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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 - LXXX

Dr. A. Raghunathan*

Abstract: After the discussion regarding omens appearing in the surroundings of a patient, hints in connection with various types of dreams perceived by a patient are discussed here. The co-relations of certain fatal dreams to some specific ailments are discussed in particular. The other areas of concern are categories of dreams, common dreams that tend to be fatal and the inference of certain dreams. As Śārīrasthāna ends by this, its definition is also emphasized here.

इत्युक्तं दूतशकुनं स्वप्नानूर्ध्वं प्रचक्षते ।

(Ityuktaṁ dūtaśakunaṁ
svapnānūrdhvaṁ pracakṣate ।)

The topics of messengers and omens have already been discussed. Now the dreams as indications for unhealth or death are to be highlighted.

स्वप्ने मद्यं सह प्रेतैर्यः पिबन् कृष्यते शुना ।। ४० ।।
स मर्त्यो मृत्युना शीघ्रं ज्वररूपेण नीयते ।
रक्तमाल्यवपुर्वस्त्रो यो हसन् ह्रियते स्त्रिया ।। ४१ ।।
सोऽस्रपित्तेन, महिषश्ववराहोष्ट्रगर्दभैः ।
यः प्रयाति दिशं याम्यां मरणं तस्य यक्ष्मणा ।। ४२ ।।
लता कण्टकिनी वंशस्तालो वा हृदि जायते ।
यस्य तस्याशु गुल्मेन, यस्य वह्निमनर्चिषम् ।। ४३ ।।
जुह्वतो घृतसिक्तस्य नग्नस्योरसि जायते ।
पद्मं स नश्येत्कुष्ठेन, चण्डालैः सह यः पिबेत् ।। ४४ ।।
स्नेहं बहुविधं स्वप्ने स प्रमेहेण नश्यति ।

(svapne madyaṁ saha pretai-
rya: piban kṛṣyate śunā ।। 40 ।।
Sa martyo mṛtyunā śīghram
jvararūpeṇa nīyate ।
raktamālyavapurvastro
yo hasan hriyate striyā ।। 41 ।।
Soऽsrapittena, mahiṣaśva-
varāhoṣṭragardabhai: ।
ya: prayāti diśaṁ yāmyām
maraṇam tasya yakṣmaṇā ।। 42 ।।
Latā kaṇṭakinī vaṁśa-
stālo vā hṛdi jāyate ।
yasya tasyāśu gulmena,
yasya vahnimanarciṣam ।। 43 ।।
Juhvato ghṛtasiktasya
nagnasyorasi jāyate ।
padmam sa naśyetkuṣṭhena,
caṇḍāḷai: saha ya: pibet ।। 44 ।।
Sneham bahuvidhaṁ svapne
sa prameheṇa naśyati ।)

He, who dreams of being drawn away by a dog while taking wine in the company of spirits, is

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

said to breath his last due to fever and that his days are numbered. A person is said to be succumbed to death by raktapitta if he dreams of being red complexioned, dressed in red garments, wearing red garland and being seduced by a lady. He who dreams being carried towards the southern direction riding on a buffalo, dog, pig, camel or a donkey, is said to be afflicted to phthisis and death.

Death due to gulma disorder is certain to one who dreams a creeper with thorns, a bamboo or a palm tree growing from his chest. He, who dreams as doing oblation into a flameless fire-pit, bare bodied but smeared with ghee and a lotus is growing from his chest, may die afflicted with kuṣṭha. One, who dreams as consuming different types edible oils like ghee, gingili oil, etc. in the company of low-class people (caṇḍāḷa), may die afflicted with diabetes.

[Note. Some peculiar dreams are described here in connection with some major systemic diseases. In dreams peculiarities have some similarities of particular diseases in which the vitiated doṣas produce such kind of abnormal features.]

उन्मादेन जले मज्जेद्यो नृत्यन् राक्षसैः सह ।। ४५ ।।
अपस्मारेण यो मर्त्यो नृत्यन् प्रेतेन नीयते ।
यानं खरोष्ट्रमार्जारकपिशार्दूलसूकरैः ।। ४६ ।।
यस्य प्रेतैः शृगालैर्वा स मृत्योर्वर्तते मुखे ।
(unmādena jale majjedyo
nṛtyan rākṣasaiḥ saha ।। 45 ।।
Apasmāreṇa yo martyo
nṛtyan pretena nīyate ।
yānam kharoṣṭramārjāra-
kapiśārdūlasūkaraiḥ ।। 46 ।।
yasya pretaiḥ śṛgālairvā
sa mṛtyorvartate mukhe ।)

He, who sees in dream being drawn down into water while dancing with rākṣasas (demons) may die afflicted with insanity (unmāda). Apasmāra (epilepsy) may cause death of one, who sees a dream in which he is being pulled away by a dead person while dancing. Travel by donkey, camel, cat, monkey, leopard and pig or by spirits/ corpse or by jackles in dream may cause death.

अपूपशष्कुलीर्जग्ध्वा विबुद्धस्तद्विधं वमन् ।। ४७ ।।
न जीवति, अक्षिरोगाय सुर्येन्दुग्रहणेक्षणम् ।
सूर्याचन्द्रमसोः पातदर्शनं दृग्विनाशनम् ।। ४८ ।।
(apūpaśaṣkulīrjagdhvā
vibuddhastadvidham vaman ।। 47 ।।
na jīvati, akṣirogāya
suryendugrahaṇekṣaṇam ।
sūryācandramasoḥ pāta-
darśanaṁ dṛgvināśanam ।। 48 ।।)

One is said to die by vomiting if he happens to dream of eating sweet items like apūpa (cake-like pudding), śaṣkulī (pastries) and later, after waking up, vomits such sweet items in real. If one sees scenes of eclipses, either solar or lunar in dream, will be afflicted with eye disorders; might turn blind if he gets scenes of either the sun or the moon falling down.

