5 ± 0.76	10.6 ± 0.28	9.5 ± 0.57
	- Petroleum ether	Nil	12.5 ± 0.73	10.3 ± 0.28	10.3 ± 0.57
	- Decoction	Nil	11.16 ± 0.76	Nil	Nil
	- Penicillin	Not used	Not used	20.0 ± 0.35	Not used
	- Ciprofloxacin	33.0 ± 1.06	35.0 ± 0.75	Not used	41.0 ± 0.70
2. Rasoṇādi					
	- Methanol	15.0 ± 0.71	16.16 ± 1.04	21.0 ± 1.0	11.1 ± 0.28
	- Acetone	11.16 ± 1.04	20.33 ± 1.04	10.8 ± 2.0	8.8 ± 0.28
	- Chloroform	Nil	20.5 ± 1.32	11.0 ± 0.28	9.5 ± 0.86
	- Petroleum ether	Nil	22.5 ± 2.29	Nil	10.0 ± 0.76
	- Decoction	Nil	17.4 ± 1.04	Nil	11.0 ± 1.0
	- Penicillin	Not used	Not used	20.0±0.35	Not used
	- Ciprofloxacin	33.0 ± 1.06	35.0 ± 075.	Not used	41.0 ± 0.70
3. Gokṣura					
	- Methanol	15.1 ± 0.76	Nil	Nil	9.8 ± 0.28
	- Acetone	11.0 ± 0.58	10.3 ± 0.27	14.16 ± 0.76	11.16 ± 0.76
	- Chloroform	Nil	10.8 ± 0.76	9.16 ± 0.34	8.5 ± 0.5
	- Petroleum	Nil	10.83 ± 0.288	8.87 ± 0.74	10.5 ± 0.5
	- Decoction	Nil	Nil	Nil	Nil
	- Penicillin	Not used	Not used	20.0 ± 0.35	Not used
	- Ciprofloxacin	33.0 ± 1.06	35.0 ± 0.75	Not used	41.0 ± 0.70

Values are expressed as MEAN ± SD

valuable āyurvedic plant drugs. While purifying these molecules, they definitely will have the multifold functional ability than the drugs presently existing in the modern pharmacopoeia. The present study revealed the new functional properties of the āragvadha, Rasonādi and gokṣura drugs on Urinary Tract pathogens and did the value addition to these drugs. Further research is highly inevitable to identify and characterize the functional molecules of these drugs with respect to the UTI treatment.

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EFFECT OF VILVAPATRA (*AEGLE MARMELOS*) IN NEONATAL JAUNDICE

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Abstract: Neonatal jaundice, though a usual phenomenon in the early neonatal period, sometimes may pose grave apprehension. This study deals with the efficacy of vilvapatra (leaf of *Aegle marmelos*) in the management of neonatal jaundice.

Introduction

Āyurvedic classics define kāmila (jaundice) as "that which causes aversion to all desires" and 'that which spoils body due to accumulation of malas". According to Kaśyapa, kāmila is caused due to vitiation of pitta[1]. Vāgbhaṭa opines that due to over consumption of pitta-provoking diet during pregnancy the newborn may be afflicted with kāmila[2].

Varied etiological factors that causing neonatal jaundice have been referred to in modern medical literature; however, the commonest pathology mentioned is immaturity of hepato-excretory system. Inefficient excretory system is overburdened by the sudden excessive load of unconjugated bilirubin presented due to various causes. The short life span of fetal red cell causes increased bilirubin preload, especially in preterm infants. Shunt-bilirubin from non-hemoglobin sources is over 20% higher than in adults. Physiological hyperbilirubinemia is also attributed in part of immaturity of the processes involved in the transfer of bilirubin from plasma to bile. Not only deficiency of conjugating ability but impaired uptake also is considered responsible for physiological neonatal jaundice which is due to decreased contents of Y and Z intracellular proteins (Levi, 1967). Enterohepatic circulation of bilirubin contributes significantly in the causation of physiological neonatal jaundice (Poland & Odell, 1971). Other important factors responsible for neonatal jaundice are ABO incompatibility, maternal diabetes, SGA/ prematurity, acidosis, hypoxia, hypothermia, septicemia, hypoglycemia, asphyxia, starvation, hematoma and drugs.

Excessive destruction of fetal RBCs results in excessive load of unconjugated bilirubin which can be considered as malarūpapitta in the form of vitiated raktadhātu. Accumulation of mala-rūpapitta ultimately favours ensuing neonatal jaundice, especially in kapha and pitta prakṛtis. In other words, prakṛti also plays an important role in causation of neonatal jaundice. Sluggish intestinal motility also favours increased enterohepatic circulation of bilirubin which aggravates neonatal jaundice. Āyurvedic classics, while describing immediate care of the

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newborn, advocate madhu (honey) and ghṛta (ghee) as the first feed to be given to a newborn. Ingestion of madhu and ghṛta help in augmenting the intestinal motility as a result of their laxative property; it also helps in early removal of meconium and thereby enhances the atmosphere for conjugation of bilirubin with intestinal enzymes so as to get it converted into sterobilin and urobilin.

Carakasamhita classifies kāmila into: koṣṭhāśrita and śākhāśrita. According to him, the sign and symptoms of neonatal jaundice can be compared to koṣṭhāśrita kāmila[3]. The potential effect of vilvapatra as a laxative and in the management of kāmila is referred to in Bhāvaprakāśa[4].So, vilvapatra was subjected to a clinical trial to assess its efficacy in neonatal jaundice

Materials and methods

35 neonates without history of trauma, asphyxia septicemia or other complications were subjected to the study from Baba Kinaram Hospital. Those having serum bilirubin between 6-15 mg/dl from 3rd day onward after delivery were included in the study.

The subjects were divided into two groups i.e. Vilvapatra treated group (Group A) and Control group (Group B) each consisted of 23 and 12 respectively. All relevant laboratory investigations as well as other points pertinent to the study were noted initially and during follow-up period (Table 1). Follow-up was made on 4th, 5th and 6th day.

TABLE 1
Incidence of of sex, initial Hb%, TRBC, Blood Group distribution and Serum bilirubin

Parameters	Group A (n=23)		Group B (n=12)		Total (n=35)	
	No	%	No	%	No	%
A. Sex						
Male	14	60.87	6	50.00	20	57.14
Female	9	39.13	6	50.00	15	42.86
B. Hemoglobin gm%						
14-16	17	73.91	7	58.33	24	68.57
16-18	6	26.09	5	46.67	11	31.43
C. Range of TRBC mill/cumm						
6.0-6.5	15	65.22	7	58.33	22	62.85
6.5-7.0	8	34.78	5	46.67	13	37.14
D. Blood Group						
O	11	47.83	7	58.34	18	51.43
A	6	26.08	3	25.00	9	25.72
B	4	17.39	1	8.33	5	14.28
AB	2	8.69	1	8.33	3	8.57
E. Range of Serum bilirubin (mg/dl)						
7-9	4	17.39	2	16.66	6	17.14
9-11	8	34.78	2	16.6	10	28.57
11-13	5	21.73	6	50.00	11	31.45
13-15	6	26.10	2	16.6	8	22.86

Juice of vilvapatra (*Aegle marmelos* leaf) was administered in Group A in the dosage of 6 drops twice a day, whereas Group B behaved as control group without any drug.

Result and discussion

Majority (54.29%) of the subjects were presenting the symptom up to sole (Table 2). Though the reduction in serum bilirubin during follow-up period was seen in both the groups, less reduction was observed in Group B (Table 3). In short, the study based on final serum bilirubin levels revealed good efficacy of vilvapatra in the management of neonatal jaundice (Table 4).

Conclusion

On the basis of pharmacodynamic properties as referred to in various āyurvedic texts, it was observed that vilvapatra has kāmilāhara and laxative properties. Its kāmilāhara property seems to have exerted the action by lowering serum bilirubin levels. Being a laxative, it helps in clearing meconium which ultimately enhanced the conjugation process in the duodenum and lowered entero-hepatic circulation. Vilva is one of the ingredients of Daśamūla which is a potent anti-inflammatory, thus might have helped in reducing hepatic cell inflammation. No unwanted side effects like vomiting or diarrhoea were noticed which encourage using vilvapatra in neonatal jaundice without any hesitation.

TABLE 3
Level of serum bilirubin (mg%) after the treatment

Jaundice upto	Serum level	Group A		Group B	
		No	%	No	%
Sole	> 15	-	-	-	-
Knee	10-15	3	13.04	3	25.00
Chest	5-10	3	13.04	2	16.66
Face	< 5	17	73.92	7	58.33

TABLE 4
Result of the test drug (based on final serum bilirubin level)

Result level of Serum bilirubin (mg/dl)	Group A		Group B	
	No	%	No	%
Good (<5 mg)	17	73.92	7	58.33
Moderate (5-10 mg)	3	13.04	2	16.6
Mild (>10 mg)	3	13.04	3	25.00

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3. Carakasamhita, Cikitsāsthānam, 16/35-36
4. Bhāvaprakāśa, Phalādi Varga, 55

TABLE 2
Physical level of jaundice before treatment

Presence of Jaundice upto	Group A (n=23)			Group B (n=12)			Total (n=35)	
	MSV%*	No	%	MSV%*	No	%	No	%
1. Sole	14.6	11	47.83	15.1	8	66.67	19	54.29
2. Knee	12.3	6	26.08	12.9	1	8.33	7	20.00
3. Chest	10.7	3	13.04	11.4	2	16.67	05	14.28
4. Face	6.8	3	13.04	5.7	1	8.33	4	11.43

*MSV=Mean Serum Value (mg%)

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ANTI MICROBIAL AND ANTHELMINTIC ACTIVITIES OF *DODONAEA VISCOSA* SEEDS

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Abstract: Petroleum ether (60-80°C), chloroform, ethanolic and aqueous extracts of seeds of *Dodonaea viscosa* were evaluated separately for antimicrobial and anthelmintic activity. Antimicrobial activity of all these extracts was tested against Gram-positive and Gram-negative organisms by well diffusion method. Significant antimicrobial activity was observed for the petroleum ether and ethanolic extracts. Anthelmintic activity was evaluated on adult Indian earthworm *Pheretima posthuma* using piperazine citrate as reference standard. Ethanolic extract was found to possess significant anthelmintic activity at the dose of 20 mg/ml. The results indicate that the petroleum ether and ethanolic extracts were more potent than the chloroform extract.

Introduction

Dodonaea viscosa (family- Sapindaceae) is an erect and broad evergreen shrub, widely distributed in India[1]. The various parts of this plant enjoys wide reputation in the traditional system of medicines to cure different human ailments including rheumatism and is febrifuge, antimicrobial, anodyne, antipruritic, discutient, hypotensive and antiviral[2-4]. Phytochemical investigations have revealed the presence of traces of alkaloids and saponin glycosides. The plant is also reported to contain flavonoids (isorhamnetin, penduletin, quercetin, doviscogenin, sakuranetin, quercetol, hyperin, kaempferol, rutin and cyanidin), saponins (dodonoside A,B), triterpens, phenols, coumarins, essential oils, fixed oils and beta-sitosterol[5]. The present study was focused to establish the antimicrobial and anthelmintic activities of ethanolic extract of *Dodonaea viscosa* seeds (DV).