मूर्ध्नि वंशलतादीनां सम्भवो वयसां तथा ।
निलयो मुण्डता काकगृध्राद्यैः परिवारणं ।। ४९ ।।
तथा प्रेतपिशाचस्त्रीद्रविडान्ध्रगवाशनैः ।
सङ्गो वेत्रलतावंशतृणकण्टकसङ्कटे ।। ५० ।।
श्वभ्रश्मशानशयनं पतनं पांसुभस्मनोः ।
मज्जनं जलपङ्कादौ शीघ्रेण स्रोतसा हृतिः ।। ५१ ।।
नृत्यवादित्रगीतानि रक्तस्रग्वस्त्रधारणम् ।
वयोङ्गवृद्धिरभ्यङ्गो विवाहः श्मश्रुकर्म च ।। ५२ ।।
पक्वान्नस्नेहमद्याशः प्रच्छर्दनविरेचने ।
हिरण्यलोहयोर्लाभः कलिर्बन्धपराजयौ ।। ५३ ।।

उपानद्युगनाशश्च प्रपात: पादचर्मणो: ।
हर्षो भृशं प्रकुपितै: पितृभिश्चावभर्त्सनम् ।। ५४ ।।
प्रदीपग्रहनक्षत्रदन्तदैवतचक्षुषाम् ।
पतनं वा विनाशो वा, भेदनं पर्वतस्य च ।। ५५ ।।
कानने रक्तकुसुमे पापकर्मनिवेशने ।
चितान्धकारसम्बाधे जनन्यां च प्रवेशनम् ।। ५६ ।।
पात: प्रासादशैलादेर्मत्स्येन ग्रसनं तथा ।
काषायिणामसौम्यानां नग्नानां दण्डधारिणाम् ।। ५७ ।।
रक्ताक्षाणां च कृष्णानां दर्शनं जातु नेष्यते ।

(Mūrdhni vamśalatādīnām
sambhavo vayasāṁ tathā ।
nilayo muṇḍatā kāka-
gṛdhrādyai: parivāraṇam ।। 49 ।।
Tathā pretapiśācastrī-
draviḍāndhragavāśanai: ।
saṅgo vetralatāvamśa-
tṛṇakaṇṭakasaṅkaṭe ।। 50 ।।
śvabhraśmaśānaśayanam
patanam pāmsubhasmano: ।
majjanam jalapaṅkādau
śīghreṇa srotasā hṛti: ।। 51 ।।
Nṛtyavāditragītāni
raktasragvastradhāraṇam ।
vayoṅgavṛddhirabhyaṅgo
vivāha: śmaśrukarma ca ।। 52 ।।
Pakvānnasnehamadyāśa:
pracchardanavirecane ।
hiraṇyalohayorlābha:
kalirbandhaparājayau ।। 53 ।।
Upānadyuganāśaśca
prapāta: pādacarmaṇo: ।
harṣo bhṛśaṁ prakupitai:
pitṛbhiścāvabhartsanam ।। 54 ।।
Pradīpagrahanakṣatra-
dantadaivatacakṣuṣām ।
patanaṁ vā vināśo vā,
bhedanam parvatasya ca ।। 55 ।।
Kānane raktakusume
pāpakarmaniveśane ।
citāndhakārasambādhe
jananyām ca praveśanam ।। 56 ।।
Pāta: prāsādaśailāder-
matsyena grasanam tathā ।
kāṣāyiṇāmasaumyānām
nagnānām daṇḍadhāriṇām ।। 57 ।।
Raktākṣāṇām ca kṛṣṇānām
darśanam jātu neṣyate ।)

The sight of the following events in dream is not at all beneficial for a person:

Formation of bamboo or certain creepers in the head, alighting of birds on one's head, seeing oneself with completely shaven head, attack of crow, vulture, etc. over the head, surrounded by dead ones, goblins, ladies, drāviḍas, āndhras (southerners), low cultured people who eat cow-meat; entangled inside the tuft of vetras (canes) or of creepers or of bamboos or grasses or horn-cluster; sleeping in caves with flowing water or in cemetery, fall of dust or ash over the body, sinking inside the water or turbid water, drawing away by the water current, enjoy oneself by dance, drum-beating or songs, wearing of red garlands or clothes, sudden ageing or magnification of the body, application of oil all over the body, ones' own marriage ceremony, shaving one own head, intake of food, oil items or liquids, vomiting or defecation, achievement of gold or iron articles, quarrel, bondage or defeat by others, loss of both the footwear, over ecstasy, curse of displeased forefathers, sight of the fall as well as the depletion of lights, planets, stars or own tooth or eye, sight of tearing of mountains, entrance into a red forest, house

with sinners, cemetery or dark places or involution of his own body into the mothers womb, falling down from palace - terraces or hill, swallow by fishes, sight of people with kāṣāya clothes (saints), cruel people, nude persons or stick bearing militants, red eyed or dark people.