Materials and methods

Plant material

The plant *Dodonaea viscosa* was identified (voucher specimens - 4/2004) by taxonomist of botany department of DRM Science College Kuvempu University and Department of Pharmacognosy, Bapuji Pharmacy College Davangere, India. Fresh dried seeds were procured during early winter season from young, mature plants from Alagilawada, Davangere District, Karnataka state. Garbled seeds were powdered, passed through sieve No. 40 to get coarse powder and was used for these studies.

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Preparation of extract

Coarsely powdered material was subjected to Soxhlet extraction successively with petroleum ether (60-80^{0}C), chloroform, ethanol (95%) and distilled water. The ethanolic extract was evaporated to dryness under reduced pressure in a rotary flash evaporator and extract was concentrated to get powder and preserved in a desiccator for further screening. The yield, consistency, colour and state were recorded (Table 1). Each extract was subjected to phytochemical investigations and the investigated constituents listed separately (Table 2). All the extracts were dissolved in di methyl sulphoxide for antimicrobial activity and similarly for anthelmintic activities. The extracts were suspended in 1% Tween-80 in normal saline.

Antimicrobial activity

In-vitro antibacterial activity of petroleum ether (60-80^{o}C), chloroform, ethanolic and aqueous extracts at different concentrations 5, 10, 15 and 20 mg/ml were studied by agar well diffusion method[6,7] against *Staphylococcus aureus, Staphylococcus albus* and *Klebsiella pneumoniae* organisms. The antimicrobial activities of all the extracts were compared with standard antibacterial agent azithromycin.The zone of inhibition was calculated by measuring the minimum dimensions of the zone of no bacteria (Table 2).

Anthelmintic activity

The anthelmintic activity was evaluated on adult Indian earthworm *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings[8-10]. The method of Mathew *et al*., and Dash, *et al*.[13,14] was followed for anthelmintic screening. Each group was treated with vehicle (1% Tween-80 in normal saline), Piperazine citrate 15 mg/ml and all extracts of 5, 10, 15, 20 mg/ml in normal saline containing 1% Tween-80. Observations were made for the time taken to paralyze and death of individual worm up to four hours of test period. Paralysis was said to occur when the normal movement did not revive even in saline. Death was concluded when the worms lost their motility followed with fading away of their body colour (Table 3).

TABLE 1

Physical and phytochemical properties of various extracts of *Dodonaea viscosa* seeds

Extracts	Colour & consistancy	YR* (g%)	Constituents reported
1. Petroleum ether (60-80)	Yellow, oily	6.25	Traces of sterols, saponins, fixed oils and fats
2. Chloroform	Dark brown, oily viscous liquid	5.00	Alkaloids, sterols, saponins and coumarins
3. Ethanol	Brownish yellow, powder	4.38	Alkaloids, carbohydrates and saponins
4. Aqueous	Dark brown, sticky mass	3.13	Alkaloids, carbohydrates, saponins, gums and mucilages

*YR = Yield of residue

Results and discussion

All the extracts have shown antibacterial activity against the tested organisms. Ethanolic extract of *Dodonaea viscosa* seeds has shown good antibacterial activity against gram-positive and gram negative bacteria. Petroleum ether extract exhibited activity except against *Klebsiella.* Chloroform extract shown moderate activity against both gram positive and gram negative bacteria. From the above findings, it is evident that the activity of the various extracts against bacteria might be due to naturally occurring bioactive phyto-constituents present in the investigated plant.

TABLE 2

Antibacterial activity of *Dodonaea viscosa* seed

Extracts (mm)	Concentration (mg/ml)	Diameter of zone of inhibition of growth (mm)		
		S au.	*S. al*	*K pn.*
Petroleum ether	05	-	14	-
	10	13	16	-
	15	12	18	-
	20	11	17	-
Chloroform	05	-	-	-
	10	-	13	-
	15	15	20	11
	20	13	18	-
Ethanolic	05	13	15	11
	10	13	17	11
	15	11	17	-
	20	15	16	11
Aqueous	05	-	12	11
	10	-	16	11
	15	11	13	-
	20	-	11	-
Azithromycin	10 (µg/well)	16	22	28

S.au - Staphylococcus aureus; S.al. - Staphylococcus albus; *K.pn - Klebsiella pneumoniae*

The petroleum ether, chloroform extracts did not show anthelmintic activity at concentration of 5 mg/ml. Ethanolic extract showed only paralysis but no mortality in similar concentration. The other test concentrations of all the extract showed marked degree of anthelmintic activity. Earthworms have the ability to move by ciliary movement. Mucilaginous polysaccharide layer covers the outer surface of the earth worms. Earthworms moves freely because of the slimy nature of the mucilaginous layer. Movement will be restricted if this layer is damaged and it may lead to paralysis and finally to death also. Drugs possessing anthelmintic properties will cause irritation and damage this layer and thus paralyse the worms. This will restrict its movement and finally gets expelled from the intestine.

TABLE 3

Anthelmentic activity of *Dodonaea viscosa* seed

Treatment	Dose (mg/ml)	Time (min)	
		Paralysis	Death
Vehicle	-	-	-
Piperazine citrate	15	15.83±0.31	-
Petroleum ether extract	5	-	-
	10	91.83 ± 1.17	122.50 ± 1.12
	15	80.83 ± 0.83	119.17 ± 1.54
	20	60.83 ± 0.83	114.17 ± 2.01
Chloroform extract	5	-	-
	10	106.50±1.41	181.50 ± 2.63
	15	90.83 ± 0.83	170.17 ± 1.30
	20	73.33 ± 1.05	114.17 ± 2.01
Ethanolic extract	5	79.17 ± 1.05	-
	10	60.33 ± 0.33	115.0 ± 2.24
	15	50.83 ± 0.83	101.67 ± 1.67
	20	32.50 ± 1.71	90.50 ± 0.34

The present investigations reveal that ethanolic extract exhibited more potent anthelmintic activity than the petroleum ether or chloroform extracts, even though all the extracts were endowed with anthelmintic activity.

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SUSTAINABLE FARMING PRACTICES OF KACCOLAM (*KAEMPFERIA GALANGA*) UNDER PARTIAL SHADE

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Abstract: An experiment was carried out at the Instructional Farm, College of Agriculture, Vellayani, Kerala to develop sustainable farming techniques for intercropping kaccolam (*Kaempferia galanga* Linn.) in coconut garden. The treatment consisted of nine different nutrient sources and five bioinoculants. Of the 45 treatment combinations studied, integration of 50% N through poultry manure and the remaining 50% through chemical fertilizer and combined inoculation of Azospirillum, PSB and AMF was found the most beneficial. It is concluded that INM strategy involving poultry manure, chemical fertilizer and combined inoculation is economical not only in terms of quantity but quality as well.

Introduction

Kaccolam (*Kaempferia galanga* Linn) family Zingiberaceae, is an attractive medicinal plant used in various medicines. The rhizomes and root stocks are bitter, thermogenic, acrid, carminative, aromatic, diuretic, expectorant, digestive, antihelminthic, febrifuge and stimulant. They are good for dyspepsia, leprosy, skin diseases, rheumatism, asthma, cough, bronchitis, wounds, ulcers, fever, malarial fever, splenopathy, inflammatory tumour and nasal obstruction. The leaves are used for ophthalmopathy, swelling, fever and rheumatism (Warrier *et al*, 2005). The aromatic essential oils of the roots are widely used in perfumery, as a condiment and as a folk medicine. The rhizomes and leaves are used as a perfume in cosmetics, hair washes and powders (KAU, 2002).

Even though the crop is cultivated in isolated pockets in the state, the domestic production is quite insufficient to meet the ever increasing demand. Scope of sole cropping of kaccolam is limited in Kerala due to high population density and intensive cultivation. The only option available is to introduce kaccolam into the existing cropping systems. Introduction of medicinal plants like kaccolam in coconut stands is found to be feasible and remunerative. It helps to augment income from coconut stands. Developing organic nutrition techniques for intercropping kaccolam in coconut garden may not only help to sustain soil fertility by way of biological nitrogen fixation and mobilization of soil phosphorus but also to maintain quality of the produce.

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The use of organic manures improves the physical properties of the soil and balances the nutrient availability to plants. Bioinoculants play an important role in integrated nutrient management. Azospirillum, phosphorus soubilizing bacteria and arbuscular mycorrhizal fungi are known for their specific functions. Studies have shown that other functions such as production of siderophores, hormones or antibiotics or increased nutrient uptake through increased root growth also help the host plant to increase productivity (Wani, 1990 and Wani and Lee, 1992). Even though many organisms work in synergistic ways, their activity in the rhizosphere of medicinal plants under the influence of organic manures and inorganic fertilizers where the nature of rhizodeposition is expected to be different when compared to other cultivated plants are yet to be studied. In this background experiments were conducted to standardize organic farming techniques for coconut based commercial cropping of kaccolam under partial shade.

Materials and methods

Experiments were carried out at the Instructional Farm, College of Agriculture, Vellayani, Kerala during 2005-'06 to develop sustainable farming techniques for intercropping of kaccolam in coconut gardens. The soil of the experimental site was laterite red loam, belonging to the order oxisol and of Vellayani series, characterized by

TABLE 1

Yield, quality attributes and BCR of kaccolam as influenced by nutrient sources and bioinoculants

Treatments	Rhizome yield (Fresh t / ha)	BCR	Oil yield (kg / ha)	Crude extract (Per cent)
I. Nutrient sources				
N_1 - 50% N FYM	5.13	4.89	10.19	11.75
N_2 - 100% N FYM	5.30	4.98	13.12	8.20
N_3 - 50% N VC	5.34	4.19	13.95	10.03
N_4 - 100% N VC	5.63	3.71	14.92	10.38
N_5 - 50% N CPC	4.63	3.63	13.25	9.04
N_6 - 100% N CPC	4.93	3.25	14.69	10.33
N_7 - 50% N PM	6.23	5.81	17.22	10.63
N_8 - 100% N PM	5.98	5.36	15.49	8.73
N_9 - 100% N CF	5.39	5.27	13.13	8.33
CD (0.05)	NS	-	-	-
II. Bioinoculants				
B_1 - Azospirillum	5.11	4.29	13.56	9.92
B_2 - PSB	5.33	4.53	14.53	9.27
B_3 - AMF	5.40	4.60	13.37	10.19
B_4 - Combination	5.71	4.80	15.47	10.28
B_5 - Control	5.41	4.61	14.03	8.89
CD (0.05)	NS	-	-	-

acidic soil reaction, low available nitrogen status and medium available phosphorus and potassium status. The experiment was laid out in split plot design. The treatments consisted of nine levels of nutrient sources, (50% N as FYM, 100% N as FYM, 50% N as vermicompost, 100% N as vermicompost, 50% N coir pith compost, 100% N as coir pith compost, 50% N as poultry manure, 100% N as poultry manure and 100 % N as chemical fertilizer) and five levels of biofertilizers (Azospirillum, Phosphorus Soubilizing bacteria and Arbuscular Mycorrhizal Fungi, combined inoculation and no biofertilizers). Leaf number, plant spread and rhizome number per plant at the time of harvest were observed. In addition, fresh and dry rhizome yield, BCR, oil yield and crude extract per cent were also estimated.