[Note: Here so many unlikely conditions are established as negative hinting points in a person's dream; that may be the reason for the inclusion of southerners like drāviḍa and āndhra as inauspicious. This also shows the fact that the north-residents of the country in previous centuries, were a majority in the main stream of culture of India at that time who considered others backward]

कृष्णा पापाननाचारा दीर्घकेशनखस्तनी ।। ५८ ।।
वीरागमाल्यवसना सप्ने कालनिशा मता ।

(kṛṣṇā pāpānanācārā
dīrghakeśanakhastanī ।। 58 ।।
Vīrāgamālyavasanā
sapne kālaniśā matā ।)

Sight of a black woman with a sinful face and sinful acts possessing elongated hairs, nails and breasts, wearing decayed garlands and discoloured clothes in a dream is equal to seeing kālaniśā (last night in ones' life span).

[Note: The mythological concept of kālaniśā as a witch haunts the sinner just before his death showing fearful acts. Even seeing such a negative and fearful image in a dream is also an omen of death.]

मनोवहानां पूर्णत्वात्स्रोतसां प्रबलैर्मलैः ।। ५९ ।।
दृश्यन्ते दारुणाः स्वप्ना रोगी यैर्याति पञ्चताम् ।
अरोगः संशयं प्राप्य कश्चिदेव विमुच्यते ।। ६० ।।

(manovahānām pūrṇatvāt-
srotasām prabalairmalaiḥ ।। 59 ।।
Dṛśyante dāruṇāḥ svapnā
rogī yairyāti pañcatām ।
aroga: samśayam prāpya
kaścideva vimucyate ।। 60 ।।)

When the channels towards the mind are vitiated with the deranged dosas in their maximum level, nightmares occur by which a patient is led to death whereas a normal man hardly gets rid of death.

[Note: Bad dreams are the harbingers of death with certainty in abnormal healthy people and those are also negative signs to the normal people though they may recover after seeing such nightmares.]

Categories of dreams

दृष्टः श्रुतोऽनुभूतश्च प्रार्थितः कल्पितस्तथा ।
भाविको दोषजश्चेति स्वप्नः सप्तविधो मतः ।। ६१ ।।

(Dṛṣṭaḥ śrutoऽnubhūtaśca
prārthitaḥ kalpitastathā ।
bhāviko doṣajaśceti
svapnaḥ saptavidho mataḥ ।। 61 ।।)

There are seven kinds of dreams: i) seen dreams (events or things witnessed previously in the vigil state), ii) heard events, iii) experienced things, iv) desired ones, v) imagined ones, vi) future-related dreams (going to experience in the future) and vii) dreams due to the vitiated humours.

[Note: The first five dreams are the repeated experiences in the vigil of a person. Only the sixth one, i.e. future-related, is an index of future which is still a matter of astonishment. The last one due to the dosas occurs by the excess influence of dosas in the mind level.

Result of dreams

तेष्वाद्या निष्फलाः पञ्च यथास्वप्रकृतिर्दिवा ।
विस्मृतो दीर्घह्रस्वोऽति पूर्वरात्रे चिरात्फलम् ।। ६२ ।।

दृष्टः करोति तुच्छं च गोसर्गे तदहर्महत् ।
निद्रया चाऽनुपहतः प्रतीपैर्वचनैस्तथा ।। ६३ ।।
याति पापोऽल्पफलतां दानहोमजपादिभिः ।

(Teṣvādyā niṣphalāḥ pañca
yathāsvaprakṛtirdivā ।
vismṛto dīrghahrasvoऽti
pūrvarātre cirātphalam ।। 62 ।।
Dṛṣṭaḥ karoti tucchaṁ ca
gosarge tadaharmahat ।
nidrayā cāऽnupahataḥ
pratīpairvacanaistathā ।। 63 ।।
yāti pāpoऽlpaphalatām
dānahomajapādibhiḥ ।)

Out of these seven types, the first five dreams seen as per the natural temperament of the persons. Dreams happening in the day time, forgotten dreams (after waking up from the sleep the person cannot recollect certain kind of dreams) longer and shorter dreams are ineffective in general.

Dreams seen in the first part of the sleep produce its result at a later stage with a minimal affect, whereas that seen at dawn produces the result that day itself with an intensive result. This result will happen if only the dream is unbroken i.e. if the person did not fall into sleep again (after dream). Opposing words against the result of negative dreams and noble actions like donations, rituals, oblations, incantations, etc. contribute to the weakening of the intensity of the outcome of such dreams.

[Note: The uncertainty of the result of dreams is established by conditioning. Out of seven types of dreams first five are just the repetitive experiences of the perceived aspects. Therefore, the chances of experiencing something new are remote. The other two types - doṣaja and bhāvika have some effects. As the doṣaja happens due to the over accumulation of bodily humours, it has no effect on one's life. Only the last one, bhāvika is to be accounted in this connection. That also has various conditions to produce the real effect. The dreams that are dissimilar to each prakṛti (refer Śārīrasthāna, III Chapter for similar dreams of each temperament), seen during night sleep and are so vivid that it cannot be forgotten in the morning are effective. If a person becomes afraid and wakes up and does not get proper sleep after a nightmare, then the result is intensive. Timely consolation and pious activities against bad dreams also diminish the intensity of such nightmares.

Again, the low possibility of effects of nightmares is established by the next verse.