Results and discussion

Supply of 50% N through poultry manure and the remaining 50% through chemical fertilizer resulted in maximum rhizome production, benefit cost ratio and oil yield per hectare. The crude extract per cent was also maximum when the two sources of nitrogen, i.e. FYM and poultry manure were applied indicating their source efficacy.

Among the bioinoculants, combined inoculation of Azospirillum, PSB and AMF recorded maximum rhizome production both fresh and dry, BCR, oil recovery per cent, oil yield per hectare and crude extract per cent.

Of the 45 treatment combinations studied, integration of the above two levels, ie, supply of 50 % N through poultry manure and the remaining 50 % through chemical fertilizer and combined inoculation of Azospirillum, PSB and AMF was found most beneficial. It is concluded that INM strategy involving poultry manure, chemical fertilizer and combined inoculation is economical not only in terms of quantity but quality as well.

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PHARMACEUTICAL STUDY OF VAṄGABHASMA

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Abstract: Vaṅgabhasma (incinerated tin) is a popular and widely used therapeutic preparation, both as singly and as ingredient in many formulations. In Rasaśāstra, utility of dhātu (metal) in the field of therapeutics is made after their proper processes. Śodhana and māraṇa are the two chief methods to transform dhātu into bhasma-form i.e. orally absorbable form. This paper deals with the procedures of preparation of Vaṅgabhasma with reference to classical Rasaśāstra texts.

Introduction

Vaṅga is an important metal since antiquity known by the name trapu. Initially its use was restricted only for coating the other metals and preparation of alloys. Kamsya (bronze) was the first material known by ancient Indians which was an alloy of vaṅga and tāmra (copper) used for preparation of many forms. In Samhita, the dhātu vaṅga is included in pañcaloha varga, Trapvādi gaṇa and bhaumadravya along with its properties like kaṭu (acrid), lavaṇa (salty), tikta (bitter), krimighna (anthelmintic), lekhana (scraping), bhedi (purgative), etc are used for the preparation of jivhanirlekhana yantra (tongue scraper), vastinetra (nozzle for enema) and are indicated in rasāyana dravya (rejuvenating property) along with other metals like svarṇa (gold), rajata (silver), tāmra, etc.

Vaṅga is the 6th dhātu explained in putiloha (lower metal) group. The metal having quick melting nature and produce bad odour on heating comes under putiloha group. It is described as a strongest metal among all metals and does pāradastambhana (stability in mercury) (Rasopaniṣat 13/6). The utilization of vaṅga was observed both in dehavāda (therapeutics) as well as dhātuvāda (alchemical) purposes. It is explained as best rasāyana and vṛṣyadravya mainly used in sarva prameha (polyureas) and śukragata vikāras (genito-urinary disorders). Other indications of Vaṅgabhasma are medoroga (lipid disorders), paṇḍu (anaemia), krimi (worm), udara, grahaṇi (spru), viṣa (toxicity), śvāsa (res-piratory disease), kāsa (cough), kṣaya (phthisis) and svapnameha (nocturnal emession). Vaṅga which is dhavaḷa (white), mṛdu (soft), snigda (smooth), drutadrava (quick melting), guru (heavy) and niṣabda (soundless in molten state) in nature and is khurakavaṅga. Khurakavaṅga is considered as superior used for therapeutic purposes.

Materials and methods

The raw vaṅga and other plant materials

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specified in the classical texts were used for śodhana (purification) and māraṇa (incineration) process of vaṅga. The purification of vaṅga was done by sāmanya (general) and viśeṣa (specific) śodhana methods. The māraṇa procedure was done by jāraṇa (roasting) and puṭa processes.

Sāmānyaśodhana

280g raw vaṅga was taken in a ladle and heated to melt by the method dāḷana (melting the metal and pouring into liquid). (Total No. of dāḷana required is seven). The molten vaṅga was then poured into cūrṇodaka (lime water - 800 ml/dāḷana) and kept in pītarayantra (a container covering with lid having hole at centre). After cooled, it was collected, and the same procedure repeated for 6 times using fresh cūrṇodaka every time.

Observations: - Solid, silvery vaṇga was turned to brighter, voluminous and brittle along with fine particles. Molten vaṅga, on pouring in cūrṇodaka, produced crackling sound. Clean and clear cūrṇodaka turned into dirty after the process. Vaṅga melts at 232°C but the duration of melting was extended on every dāḷana process. On 7th pouring, some amount of vaṇga was converted into fine powder form and metallic part became small and brittle. (Fig. Ia-f and Fig. IIa&b)

Result: The initial weight 280g became 278g with a loss of 2g. Theoretically there should be gain in weight due to oxidation of tin metal. Here, due to process and handling, fine particles that remained uncollected, cause loss in the material.

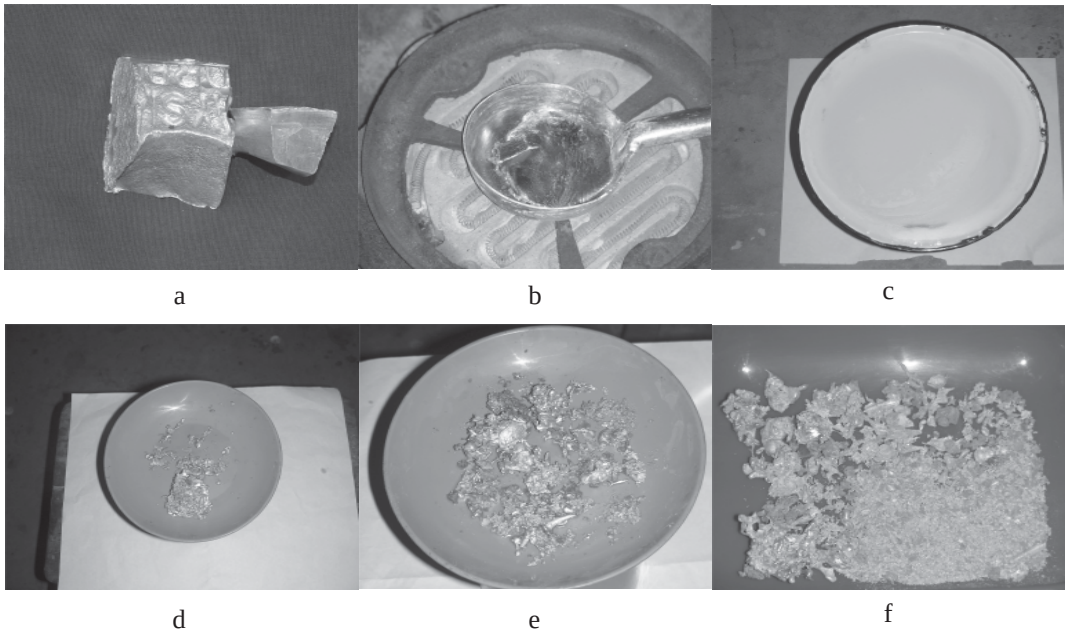


Fig. I a-f

a Raw vaṅga; **b** Molten vaṅga; **c** Cūrṇodaka;
d Vaṅga after 1st dāḷana; **e** Vaṅga after 7th daḷana (wet); **f** Sāmānya śodhita vaṇga (dried)

Melting	Duration (min)
1st	5
2nd	7
3rd	8
4th	10
5th	11
6th	13
7th	14

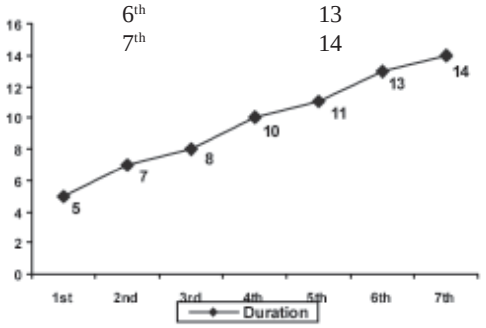


Fig. IIa
Observation of duration of melting of vaṅga

Cūrṇodaka	pH value
Fresh	12.08
1st	12.15
2nd	12.08
3rd	12.06
4th	11.75
5th	12.07
6th	12.07
7th	12.18

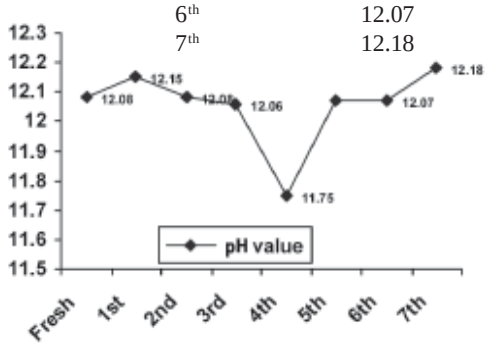


Fig. IIb
Observation of pH of cūrṇodaka during dāḷana

Viśeṣaśodhana

273g sāmānyaśodhita vaṅga was taken in a ladle and heated to melt by dāḷana method. (Here, the total number of dāḷana required is three). The molten vaṅga was then poured into nirguṇḍī kvātha (decoction of *Vitex negundo* - 800 ml/ dāḷana) mixed with haridrācūrṇa (powder of *Curcuma longa* - 34.1g (1/8th of vaṅga) and kept in a pīṭhara yantra. After cooling, it was collected, and the procedure repeated 2 times using fresh nirguṇḍī kvātha and hardirācūrṇa every time.

Observation: - Vaṅga turned to slight yellowish green colour, shiny, brittle, voluminous and finer at the end of viśeṣaśodhana process. On second heating, the adhered haridra to vaṅga started burning, formed carbon and started floating on surface of liquid on pouring. At the end of pouring major amount of vaṅga was converted into fine powder, small particles and a big mass form (Fig. IIIa-f and Fig. IVa&b).

Result: - The initial weight of 273g of vaṅga became 273.37g in the final with a gain of weight of 0.37g. The reason for the weight gain is due to oxidation of tin metal.

Jāraṇa

80g of śodhita vaṅga was taken in an iron pan and heated to melt. 20g (¼ of vaṅga) of apāmārga pañcāṅga (coarse powder of *Achyranthus aspera* - whole plant) was then slowly added to the molten vaṅga and rubbed with pressure simultaneously with back of ladle. The process was continued till all the śodhitavaṅga turn into fine powder-form completely. The jāritavaṅga was collected at the center, closed by a śarāva (casserole), and intense heat was given for 3 hours. After cooling, the jāritavaṅga was filtered through a cloth and collected.

Observation: - Molten vaṅga when rubbed with

apāmārgapañcāṅga, initially turned to dark grey and then to light gray and lastly a grayish-white powder formed. Burnt apāmārgapañcāṅga turned into carbon when comes in contact of fire. Sometimes apāmārga catches fire also. No metallic tin particles were seen after filtration. It took seven hours to complete jāraṇa procedure. The colour obtained was grayish white, soft and smooth to touch

Result: - The initial weight 80g became 86g after the process with a weight gain of 6g. This is because of oxidation of the vaṅga and addition of remnants of apāmārga.

Puṭa

80g of jārita vaṅga (roasted tin) was taken in a khalvayantra (mortar and pestle); added 35g of bhāvanadravya i.e. kumāri pulp (*Aloe vera*) and triturated till it becomes suitable for pellets preparation. Pellets of 3 cm diameter and 0.5 cm thickness were made, dried in shadow and weighed. Dried pellets were arranged in a casserole and closed by another casserole. Gap was sealed by a cloth smeared with clay and allowed to dry. Like this, 7 coatings were done to casseroles after drying the previous coating. The prepared (smeared) casserole was subjected to puṭa i.e. electric muffle furnace (600° C peak temperature maintained for an hour) (Total number of puṭa required is six). After cooling, the casserole was removed and cleaned.

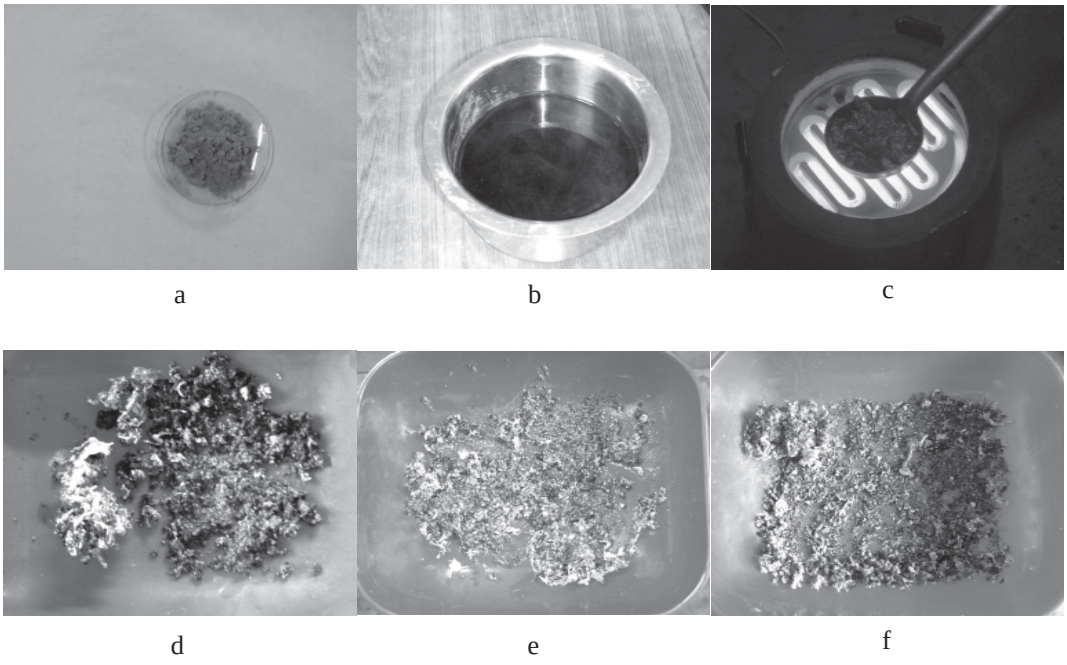


Fig. III a-f

a Nirguṇḍi kvātha; **b** Haridra cūrṇa; **c** Heating of the vaṅga;
d Vaṅga after 1st dāḷana (wet); **e** Vaṅga after 3rd dāḷana (wet); **f** Vaṅga after 3rd dāḷana (dry)

Bhasma was weighed and observed for bhasma-parīkṣa (confirmatory tests of properly prepared bhasma as specified in classics). Same process was repeated for 5 times to obtain Vaṅgabhasma with all desired characteristics mentioned in classics. (Table 1 - Fig. V)

Result: - The initial weight i.e. 80g of jāritavaṅga became 81.34g with a gain of 1.34g after the process. The weight gain was due to formation of compound. (Fig. VIa-c)

Discussion

Vaṅga is one of the world's most valuable metal, its two main uses, both in past and present, have been the coating of other metals and in alloys. In Rasaśāstra, its description starts from dhātuvāda but it has high therapeutic values also. In dhātuvarga, it is included in putiloha group as it melts easily. Introducing brittleness in the metal is an important characteristic of śodhana in case of vaṅga which also helps for the preparation of bhasma.

So many procedures like dāḷana (melting the metal and pouring in liquids), svedana (boiling in liquids), nirvāpa (heating the material to red hot and quenching in liquids), secana (sprinkling liquids over hot metal) and avāpa (sprinkling any substance into molten material) are describing in the classics. Among them, dāḷana process was observed best, easy method for vaṅga śodhana. After śodhana, some portion of vaṅga turns into fine powder form or compound form and the remaining metallic portion became reduced to brittle. This brittleness helps for further jāraṇa as well as māraṇa procedures. Lime water, nirguṇḍī and haridra were found safe, easily available, easy to prepare and having high therapeutic values hence selected for śodhana process.

Vaṅga will melt at 232° C temperature but it was observed that due presence of wet slag/fine powder/tin oxide compound/haridrācūrṇa/ carbon, its duration was extended during dāḷaṇa process both in sāmānya śodhana and viśeṣa

Melting	Duration (min)
1st	6
2nd	13
3rd	15

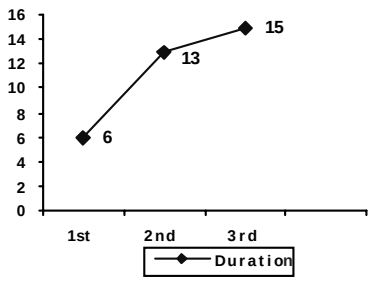
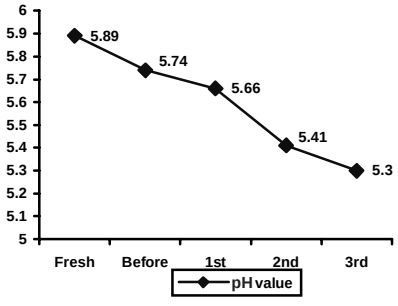


Fig. IV a

Observation of duration of melting of vanga for dhālana process

Nirguṇḍikvātha+Haridracūrṇa	pH value
Fresh Nirguṇḍikvātha	5.89
Before dāḷaṇa*	5.74
1st	5.66
2nd	5.41
3rd	5.30



**Fresh Nirguṇḍi kvātha + Haridra cūrṇa*

Fig. IV b

Observation of pH of Nirguṇḍī kvātha mixed with Haridra cūrṇa during dāḷana.

ā

śodhana. In case of śodhana, maximum portion observed was tin metal.

Rasaśāstra mention jāraṇa or māraṇa or both methods for the preparation of Vaṅgabhasma using herbal, mineral or animal origin materials. Jāritavaṅga was grayish white powder, fine and soft in consistency. Here partial conversion of vaṅga into compound (tin oxide) was observed. Jāraṇa process is the initial stage of māraṇa process. Apāmārgapañcāṅga is prescribed by all most all ācāryas; and it is easily available hence selected for jāraṇa process. Apunarbhava test (nonreversible action towards its origin) (Najaraju V *et al* M.D thesis, 1982.) using mitra pañcakadravyas [guñjā (*Abrus precatorius*), madhu (honey), guḍa (jaggery), ghṛta (ghee) and guggulu (*Commiphora mukul*)] shows that presence of free metal was observed in jārita vaṅga and not found in Vaṅgabhasma.

600°C peak temperature for an hour was sufficient for the configuration of vaṅga to convert it into bhasma. Sometimes it was observed that more than this temperature reduces vaṅga into tin metal again. Māraṇa done

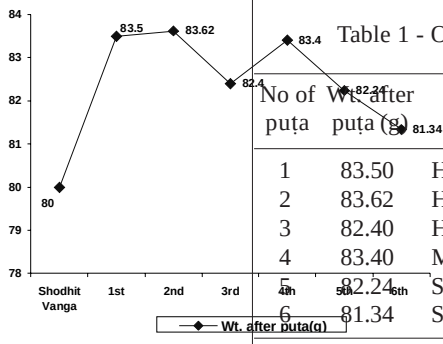
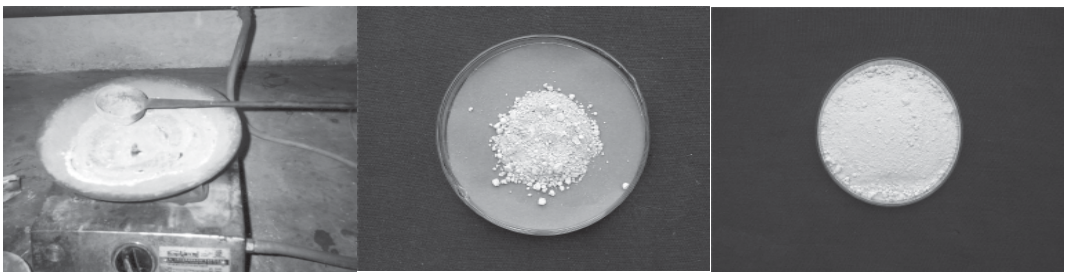


Table 1 - Observations of māraṇa process

No of puṭa	Wt. after puṭa (g)	Consis-tency	Color	Tests	
				Varitara	Rp*
1	83.50	Hard	White	-	-
2	83.62	Hard	White	-	-
3	82.40	Hard	White	-	+
4	83.40	Mod. hard	White	Partially +	+
5	82.24	Soft	White	Partially +	+
6	81.34	Soft	White	+	+

*Rp - Rekhapurna

Fig. V
Observation of weight of Vaṅgabhasma with puṭa



a b c

Fig. VI a-c
a Jārana process; b Jārita vaṅga; c Vaṅgabhasma

by using jāritavaṅga showed complete conversion of vaṅga into compound form with absence of free metal. The chemical analysis of Vaṅgabhasma (Najaraju V *et al* M.D thesis, 1982.) reveals that jāritavaṅga contains Sn-67.51%, Fe-0.79%, Al-0.31% and Mg-0.62%. The Vaṅgabhasma contains Sn- 74.29%, Fe- 0.7%, Al- 0.76% and Mg- 1.44%.

Conclusion

Vaṅga is known as a green metal. It is environmentally safe and also safe for contact with food. Most of the classics mention its pramehaghna property, and specially describe that as how a lion only can kill a herd of elephants, similarly vaṅga only can irradiates all types of prameha roga.

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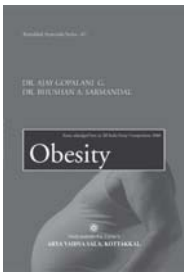

OBESITY

Essay adjudged best in
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Obesity is a condition in which physiological equilibrium is disturbed due to the abnormalities in the functioning of the various body systems. This provides a platform for many ailments such as hypertension, diabetes mellitus, coronary heart disease, osteo-arthritis, infertility, impotency and psychological disorders like anxiety, depression, etc. Thus the mortality and morbidity rates are more in obese persons. This book provides a clear picture on the various aspects of obesity including its etiology, pathogenesis, clinical features and management.