अकल्याणमपि स्वप्नं दृष्ट्वा तत्रैव यः पुनः ।। ६४ ।।
पश्येत्सौम्यं शुभं तस्य शुभमेव फलं भवेत् ।

(akalyāṇamapi svapnam
dṛṣṭvā tatraiva yaḥ punaḥ ।। 64 ।।
Paśyetsaumyam śubhaṁ tasya
śubhameva phalam bhavet ।)

When a person experiences a bad dream first and then a positive dream just afterwards, he will get only positive results.

[Note: A negative dream's effect will be nullified by seeing a positive one just after that and if a negative dream happens after a positive dream, then the result will also be negative. In total, this points out the unstable nature of dreams regarding their results. We saw that a dream will be effective rarely according to various conditions. We also saw the lowering effect of a dream against the benevolent activities like donations, hymn-chanting, etc. Not only is this regarding such dreams, but for omens, riṣṭa

symptoms also. All these establish the karma siddhānta (hypothesis of act and their results). Diseases are the outcome of our deeds and the remedial measures are also our deeds in an accurate way.]

देवान् द्विजान् गोवृषभान् जीवत: सुहृदो नृपान् ।। ६५
साधून् यशस्विनो वह्निमिद्धं स्वच्छान् जलाशयान् ।
कन्या: कुमारकान् गौरान् शुक्लवस्त्रान्सुतेजस: ।। ६६
नराशनं दीप्ततनुं समन्ताद्रुधिरोक्षितम् ।
य: पश्येल्लभते यो वा छत्रादर्शविषामिषम् ।। ६७ ।।
शुक्ला: सुमनसो वस्त्रममेध्यालेपनं फलम् ।
शैलप्रासादसफलवृक्षसिंहनरद्विपान् ।। ६८ ।।
आरोहेद्गोश्वयानं च, तरेन्नदह्रदोदधीन् ।
पूर्वोत्तरेण गमनमगम्यागमनं मृतम् ।। ६९ ।।
सम्बाधान्नि:सृतिर्देवै: पितृभिश्चाभिनन्दनम् ।
रोदनं पतितोत्थानं द्विषतां चावमर्दनम् ।। ७० ।।
यस्य स्यादायुरारोग्यं वित्तं बहु च सोऽश्नुते ।

(devān dvijān govṛṣabhān
jīvata: suhṛdo nṛpān ।। 65 ।।
Sādhūn yaśasvino vahni-
middham svacchān jalāśayān ।
kanyā: kumārakān gaurān
śukḷavastrānsutejasa: ।। 66 ।।
Narāśanam dīptatanum
samantādrudhirokṣitam ।
ya: paśyellabhate yo
vā chatrādarśaviṣāmiṣam ।। 67 ।।
Śukḷā: sumanaso vastra-
mamedhyālepanam phalam ।
śailaprāsādasaphala-
vṛkṣasimhanaradvipān ।। 68 ।।
Ārohedgośvayānaṁ ca,
tarennadahradodadhīn ।
pūrvottareṇa gamanam-
agamyāgamanaṁ mṛtam ।। 69 ।।
Sambādhānni:sṛtirdevai:
pitṛbhiścābhinandanam ।
rodanam patitotthānam
dviṣatām cāvamardanam ।। 70 ।।
Yasya syādāyurārogyam
vittam bahu ca soऽśnute ।)

Dreams of the following are to be considered positive: Sights of immortals, Brāhmins, cows, ox, living friends, kings, pious people, famous people, ignited fire, clean water pools, radiant virgin and young boys who are fair complexioned and are wearing white dresses, demon with bright complexion smeared with blood all over the body, the umbrella, mirror, prison, meat; white flowers, white dresses, dirty (body) smears, fruits, climbing on hill, palaces, fruitful trees, lion man, elephant, bull or horse; swimming over the river, lake or sea, a travel to the east or the north, intercourse with a prostitute, dead body, relief from troubles, praise by immortals or dead ancestors, weeping, uplifting, a fallen one and quarrel between two enemies. All these seen in dream will produce long life, good health and plenty of wealth.

मङ्गलाचारसम्पन्न: परिवारस्तथाऽतुर: ।। ७१ ।।
श्रद्दधानोऽनुकूलश्च प्रभूतद्रव्यसङ्ग्रह: ।
सत्त्वलक्षणसंयोगो भक्तिर्वैद्यद्विजातिषु ।। ७२ ।।
चिकित्सायामनिर्वेदस्तदारोग्यस्य लक्षणम् ।

(maṅgalācārasampanna:
parivārastathāऽtura: ।। 71 ।।
Śraddadhānoânukūlaśca
prabhūtadravyasaṅgraha: ।
sattvalakṣaṇasaṁyogo
bhaktirvaidyadvijātiṣu ।। 72 ।।
Cikitsāyāmanirvedasta-
dārogyasya lakṣaṇam ।)

A patient who is holy and pious and having attendants of similar nature, keeping faith in the physician as well as in treatment, co-operative to physician, having plenty of wealth (for treatment purpose), being combined with good will and qualities, obedience in physician, treatment, etc., optimistic in treatment is sure to regain his health and vigour.

इत्यत्र जन्ममरणं यत: सम्यगुदाहृतम् ।। ७३ ।।
शरीरस्य तत: स्थानं शारीरमिदमुच्यते ।
(ityatra janmamaraṇam
yata: samyagudāhṛtam ।। 73 ।।
Śarīrasya tata: sthānaṁ
śārīramidamucyate ।)

Definition of this sthāna, Śārīram is given now.

This sthāna (section) is named śārīram as all the things occurring in a body from birth to death are highlighted in it properly.