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ROLE OF ĀYURVEDA IN THE MANAGEMENT OF DEMENTIA OF ALZHEIMER'S TYPE

Rajiv Kumar Relhan and Mrs. Peeyush Sexesna*

Abstract: Dementia of Alzheimer's Type (DAT) is a disease in which there is continuous decline in a number of crucial functions which result in the loss of personal and social independence in a previously competent person. Modern medicine has made a great way to diagnose and treat the disease; but it is inadequate to the satisfactory point of management. In this situation, integrated approach becomes the need of the time. Āyurvedic therapeutic procedures like śirodhara, śirovasti, abhyaṅga have been observed to ease the patients.The herbs like aśvagandha, brāhmī and śaṅkhapuṣpi described in āyurvedic classics have been proved as anti-anxiety, adaptogenic and memory enhancer. Here, an effort has been made to interpret the modern pathogenesis of DAT in terms of āyurveda and also plan the treatment in accordance with āyurvedic principles.

Introduction

Dementia of Alzheimer's Type (DAT) to date continues to be a challenge to the medical world. In India, because of ignorance about the disease among the lay people, by the time patient approaches a specialist, the disease might have already crossed the boundaries of an effective treatment. For those who reach a specialist in time are fortunate to have better outcome of the treatment strategies. The currently available treatment approach for DAT is to provide supportive medical care, emotional back-up to patients and their families, and pharmacotherapy for specific symptoms and disruptive behaviour. However, modern pharmacological treatment can effectively control the problematic symptomatology, but sometimes unavoidable adverse and toxic effects of the psychotropic drugs put a barrier on their use.

Some times in spite of good treatment and early diagnosis, the disease progresses very fast. Such a situation creates a room for an alternative system of medicine to be added as an adjuvant therapy.

Keeping this in mind we have tried to search āyurvedic literature and found that there are some drugs that meet the demands of a logical treatment of DAT in the light of modern scientific medicine.

The āyurveda edge

Āyurvedic therapy works on a principle that can be applied to any disease entity apart from those mentioned in āyurvedic literature. This can as

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well be applied to DAT. The possible benefits of such therapy are:

Two therapies working on the same pathology from different dimensions and angles result in more effective control of the symptoms. A number of chemical drug molecules and dosages required may be at least as minimum therapeutic dosage. A less number of drugs with minimum therapeutic dose may pose minimum adverse toxic effects.

Now the question arises as to what kind of therapy should be used as an adjuvant therapy with the currently available modern treatment plan. We need a therapy that looks more basically into the etiopathogensis of signs and symptoms of DAT from a different view point. The therapy should be used over a longer period of time supported by adequate observational data. And finally, the side effect profile should be minimum. According to āyurveda, our body is a combination of doṣa, dhātu and mala.

Doṣa

There are three doṣas - vāta, pitta and kapha. These are basically forces or bio-energies which carry out different functions of the body at the cellular and gross level. Thus vāta is a force behind any kind of movement taking place in the body. This movement may range from a movement of ions across the cell membrane, generation of action potential, propagation of nerve impulse, or movement of involuntary and voluntary muscles. So vāta is in charge of motion.

Pitta:- It is the force behind all chemical reactions and transformation that occur in the cells tissues, organs and systems. Vāta can bring different molecules together, but reactions occur only when the force of pitta comes into play.

Kapha:- It is a force of cohesion between the molecules of the cell membrane, cell organelle, tissues, organs, systems and the body as a single entity. In other words it gives stability to different structures of the body.

Dhātu

There are seven dhātus which hold our body. These are: i. rasa (plasma), ii. rakta (blood, plasma with formed elements of the blood), iii. māmsa (muscular component of the body), iv. meda (lipoid tissue), v. asthi (skeletal tissue), vi. majja (bone marrow) and vii. śukra (reproductive material)

Mala

It is the waste products of our body which need elimination. Even if we take up modern anatomical and physiological perspective, we find that basic structural and functional principles of both sciences correspond with each other.

Pathogensis of DAT

So long as doṣa, dhātu and mala remain in a state of equilibrium, our body remains healthy. The main cause of disease, according to āyurveda, is a state of disequilibrium among the three doṣas. This disequilibrium, in terms of either too much increase or decrease in the qualities of respective doṣa, arises as a result of erratic diet, incompatible environment, life style or genetic propensity for specific disorder. Such a disruption of harmony between doṣas vitiate dhātu and mala to give rise to different disorders.

In ancient times, while formulating the nomenclature of different diseases, it is clearly mentioned that it is not possible to give a name to all the groups of signs and symptoms. Such entities that have not been named should be viewed according to the involvement of doṣa and treatment should be directed towards balancing the vitiated doṣa. According to āyurveda,

nervous system and its disorders come under the province of vāta. The qualities of vāta mentioned in āyurveda are: i. laghu (light in weight), ii. rūkṣa (dry), iii. sūkṣma (subtle), iv. cala (always in motion), v. śīta (cold), vi. viśada (non slimy) and vii. khara (rough)

When vāta gets vitiated by its contributing factors, it brings about the above mentioned changes in vulnerable systems of the body. When the nervous system has a genetic component for DAT-like syndromes, as signified by vāta disruptions, the chances of expression of the disorder are more. If we look at the neuropathology of DAT according to modern medical science, the gross anatomical observations are diffused atrophy of brain with flattened cortical sulci and enlarged ventricles. The microscopic features are senile plaques, neurofibrillary tangles, neuronal loss or synaptic loss. All these findings may be the result of rūkṣa, viśada, laghu, khara qualities of the vitiated vāta. Thus we see the vāta is the chief doṣa implicated in the pathophysiology of DAT. However, other two doṣas also get involved, but they are of secondary importance.

Symptomatology of DAT

Alois Alzheimer first described this condition that later assumed his name. It is characterized by multiple impairments in cognitive functions like: i. memory and learning, ii. language, iii. general intelligence, iv. problem solving, v. perception, vi. orientation, vii. attention and concentration and viii. judgement.

Other impairments:

Psychiatric:- (a) anxiety, (b) depression and (c) psychosis

Neurological:- (a) apraxia, (b) agnosia and (c) seizures

Cause

The exact cause of DAT is still obscure, but some studies have indicated that genetic factors play an important role in the development of this disorder

Diagnosis

DAT is diagnosed after the other causes of dementia have been excluded from the diagnostic consideration.

How āyurveda can help?

According to āyurveda, two modalities of treatment i.e. internal and external can be planned.

External treatment:- (a) abhyaṅga, (b) śirodhāra and (c) śirovasti

Internal treatment: (a) per-oral administration of single herbs and (b) per-oral administration of compound herbal preparations

Abhyaṅga

It is a procedure in which general body massage is given with different medicated oils. In Aṣṭāṅgahṛdaya, it has been mentioned that the person who regularly and properly gets general body oil massage follows specific attributes of abhyaṅga[1]:

1. Jarahara (retards the fast-aging process): Since DAT is basically a fast-aging process in the cells of brain leading to neuronal loss, synaptic loss and diffused brain atrophy, such a procedure can help in preventing, delaying the expression of DAT. In diagnosed patients, the progression of disease can be slowed down.
2. Śramhara (helps to overcome fatigue)
3. Vātahara (alleviates the disturbances of vāta**,** the chief pathological culprit behind DAT).
4. Dṛṣṭiprasāda (improves eyesight by preventing the senile degeneration of ophthalmic

tissue): DAT is a disease of old age and if this is superimposed by the diseases of the eye that affect the eyesight, patient becomes more confused.

5. Puṣṭi (nutrition): It helps the individual cells, tissues of the body to get proper nourishment. The macro and micro channels which carry nutrition to the different cells, tissue and organ systems some times get blocked by the waste material coming out of incomplete metabolic reactions. The flow of nutrients is thus hampered. Proper body massage clears the channels of those waste materials and thus provides nutrition to the body. A well-nourished body is able to withstand DAT with minimum complications.
6. Ayuh (longevity): Dying with painful diseases is a curse. If all the tissues and organs work properly, the life span is automatically prolonged provided there are no accidental deaths. Massage therapy is helpful in improving the function of the vital organs of the body and thus promotes the average life span.
7. Svapna (ensuring good sleep): Today, man and machine have become alike. People work continuously without giving sufficient rest to the body and mind. An erratic lifestyle can sometimes disturb the internal biological clock, hereby aggravating many diseases. Sleep disturbance is also one of the difficult problems that the patients of DAT face. Massage therapy in such cases ensures good quantitative and qualitative sleep thus causing reduction in the need of hypnotics.
8. Dārḍhya (sturdiness): It makes the muscles and joints well-toned and mobile. Patients of DAT are unable to do proper exercises in order to keep their muscle and joints well-toned. The main groups of muscles connected with locomotion may undergo disuse atrophy causing the body to become weaker. Massage therapy works as a sort of passive exercise that keeps the body well toned.

Recommended oils: Mahānārāyaṇa tailam, Dhānvantaram tailam, Kārpasāsthyādi tailam.

Śirodhāra

In this procedure, oil, milk or butter milk or a decoction of suitable herbs is poured on to the forehead in a continuous stream. This therapy stimulates the deeper centers of the brain to harmonize the neurotransmitter release and uptake and is helpful in relaxing the mind and body. This procedure is useful in: i. insomnia, ii. headache, iii. psychomotor agitation and iv. memory disturbances

Recommended oils:- Brahmī tailam, Bhṛṅgāmalakādi tailam

Śirovasti

Keeping the oil over the head with the help of a tubular leather cap is called śirovasti. The skin of the scalp is profusely supplied by the blood vessels. When medicated oils in an amount of 800-1000 ml are kept on the scalp in a tubular cap for about 45 minutes, the pressure exerted by the quantity of oil is sufficient to facilitate the absorption of drug molecules from the scalp skin to the blood capillaries. Further drug molecules present in the oils are the fat soluble which may have better affinity to act for the brain that is chiefly composed of lipoid tissues. It is useful in movement disorders and facial paralysis

Per oral administration of single herbs:- Use of following herbs is recommended to control the various symptoms of DAT.

Maṇḍūkparṇī

Botanical name: *Centella asiatica*

Family: Umbelliferae

Habitat: It is found in India and Sri Lanka up to an altitude of 2000 feet where there is a free flow of water.

- Promotes memory, particularly the retaining power and general intelligence
- Useful in insomnia
- Useful in urinary incontinence which is one of the problematic complaint of advanced cases of DAT

Uses and dosage: Its juice is recommended in a dose of 10-20 ml /day.

Śaṅkhapuṣpi

Botanical name: *Convolvulus pluricaulis*

Family: Convolulaceae

Habitat: It is found all over India particularly in rocky land. It has maximum potency when collected and used in the months from May to December.

Indications: It can be used for those patients of DAT who have psychomotor agitation and insomnia as chief complaints.

Use and dosage: It can be used as hygienically prepared whole plant paste in a dose of 10-20g.

Kūśmāṇḍa

Botanical name: *Benincasa hispida*

Family: Cucurbitaceae

Habitate: It is found all over India

Indications: It is particularly used in memory disorders as well as depressive features associated with DAT

Usage and dosage: Its juice can be used in a dose of 20 ml to 30 ml daily

Jyotiṣmati

Botanical name: *Celastrus paniculatus*

Family: Celastraceae

Habitate: Found in the Himalaya, Punjab, East Bengal, Bihar and Sri Lanka

Indications: Promotes memory and intelligence impairment, which is most troublesome for the patients of DAT

Usage and dosage: Its oil can be used in a dose of 5-15 drops mixed with milk or clarified butter (ghee)

Thus if traditional wisdom can be integrated with modern advances of the science, āyurveda can help in combating the most challenging and debilitating diseases like Dementia of Alzhiemer's Type.

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ABACTERIURIAL EFFECT OF VARUṆAŚIGRUGHANAVAṬI IN URINARY TRACT INFECTION - A CLINICAL STUDY

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Abstract: Urinary tract infection is a common problem. As far as symptomatology is concerned, it is closely related to mūtrakṛcchra in āyurveda. Though a number of antimicrobial agents are available, resistance of bacteria, possibility of recurrence and side effects are major problems. Varuṇaśigru kvātha is a well known drug indicated in various urinary disorders. This study evaluates the efficacy of Varuṇaśigrughanavaṭi in the management of urinary tract infection. The results obtained were encouraging, especially the recurrence of symptoms found significantly less.

Introduction

Urinary Tract Infections (UTI) are a common cause of morbidity and can lead to significant mortality. It is an inflammatory response of urothelium to bacterial invasion i.e. usually associated with bacteriuria and pyuria[1]. UTI is well treated by antimicrobial agents according to their sensitivity. However, several problems still remain. Generally, the use of antibiotics and antiseptic has limitations because of the fact that the infective organism develops resistance and toxic side effects are also common. For the last few decades efforts are being made for a safer and effective management of UTI and any contribution in this field will be of significant value.

Āyurveda being the oldest system of medicine, various uropathies and their management have described under the heading of mūtrāghāta, mūtrakṛcchra, aśmari, etc. A number of āyurvedic drugs have found effective in the management of UTI. Varuṇaśigru kvātha is a well known formulation indicated in various urinary disorders. As the preparation of kvātha (decoction) is not convenient and palatable to most of the patients, there is need to formulate varuṇaśigru in the form of vaṭika to make it easily palatable to all the patients and also to fix the accurate dose of drug.

Materials and methods

The study was conducted in the OPD (Śalyatantra), Sir Sunderlal Hospital, Banaras Hindu University, Varanasi. Patients of mūtrakṛcchra (UTI) were registered after taking detail history and investigations as per designed proforma.

Inclusion criteria**: -** Patients aged between 15 to 75 years, those having clinical symptom of UTI

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(mūtrakṛcchra) like burning sensation, frequency and urgency, etc. and with positive urine culture were included in the study.

Exclusion criteria: - Patients below 15 years and over 75 years, those with sterile urine specimen and those suffering from tuberculosis, malignancy and diabetes were excluded.

Examination**:** - Clinical examinations like per abdominal examination, local and digital rectal examination for assessment of prostate were carried out. Dehaprakṛti of each patient was analyzed as per special proforma designed by the department.

Investigations**:** - 1) Hematological - TLC, DLC, ESR, Hb%; 2) Biochemical - Fasting blood sugar, blood urea, serum creatinine; 3) Urological - Urine for R & M, C & S; 4) Ultrasonography - KUB and prostate were done.

TABLE 1
Distribution of patients according to age group and dehaprakṛti

Age & Prakrti	Grp.I (n=15)		Grp.II (n=15)		Total (n=30)	
	No.	%	No.	%	No.	%
Age:						
< 20	3	20.00	0	00.00	03	10.00
21-30	4	26.67	7	46.67	11	36.67
31-40	2	13.34	4	26.67	06	20.00
41-50	2	13.34	2	13.34	04	13.34
51-60	1	06.67	1	06.67	02	06.67
> 60	3	20.00	1	06.67	04	13.34
Total	15	100	15	100	30	100
Prakṛti:						
V-P	09	60.00	08	53.34	17	56.67
P-K	03	20.00	04	26.67	07	23.34
K-V	03	20.00	03	20.00	06	20.00
Total	15	100	15	100	30	100

* V-P - Vāta-pittaja; P-K - Pitta-kaphaja; K-V - Kapha-vātaja

The selected patients were randomly divided into two groups i.e. Test group (Group I) and Control group (Group II). The test drug Varuṇaśigrughanavaṭi (45 mg) twice per day was administered orally in the Group I. Antibiotic in standard doses according to culture and sensitivity of urine was administered in the Group II patients. The duration of therapy was 21 days in Group I and 07 days in Group II.

Assessment criteria:

- Symptoms of UTI
- Urine culture and sensitivity
- Urine routine and microscopic
- Ultrasonography
- Blood urea
- Serum creatinine

Observations

All the parameters such as age and sex distribution, symptomatology and urine frequency were reviewed and recorded. In this study, the minimum age of patient was 19 years and maximum 75 years and none of the patient

TABLE 4
Frequency of urine before & after treatment

FU*	BT (n=15)		AT (n=15)		(BT-AT)	
	No.	%	No.	%	No.	%
Group I*						
<5	03	20.00	09	60.00	06	40
6-10	11	73.34	05	33.34	06	40
11-15	01	06.67	01	06.67	00	00
Total	15	100	15	100	12	80
Group II**						
<5	01	06.67	9	60.00	08	53.34
6-10	10	66.67	4	26.67	06	40.00
11-15	04	26.67	2	13.34	02	13.34
Total	15	100	15	100	12	106.68

* $\div^2$ Value: x^2=5.00, P<0.05 Significant
** $\div^2$ Value: x^2=9.60, P<0.01 Highly significant

belonged to ekdoṣaja prakṛti or samdoṣaja prakṛti (Table 1). The changes in symptoms were compared before and after the therapy in both the groups and found statically highly significant in burning micturition and urgency, whereas in fever with chill it was significant, and in dysuria, dribbling and pain in lower abdomen was non-significant. (Table 2) There was marked relief in symptoms of UTI. The incidence of symptomatology in relation to deha-prakṛti in Group I & II is detailed in Table (3). Marked decrease in frequency of urine was noted in both the groups after the treatment. The changes in frequency of urine were found statically significant in Group I, and in Group II, it was highly significant (Table 4). The changes in bacteriological status in urine culture were compared before and after treatment. In both the group, it was found statically highly significant in *E.coli*, whereas the rest of micro-organisms were non significant (Table 5). It was observed that, symptoms and bacteriological status of both the groups were reduced; however in follow up, the recurrence of symptoms and bacteriological status were found high in Group II i.e. treated by antibiotic, whereas in Group I, the recurrences were less.

Discussion

Symptomatologically, both the treatments were found equally effective. The symptomatology of UTI is mainly due to inflamed and infected bladder and urethral mucosa. The presence of albumin, pus cells, epithelial cells, crystals and RBCs in urine are also due to inflammation of the urinary tract. These findings were reduced in both groups. The data suggests that

TABLE 2
Incidence of symptomatology

Symptom	BT (n=15)		AT (n=15)		Diff. (BT-AT)		x^2 test	
	No.	%	No.	%	No.	%		
Group-I:								
Burning micturition	13	86.67	3	20.00	10	66.67	x^2=13.39p<0.01	HS
Dysuria	04	26.67	2	13.34	02	13.34	x^2=0.83p>0.05	NS
Dribbling	08	53.34	6	40.00	02	13.34	x^2=0.54p>0.05	NS
Fever with chill	06	40.00	1	06.67	05	33.34	x^2=4.66p<0.05	S
Urgency	11	73.34	3	20.00	08	53.34	x^2=8.57p<0.001	HS
Pain in lower abdomen	05	33.34	3	20.00	02	13.34	x^2=0.68 p>0.05	NS
Per urethral discharge	08	53.34	3	20.00	05	33.34	x^2=3.59 p<0.05	NS
Group-II:								
Burning micturition	09	60.00	2	13.34	07	46.67	x^2=7.03 p<0.01	HS
Dysuria	07	46.67	3	20.00	04	26.67	x^2=2.40 p>0.05	NS
Dribbling	06	40.00	4	26.67	02	13.34	x^2=0.60 p>0.05	NS
Fever with chill	06	40.00	1	06.67	05	33.34	x^2=4.66 p<0.05	S
Urgency	11	73.34	1	06.67	10	66.67	x^2=13.89 p<0.001	HS
Pain in lower abdomen	06	40.00	2	13.34	04	26.67	x^2=2.73 p>0.05	NS
Per urethral discharge	09	60.00	2	13.34	07	46.67	x^2=7.03 p<0.01	HS

BT - Before treatment; AT - After treatment, HS - Highly significant, NS - Not significant, S - Significant

TABLE 3

Incidence of symptomatology in relation to dehaprakṛti

Symptom	No.	Before Treatment						Before Treatment					
		VP	%	PK	%	KV	%	VP	%	PK	%	KV	%
Group - I:													
Burning micturition	13	8	61.53	2	15.38	3	23.07	1	07.69	0	00.00	2	15.38
Dysuria	04	3	75.00	1	25.00	0	00.00	2	50.00	0	00.00	0	00.00
Dribbling	08	6	75.00	1	12.50	1	12.50	5	62.50	1	12.50	0	00.00
Fever with chill	06	5	83.33	0	00.00	1	16.67	1	16.67	0	00.00	0	00.00
Urgency	11	7	63.64	2	18.18	2	18.18	3	27.27	0	00.00	0	00.00
Pain in lower abdomen	05	3	60.00	1	20.00	1	20.00	2	40.00	1	20.00	0	00.00
Per urethral discharge	08	5	62.50	1	12.50	2	25.00	2	25.00	1	12.50	0	00.00
Group - II:													
Burning micturition	09	4	44.44	3	33.33	2	22.22	1	11.11	0	00.00	1	11.11
Dysuria	07	3	42.86	1	14.28	3	42.86	1	14.28	0	00.00	2	28.57
Dribbling	06	2	33.34	2	33.34	2	33.34	0	00.00	2	33.34	2	33.34
Fever with chill	06	4	66.67	2	33.34	0	00.00	0	00.00	1	16.67	0	00.00
Urgency	11	5	45.45	4	36.36	2	18.18	1	09.90	0	00.00	0	00.00
Pain in lower abdomen	06	2	33.34	2	33.34	2	33.34	1	16.67	0	00.00	1	16.67
Per urethral discharge	09	5	55.56	4	44.44	0	00.00	2	22.22	0	00.00	0	00.00

VP = Vāta-pittaja, PK = Pitta-kaphaja, KV = Kapha-vātaja

TABLE 5

Bacteriological status in urine culture before and after the treatment

Organism	BT (n=15)		AT (n=15)		Diff. (BT-AT)		x^2 test	
	No.	%	No.	%	No.	%		
Group I:								
E. Coli	8	53.34	1	06.67	07	46.67	x^2=7.78 p>0.01	HS
Staphylococcus aureus	1	06.67	0	00.00	01	06.67	x^2=1.03 p<0.05	NS
Enterococcus faecalis	2	13.34	0	00.00	02	13.34	x^2=2.14 p>0.05	NS
Pseudomonas	2	13.34	1	06.67	01	06.67	x^2=0.37 p>0.05	NS
Other	2	13.34	2	13.34	00	00.00	x^2=0.0 p<0.05	NS
Group II:								
E. Coli	11	73.34	2	13.34	09	60.00	x^2=10.99 p>0.01	HS
Staphylococcus aureus	01	06.67	0	00.00	01	06.67	x^2=1.03 p<0.05	NS
Enterococcus faecalis	00	00.00	0	00.00	00	00.00	x^2=0.0 p>0.05	NS
Pseudomonas	01	06.67	0	00.00	01	06.67	x^2=1.03 p>0.05	NS
Other	02	13.34	2	13.34	00	00.00	x^2=0.0 p<0.05	NS

Varuṇaśigrughanavaṭi might have acted as anti-inflammatory and antimicrobial agent. It also suggests the anti-inflammatory and antibacterial properties of varuṇa (*Creteva magna*) (Das *et al*, 1974). The drug śigru (*Moringa petrygosperma*) is known for its anti-inflammatory, antibacterial and diuretic activity. Therefore it reduces the inflammation and controls infections of the urinary bladder (Limaye D.A. *et al*, 1995). It was observed that both therapies were almost equally effective. The significant reduction of bacteriuria in Group I might be due to the changing of urinary constituents or media by which pathogenic bacteria could not flourish.