इति श्रीवैद्यपतिसिंहगुप्तसूनुश्रीमद्वाग्भटविरचितायामष्टाङ्गहृदयसंहितायां द्वितीये शारीरस्थाने दूतादिविज्ञानीयो नाम षष्ठोऽध्याय: ।। ६ ।।

(iti śrīvaidyapatisimhaguptasūnuśrīmadvāg-bhaṭaviracitāyāmaṣṭāṅgahṛdayasamhitāyām dvitīye śārīrasthāne dūtādivijñānīyo nāma ṣaṣṭhoऽdhyāya: ।। 6 ।।)

Thus ends the chapter named dūtādiviñjānīyam, the Sixth in the Śārīrasthānam of Aṣṭāṅgahṛdaya samhita composed by Śrimad Vāgbhaṭa, son of Śrī Vaidyapati Simhagupta.

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PHARMACOGNOSTICAL AND PRELIMINARY PHYTOCHEMICAL STUDIES ON THE THORNS OF *BOMBAX CEIBA* L.

T.R.Shantha, G.Venkateshwarlu, M.J.Indira Ammal, K.Gopakumar and B.N.Sridhar*

Abstract**:** Different parts of śālmalī [*Bombax ceiba* L. syn: (*Salmalia malabarica*)], are used in the indigenous system of medicine for treating various diseases. It is beneficial for promoting skin- colour/complexion and is useful for emaciation. This paper deals with the pharmacogno-stical and preliminary phytochemical studies on the thorns of *Salmalia malabarica.*

Introduction

Bombax ceiba (Bombacaceae) is known as śālmalī in Sanskrit and red silk cotton tree in English. In Kannada it is known as kempu buragada gida because of the presence of reddish flowers and for the presence of abundant reddish brown tanniferous content in almost all parts of the tree.

Thorns of this tree are known as śālmalīkaṇṭa-kā. In āyurveda, śālmalī has been described as rasāyana (rejuvenator) and promoter of skin colour. The pharmacodynamic properties are madhurarasa (sweet in taste), śītavīrya (cold in potency), madhuravipāka (sweet after post digestion), laghu, snigdha and picchila in guṇas. The thorns are beneficial for skin disorders; the paste of prickles made in milk (śālmalī kaṇṭaka lepanam) is applied as face cream in abnormal pigmentation, discolouration and freckles of face and alike. This facial pack has specially used in eradicating acne vulgaris (mukhadūṣika) (Gyanendra Pandey, 2002).

Śālmalī is a very large, deciduous tree, branches whorled spreading almost horizontally, and trunk bark may have gray in colour with sharp conical shape prickles. Leaves digitate; leaflets 5-7, on short petiole; flowers large, dark crimson, scarlet, solitary and fleshy; capsule green, cylindrical, smooth, seeds packed in white silky cotton. It is distributed in different regions of the country and mostly in warm forest areas (Anonymous, 2001).

Material and methods

Fresh thorns of śālmalī were collected from Pallam, Kottayam, Kerala. For microscopial studies, free hand sections of fresh thorns were cut, cleared with chloral hydrate solution and water and then stained with safrannin according to the methods given by Johansen (1940) and Wallis (1967). A drop of HCl and phloroglucinol were used to detect the lignified cells for cut sections, as well as for powder drug as per the methods followed by Wallis T.E., 1967. Photomicrographs were taken with Nikon Digital

* *Regional Research Institute (Ay.), Jayanagar, Bangalore-11.*

camera Cool pix 4500 unit. Powder of the dried woody conical thorns was used for chemical analysis. Physico-chemical studies and preliminary phytochemical screening were carried out as per the standard methods and procedure [(Anonymous, 1966; Kokate, C.K. (1993)]. The fluorescence behaviour of the powdered drug in different solutions towards the ordinary light and ultra-violet light (both long and short wave lengths) were carried out as per Chase and Pratt R. 1949. TLC studies of the petroleum ether 60 to 80°C, chloroform and ethanol extracts were carried out in various solvents at 30°C using Silica gel 60 F_{254} pre-coated sheets as adsorbent (Igon Stahl, 1969).

Observations and results

Macroscopical characters:- Thorns are thick, woody, conical appears on the stem in the groups of 3,4 and 6-7 and measures 1cm to 1.5 cm by width. They are reddish brown in colour; edges are black in colour, sharp and slightly pointed. Outer surface is smooth, brown to black in colour; taste slightly sweet and mucilaginous; odour agreeable.

Microscopical characters:- T.S of the thorns shows outer single layered epidermis, covered by thin wavy cuticle and made up of rectangular cells filled with reddish brown content of tannin. Upper layer of ground tissue cells are of 8 to 10 layered, thin walled, compactly arranged, brown coloured and followed by many layers of thick walled paranchymatous cells, which are brown to reddish brown in colour filled by abundant reddish tannin content on the walls of the cells in drops in the form of globules, and some of the cells are filled in the form of patches. Some of the cells show small, rounded starch grains. In between the thick walled cells, patches of stone cells are also present which are polygonal and rounded with narrow and broad lumen; pits well developed, lumen broad and narrow (Fig.I a-h).

Macerate studies:- Macerate studies shows abundant thin walled parenchymatous cells; stone cells in groups, in two and in single; thick walled cells with abundant tannin content; thin walled parenchyma cells with tannin content and brown coloured thin walled parenchyma cells (Fig. II a-f).