Conclusion

- Varuṇaśigrughanavaṭi reduces: a) symptoms of urinary tract infection, b) micro-organism in urine and c) pus cells in urine.
- Recurrence of symptoms and micro-organism in urine was less in the Varuṇaśigrughanavaṭi treated group.
- Both therapies found equally effective in controlling mūtrakṛcchra (UTI).

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RASAPAÑCAKA OF VANATAMBĀKU (*SOLANUM ERIANTHUM* D. DON.)

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Abstract: The knowledge and experience of therapeutic use of plants from generation to generation has lead to the origin of the concept of fundamental principles of drug action (rasapañcaka). There are quite a few plants with potential medicinal values that have not got a place in āyurvedic classics due to lack of knowledge of their rasapañcaka (pharmacodynamic properties). Keeping this in view, an attempt has been made to determine rasapañcaka (rasa, guṇa, vīrya, vipāka and prabhāva) of vanatambāku (*Solanum erianthum* D.Don), a widely used folk remedy.

Introduction

Global awareness on 'green medicine' is increasing than the synthetic ones because of least adverse effects and safety. Around twenty one thousand medicinal plants are in use as medicine throughout the world. In India eight thousand plants are being used as medicine. Of them about thousand plants are used in ayurveda. Nearly six hundred plants are referred to in original scriptures of ayurveda for their rational use as medicine. Later on, other scholars of āyurveda added more plants into the system in different period of time. Vanatambāku (*Solanum erianthum* D. Don) is a non-documented medicinal plant.

Objectives: - The main objectives of the study were: i. to determine the pharmacodynamic properties of vanatambāku and ii. to incorporate the plant vanatambākuinto the existing Āyurvedic Materia Medica so that it can be used in therapeutics.

Material and methods

Primary data related to vanatambāku (*Solanum erianthum* D. Don.) was collected by direct and indirect means:

A field survey was carried out as part of the study at selected rural areas like Ramnagar, Manduadih and surrounding areas of Varanasi district of Uttar Pradesh. Relevant information on this non documented medicinal plant i.e. its local name and therapeutic uses in different diseases like dyspepsia, anorexia, renal calculi, haemorrhoids, wound, boil, cut, skin diseases, fever, snakebite, headache, diarrhoea, dysentery, colic, epilepsy, etc. were collected from the local habitants, especially traditional healers. The selected plant specimen was botanically identified as *Solanum erianthum* D. Don and collected for the present study after making a critical observation on habit and habitat, vegetation type, etc. The freshly collected specimen was photographed which exhibits the details of

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plant and presumed to be helpful in visual identification of the species. (Fig. 1)

Identification

The plant was identified according to the Bentham & Hooker's system of classification using local floristic works. All relevant available books on Indian indigenous medicinal plants were consulted for correct identification and verification. Expert opinion of plant taxonomists was also sought for crosschecking and confirmation on identity. The family, genus and species of the specimen was ascertained. The medicinal use and action of the plant specimen was recorded separately. Simultaneously the taste of the useful part was ascertained to know the rasa. Suśruta's guideline was adopted to ascertain rasa of the plant. According to him, an intelligent practitioner has to study the dravya by rasa[1]. The selected plant specimen was assessed for its rasa by direct perception. Seven volunteers had assessed the plant-sample as per the guideline mentioned by Caraka[2].

At first, the selected plant was collected and washed well. Then the volunteers were asked to chew the plant (kola pramāṇa - 6g of kalka was given) well so that it comes in contact with all parts of the tongue. The taste that was perceived immediately was noted first and has been considered as the rasa of that particular drug. All the information that has been obtained regarding the plant specimen entered systematically into an established proforma specially prepared with a purpose of recording relevant information of particular medicinal plant.

Fig. 1
Vanatambāku (*Solanum erianthum* D.Don)

Observation and results

Morphology

Solanum erianthum D.Don (Syn - *Solanum verbascifolium* auct., non Linn.), belongs to Solanaceae family, is a shrub or small unarmed tree 1.8-6m high, covered almost all over with a dense yellowish or grey tomentum of scurfy, stellate hairs. Leaves 10-20 by 5-15 cm, elliptic-lanceolate, acuminate. Flowers numerous, in woolly dichotomous corymbose cymes. Corolla white, nearly 1.3 cm long, deeply divided, elliptic lanceolate, acute, stellately hairy outside. Berry 8mm diameter, globose, yellow covered with small stellate hairs. Seeds 1.5 mm diameter, slightly rugose. Useful part of this plant is root (mūla) and whole plant (pañcāṅga).

Analysis of the proforma revealed that the plant has multiple therapeutic uses in conditions like inflammation, pain, skin disease, wound, sore, asthma, cough, rheumatism and diabetes. All the therapeutic uses were understood for their action in accordance with the guidelines of Caraka and Suśruta Samhitas, and an attempt has been made for correct action corresponding to it's uses (Table 1).

Discussion

Suśrutasamhita refers to the guidelines to be followed for determination of rasapañcaka and karma (action) of a plant. According to hm, rasapañcaka residing in different substances are

inferred (anumāna) by their effect (karma)[3]. Caraka explains that karma is the movement (kriya) initiated by conscious will[4].

From the above, it can be understood that kriya (movement) of any substance in a body depends upon conscious will, or in other words, it happens only in a living body - e.g. kriya-agni vardhana, kṣīravardhana, krimighātana, etc. By observing the kriya, one can understand the use (prayoga) of a plant accordingly. For example, by knowing the agnivardhanakriya of a plant, it can be used to improve appetite in patients of agnimāndya. According to Carakasamhita, the plants which are used to improve agni are known for their dīpana action. Similarly, plants which have krimighātanakriya are known for krimighna action. In short, the property of a drug is inferred through action. According to Caraka, anumāna (inference) is based on prior perception which is of three types and is related to three times[5].

In the understanding of action of a drug, kriya (movement) is perception, which is experienced first by the user and communicated later to the prescriber or to the people of the society. Based on this, a list of uses of plant specimen was prepared in accordance with the guidelines referred to in the classics, and on the basis of therapeutic uses their actions were understood.

TABLE 1
Therapeutic uses of vanatambāku with their corresponding action

	Therapeutic use (prayoga)	Actions (karma)
1.	Inflammation	Anti-inflammatory
2.	Pain	Analgesic
3.	Skin disease	Alleviating skin disease
4.	Wound/ Sore	Healing
5.	Asthma	Anti-asthmatic
6.	Cough	Antitussive
7.	Rheumatism	Alleviates rheumatism
8.	Diabetes	Anti-diabetic

Of rasapañcaka of vanatambāku, rasa was first analyzed by seven volunteers engaged for the work and was confirmed it having kaṭurasa based on direct perception through tongue. Further, guideline of Caraka was followed to analyze bhautika guṇas of the plant[6]. Based on the taste, vanatambāku is found to have laghu, rūkṣa and uṣṇa guṇas.

Ascertainment of vīrya was done according to dvividha concept of vīrya i.e. uṣṇa and śīta vīryas based on the principle referred to in the Carakasamhita[7]. Kaṭurasa of vanatambāku falls in the category of agneya hence it is uṣṇa in potency (vīrya).

According to Caraka, substances having kaṭu, tikta and kasaya rasas will have often kaṭu vipāka[8] and accordingly on the basis of predominance of rasa in a plant vipāka was determined and following this rule our study plant is found to have kaṭu-vipāka.

For some plants action cannot be explained in terms of rasa, guṇa, vīrya and vipāka, for it is due to their prabhāva. Caraka says, in cases, where in spite of similarity in rasa, guṇa, vīrya and vipāka there is difference in action, this (difference) is said to be due to prabhāva (specific potency)[9]. Action based on prabhāva was also analyzed and found the kuṣṭaghna karma of vanatambāku is due to prabhāva.

In short, it was observed that vanatambāku is having kaṭu rasa; laghu, rūkṣa and uṣṇa guṇas; uṣṇa-vīrya; kaṭu-vipāka and kuṣṭaghna-prabhāva. So, the anti-inflammatory (śophahara), pain relieving (rujāpaha), healing (ropana), anti

dyspnoea (śvāsahara), cough alleviating (kāsa-hara), alleviating rheumatism (āmavāta-hara) and anti diabetic (pramehaghna) and anti-leprotic (kuṣṭhaghna) actions of vanatambāku are according to its rasa, guṇa, vīrya, vipāka and prabhāva.

Conclusion

This study may be considered to be unique in nature as it is related to a non documented medicinal plant on which much work has not been done but lot of studies has been carried out. As this is only a preliminary study, further evaluation of actions of the plant by incorporating the present knowledge from different field of science like pharmacognosy, chemistry, pharmacology and medical science is necessary.

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Clinical observation

ACUTE DISC PROLAPSES C_5- C_6 (GRĪVĀGRAHAM)

M. Radhamani and Reena Ramesh Warrier*

CERVICAL SPINE INJURY

Cause: - Trauma
Risk factor: - Scooter accident
Injury: - Extension injury, acute disc prolapse C_5- C_6
Signs & symptoms: - Pain, stiffness, poor neck control,
neck pain radiating towards right hand, numbness of right hand
and weakness of right grip.

A male, 60 years old, admitted in our AH&RC, Kottakkal on 18.10.2006 with complaints of numbness and pain on right hand, lack of sleep and hypertension. He was a known diabetic.

He had a history of scooter accident one month back. After one week, the symptoms started as pain on neck radiating towards right hand and numbness of right hand. Grip also was very weak on the right side. No history of head injury or loss of consciousness due to the accident. MRI of cervical spine showed right postero-lateral chronic disc protrusion at C_5- C_6 level and narrowing of the right nerve root canal. X-ray of cervical spine showed degenerative changes in cervical vertebral bodies. The case was diagnosed as acute disc prolapse C_5- C_6. The patient was directed to wear a cervical collar, and advised surgery if it did not respond to conservative treatment.

At the time of hospitalization, his body weight was 64 kg and blood pressure was 140/90 mm Hg. The patient was using cervical collar without which he had poor neck control. His diet schedule was: 3 cups of tea without sugar at 6.00 - 9.30 a.m; milk (protein mix) at 9.30 am; porotta+curd/upma/ bread at 10.00 am; chapatti+curry at 2.30 pm; tea at 6.00 and 7.30 pm; dinner 10.00 pm and coffee+biscuits at 11.00 pm. As a first step of treatment, his unwholesome diet habit was revised in the following manner:

- 09.00 am Breakfast
- 12.00 noon Lunch
- 04.00 pm Tea
- 07.00 pm Fruits and milk

The following medicines were prescribed:

- Dhānvantaram kaṣāyam (15 ml) + boiled and cooled water (60 ml) +
  Gandhatailam (10 drops) - to be taken twice daily i.e. in the morning (6.00 am) on empty stomach and at 6.00 pm.

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- Sārāmbubhāvita kanmadam (2 gm) +
  Mahādhānvantaram guḷika (1) +
  Yogarājaguggulu vaṭika (1) - twice daily after food.
- Guggulutiktaka ghṛtam - 1 teaspoon at bedtime.

In addition to the above, Dhānvantaram tailam mixed with Muriveṇṇa was used for veṣṭana (bandage) on both the arms and neck for three hours daily for five days.

Veṣṭana (oiled bandage):- Soak a piece of cotton cloth, with sufficient length and breadth, in gently warmed prescribed oil and wrap it over the affected area. Keep the cloth wet using warm oil. Remove the bandage after the prescribed period and wipe the oil with a dry towel.

After 5 days, Veṣṭanam was replaced by Upanāham with Eḷḷuzhunnādi cūrṇam for twenty one days.

Upanāham:- Take sufficient quantity of Eḷḷuzhunnādi cūṇam*. Add a mixture of milk and water (in equal parts) to Eḷḷuzhunnādi cūṇam so as to make a loose paste of viscous form. Cook the above paste under low fire stirring well, until it turns thick. After application of the prescribed oils (gently warmed) over the affected parts, spread the above paste evenly to form a layer of quarter inch thickness. A polythene covering may be placed over the paste to keep it in position. A gauze bandage may be applied over this bandage (neither too tight nor too loose) and retained for 2-3 hours daily. After removing the paste, the portion may be washed with warm water or wiped with a dry towel followed by the application of the prescribed oil once again to form a thin film.

In addition to the above, Mañña kizhi on the back was performed for 26 days.

Mañña kizhi:- Mix fine powder of turmeric, dill seed, saltree resin, puffed rice - all in equal parts (25 g) with the white of three eggs. Put this mixture in a piece of cloth and fasten with a thread to form a bolus (kizhi). Gently warm the prescribed tailam or kuzhampu and apply it over the backbone (spine). Smear the prescribed oil in a pan and place it over a low flame. Place the kizhi in the hot pan to warm gently, and when it becomes comfortably warm, massage on the backbone in the upward direction for half an hour. Then wipe off the oil from the body with a clean, dry towel. Kizhi has to be prepared daily.

Picu was introduced after one week of Mañña kizhi. On the 14th day of admission, Śirovasti was done for seven days. After that he was on Marśanasyam for seven days. Dhānvantaram (7 medicated) was used for nasyam. Observing the dietary regimen, the same prescription of internal medicines we continued.

During the course of treatment neck pain, numbness and radiating was alleviated, but gradually and the firmness of the grip improved. At the time of discharge, the patient obtained 80% relief of his complaints. He was advised to continue the internal medicines.

On 29.11.2007, the patient came for review. He was continuing all the internal medicines except the Sārāmbubhāvita kanmadam. Though he had slight weakness on the right hand, his neck muscles were stronger. He was not using collar; and had no pain on hands and neck. After review he was advised to continue the medicines and oil applications.

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*Eḷḷuzhunnādi cūrṇam: - Eḷḷu (*Sesamum indicum*), uzhunnu (*Vigna mungo*), uluva (*Trigonella foenum-graecum*) and satapuṣpa (*Anethum graveolens*) taken in equal quantity are to be roasted and finely powdered.

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EXCERPTS FROM CIKITSĀMAÑJARI - LVIII

P. Unnikrishnan*

Abstract: The causative factors of insanity (unmāda) and seizure (apasmāra), and their various treatments are explained in this issue.

TREATMENT OF UNMĀDA

Insanity (unmāda) is caused by vitiated vāta, pitta, kapha or sannipāta (combination of these doṣas), worry (ādhi) and viṣa (toxins). These causative factors invade and derange the mind and body and cause to various diseases.

Insanity caused by vāta is treated with sneha-pāna and that caused by blocked (āvṛta) vāta is treated with oily laxatives. When it is caused by deranged kapha and pitta, the line of treatment should be initially with emesis, then purgation and enema and nasal purging after proper oleation and sudation.

When the deranged doṣas are brought to normal state by purification treatment, the patient's mind becomes clear. If the patient is not relieved by the above measures, drastic nasal purging and eye medications (añjana) can also be done. Pleasing, reassuring, threatening or angering the patient, pushing or inflicting pain to his body by beating, etc. may have to be done in extreme cases. Application of oil on the body and rubbing in the opposite direction of hairs (udvartana), application of medicated paste on the body (lepa), inhalation of medicinal fumes (dhūma) and consumption of plain or medicated ghee are recommended to bring the patient's mind to an equilibrium state who has undergone purification treatments.

Fine powders of the following, mixed with breast milk, sugarcane juice, sugar and honey is given for nasya in liquid form for the relief of insanity (cittavibhrama).

Mṛdvīka	*Vitis vinifera*
Madhuka	*Glycyrrhiza glabra*
Madhūka	*Madhuca longifolia*
Pippali	*Piper longum*
Kharjura	*Phoenix dactylifera*
Malayaja	*Santalum album*
Sāriba	*Hemidesmus indicus*
Jala	*Plectranthus vettiveroides*
Abda	*Cyperus rotundus*

Fine powder of viṣṇukrānti (*Evolvulus alsinioides*), added with a small quantity of madhuka (*Glycyrrhiza glabra*) and khaṇḍa (sugar candy), mixed with breast milk is prescribed for nasya. The patient should follow a milk diet. His head is to be irrigated with 108 pots of cold water

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every morning for three days or seven days depending upon the gravity of the disease.

Irrigation of the head with a mixture of milk and tender coconut water relieves insanity. The following drugs are to be crushed and put in water on the previous day, and the head is to be irrigated with this.

Śatāvari	*Asparagus racemosus*
Veṭṭi	*Symplocos racemosa*
Kañjirattaḷir	*Strychnos nux-vomica* (shoot)
Tirutāli	*Ipomoea sepiaria*
Centeṅgin-karikku	*Cocos nucifera* (a variety bears pale reddish colour fruits)

Mix fine powders of the following drugs, each one kazhanju (4g), with uri (96 ml) milk and eight nāzhi* of water and reduce to milk. Intake of this added with a small quantity of powdered sugar after supper, relieves insanity.

Ñeriññil	*Tribulus terrestris*
Śatāvari-kkizhaṅgu	*Asparagus racemosus* (tuber)
Jīrakam	*Cuminum cyminum*
Ceṛupūḷaver	*Aerva lanata* (root)
Cuṇdaver	*Solanum indicum* (root)

Make a paste of finely powdered cukku (*Zingiber officinale*) and tippali (*Piper longum*) in the expressed juice of kaippayila (*Momordica charantia*), karunociyila (*Vitex negundo*) and kaññikūrkkila (*Plectranthus amboinius*). The juice of this mixture added with ghee is to be used for nasya. Irrigation can also be done. Plain water or water medicated with śatāvari, veṭṭittaḷir (tender leaves of *Symplocos racemosa*), etc. detailed above can also be used for irrigation. A kaṣāya prepared from ñeriññil (*Tribulus terrestris*), śatāvarikkizhaṅgu, etc. mentioned above, added with milk is to be consumed in the evening. All these treatments are capable of relieving unmāda.

Prepare a kaṣāya from the roots of sahadevi (*Vernonia cinerea*) and viṣṇupatni (*Ipomoea sepiaria*) mixed with hayyamgavīnam (butter). Intake of rice porridge mixed with this preparation is very effective. Consumption of milk mixed with expressed juice of muttil (*Centella asiatica*) is also effective.

Consumption of oil medicated with the kaṣāya of kāntāra (*Callicarpa macrophylla*) and vīra (*Coccinia grandis*) relieves unmāda. Fine powder of roots of payasa (*Holostemma adakoedien*) can also be taken. Śāntiphala (*Phyllanthus emblica*) can be used for curry.

Prepare a kaṣāya with the roots of kuṛuntoṭṭiver (*Sida rhombifolia* ssp. *retusa*), ōrilaver (*Desmodium gangeticum*), mūvilaver (*Pseudarthria viscida*), ceṛuvazhutinaver (*Solanum indicum*) and ñeriññil (*Tribulus terrestris*) added with one edaṅgazhi (768 ml) of ghee and expressed juices of ciṭṭamṛtu (*Tinospora cordifolia*), nīrāral (*Marsilea quadrifolia*), śatāvarikkizhaṅgu (*Asparagus racemosus*), kaṛuka (*Cynodon dactylon*), tamaravalayal (*Nelumbo nucifera*), kaṭṭavāzha (*Aloe barbedensis*) and kadaḷikkizhaṅgu (*Musa paradisiaca* - tuber). Tender coconut water and milk as liquid components, and solid component as the drugs Kalyāṇaka ghṛta (excluding kāṭṭuveḷḷari and including amukkuram in its place) are to be added to prepare a medicated ghee. Intake of this medicine relieves unmāda and apasmāra and the diseases caused by excessive increase of pitta. Faculties of the mind such as intellect, retention and recall are also promoted by consumption of this medicine.

Intake of pañcagavyam (a combination of cow's milk, ghee, curd, dung and urine) daily is advised.

*1 nāzhi = 192 ml

Ghee medicated with pañcagavya and Kalyāṇaka ghṛta are also good for the relief of unmāda. Fumigation of dried powder of leopard's dung mixed with old ghee relieves unmāda.

TREATMENT OF APASMĀRA

There are four types of apasmāra (seizure) caused by vāta, pitta, kapha and sannipāta. The five purification treatments detailed in āyurveda are to be done based on the vitiated doṣa. Treatment indicated for unmāda is to be done after this. Consumption of fine powder of iraṭṭimadhuram (*Glycyrrhiza glabra*) mixed with the expressed juice of old kumpaḷaṅga (*Benincasa hispida*) is effective.

Medicated ghee prepared with the expressed juice of kumpaḷaṅga as liquid component and fine paste of yaṣṭīmadhu (*Glycyrrhiza glabra*) as solid component relieves apasmāra and increases intellect and quality of voice. The proportion of ghee and juice of kumpaḷaṅga is 1:18.

Prepare ghee from the juice of brahmi (*Bacopa monnieri*) as liquid component and caṅkiyapūvu (*Canscora decusseta*), vayampu (*Acorus calamus*) and koṭṭam (*Saussurea lappa*) as solid components. Seizure with forgetfulness is relieved by consumption of this ghee. Worship of Lord Śiva and incantation of Śrīpañcākṣari are advised.

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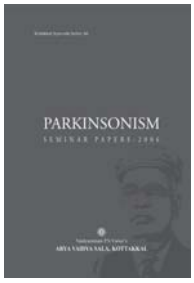

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