Powder microscopy:- Powder reddish brown in colour; taste slightly sweetish and mucilaginous; odour pleasant when treated with chloral hydrate and water fragments of tissues observed under the microscope (Fig. III a-f).

Diagnostic characters:- Presence of: i) thick black to brownish black coloured woody, conical shaped thorns in groups of 2, 3, 4 to 7 and sometimes more on the trunks of stem, ii) thick to thin walled paranchymatous layer of

TABLE 1
Physico-chemical and
Preliminary phyto-chemical studies

Parameters	Result (in %)
Foreign matter	< 2
Loss on drying at 110°C	3.10
Ash content	2.00
Water soluble ash	nil
Acid insoluble ash	nil
Extractive values:	
- Petroleum ether	1.84
- Chloroform	0.44
- Ethanol	10.50
Solubility at room temperature:	
- Ethanol	18.50
- Water	21.30
Extractable matter (Hot)	26.50
pH value	6.75
Inorganic constituents (qualitative)	*

*Carbonate, Sulphate, Chloride, Calcium, Magnesium, Sodium and Potassium

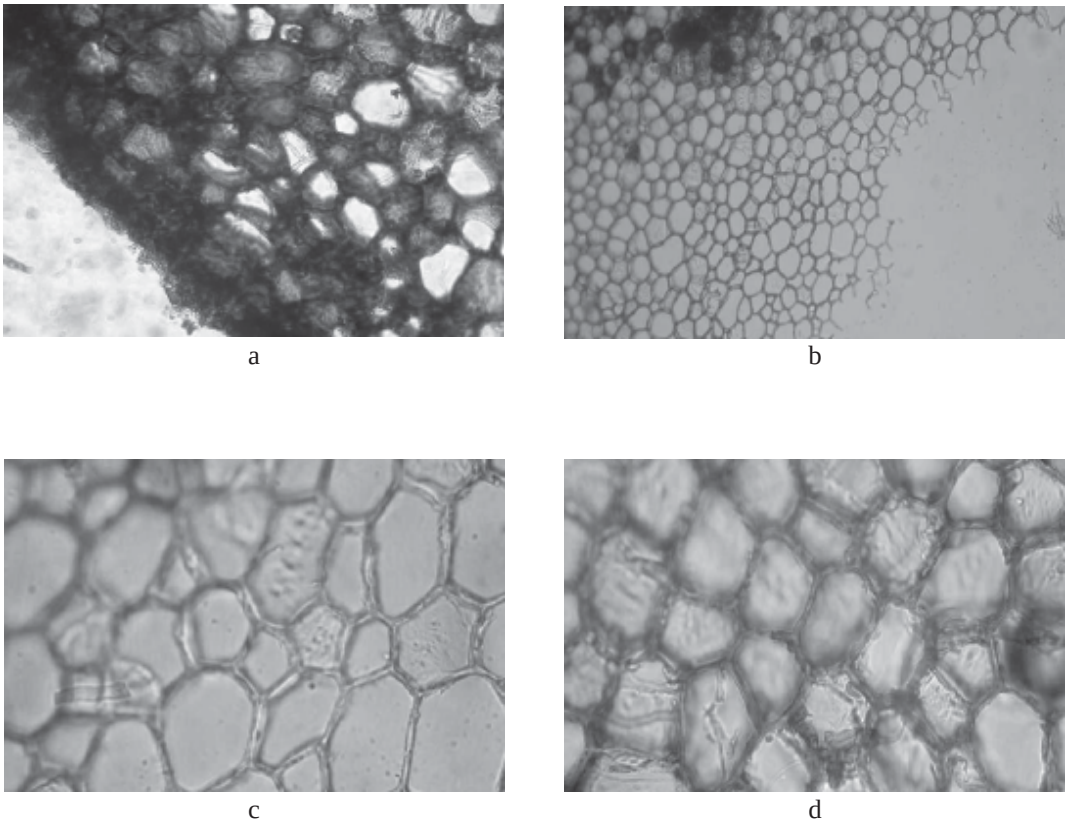
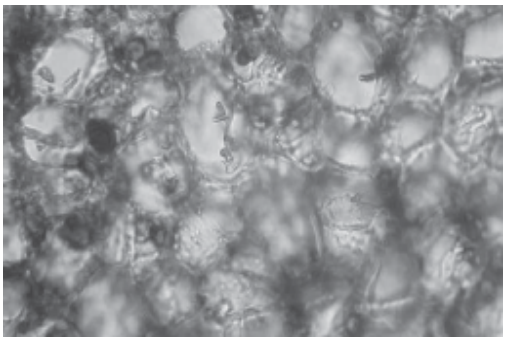
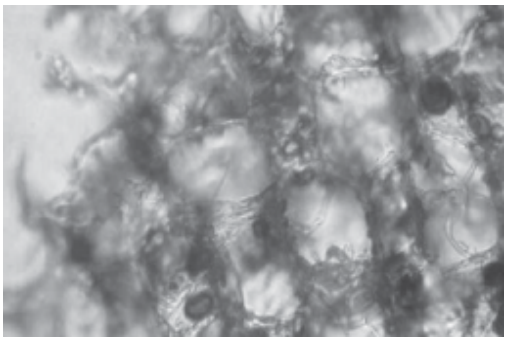


Fig. I a-d: *Bombax ceiba* thorn - Microscopy

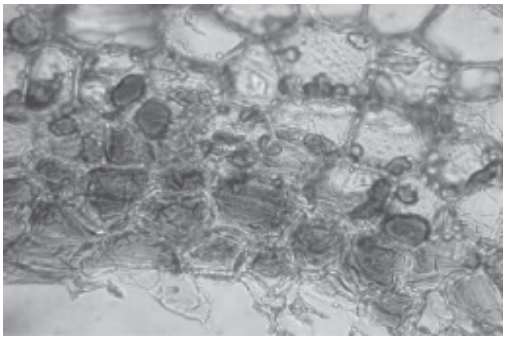
a TS of the thorn; **b** Thin walled parenchymatous layer (10x x 10x); **c** A portion enlarged (10x x 40x); **d** Thick walled cell layer



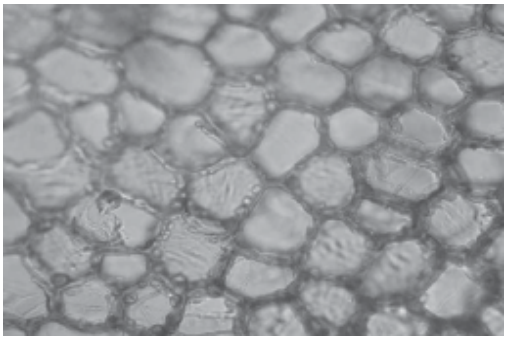
e



f



g



h

Fig. I e-h: *Bombax ceiba* thorn - Microscopy

e Cells showing tannin content; **f** Parenchymatous cells showing abundant reddish tannin content (10x x 40x); **h** Parenchymatous layer showing tannin content (10x x 40x); **h** A portion enlarged showing thick walled cells with tannin content and stone cells(10x x 40x)

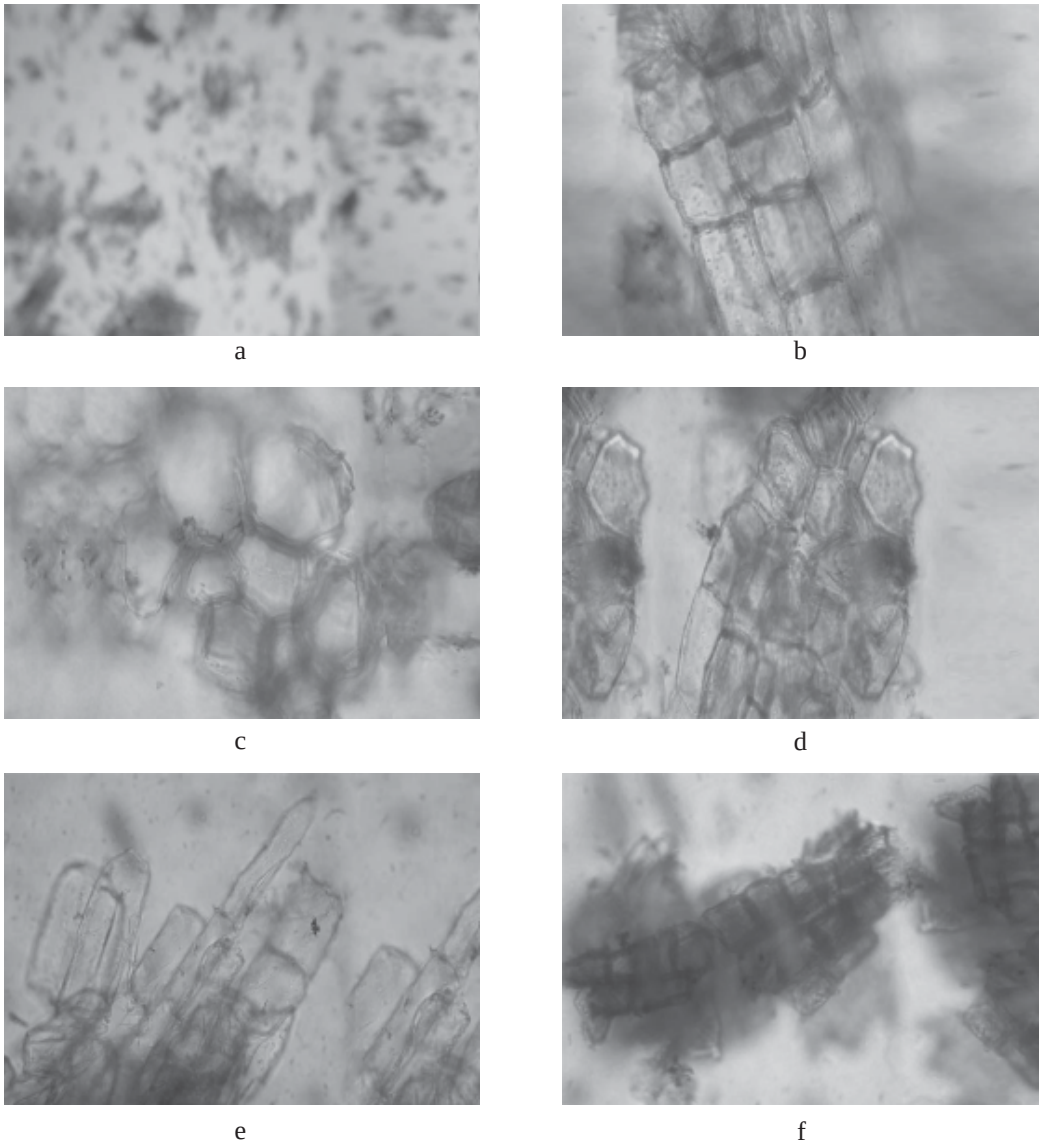


Fig. II. a-f : *Bombax ceiba* thorn - Macerate studies

a Abundant parenchymatous cells, thick walled cells tannin containing cells;
b Thinwalled parenchymatous cells (10x x 40x); **c** Groups of stone cells (10x x 40x);
d Thick walled cells and stone cells (10x x 40x);
e Parenchymatous cells (10x x 40x); **f** Parenchymatous cells with resin content (10x x 40x)

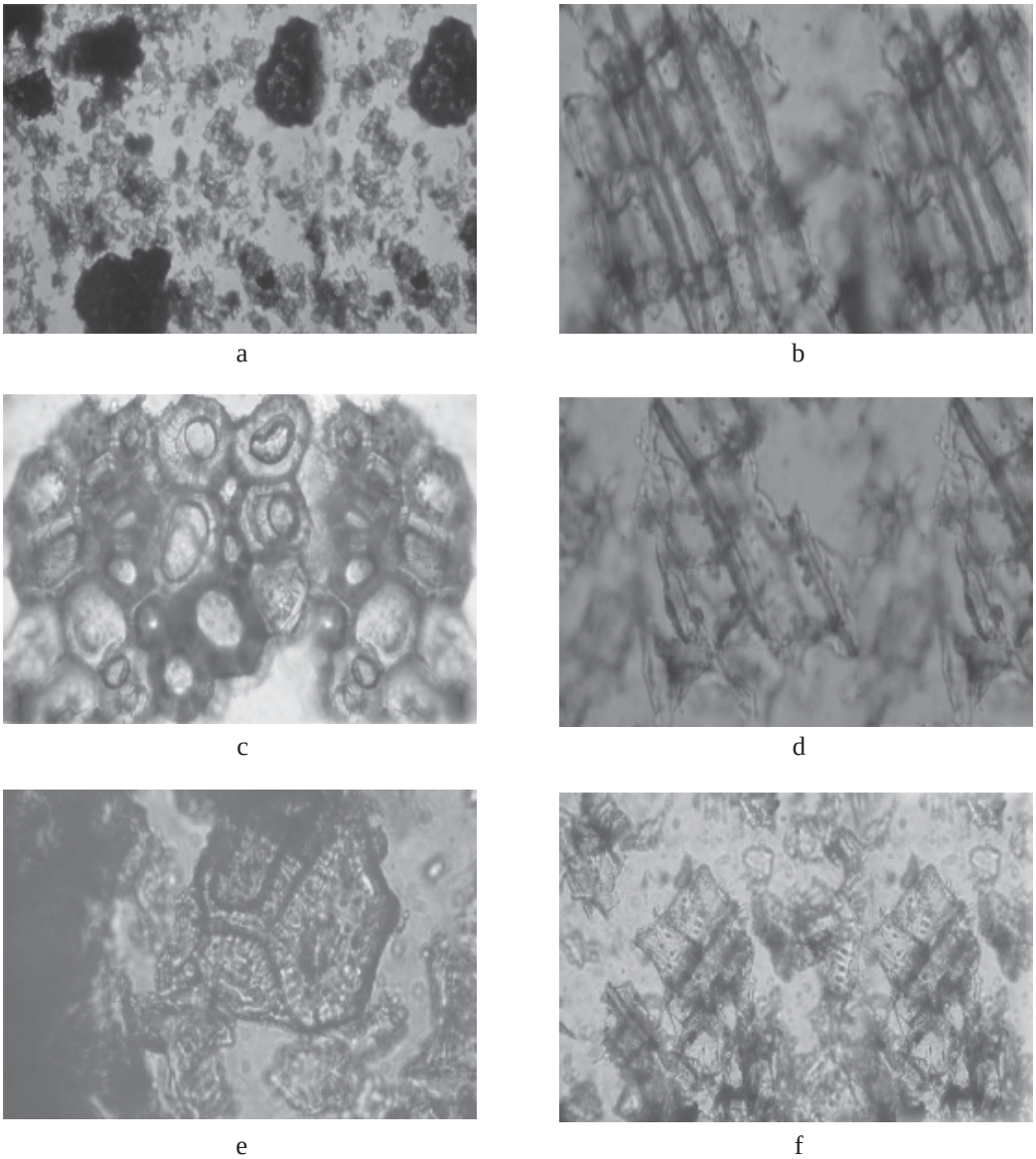


Fig. III. a-f : *Bombax ceiba* thorn - Powder microscopy

a Different fragments of tissues (10x x 10 x);
b Parenchyma cells; **c** Stone cells; **d** Parenchyma cells with tannin content;
e Stone cells; **f** Fragments of parenchyma cells

cells in cortex region, iii) single or groups of stone cells and simple rounded starch grains in ground tissue region, iv) abundant reddish brown tanniniferous content in all most all the cells and v) abundant reddish brown content of tannin in the form of globules/masses on the walls of the cells.

Physicochemical/ phytochemical studies:- Powder of the thorns was used for chemical analysis. Physico-chemical studies and preliminary phytochemical screening of the drug were carried out as per the methods and procedures in standard references (Table 1&2).

Fluorescence analysis: - The fluorescence behavior of the powdered drug in different solutions towards ordinary light and ultra violet light (both long and short wavelengths) were observed (Table 2).

TLC:- Thin Layer Chromatographic studies of the petroleum ether 60-80°C, chloroform and ethanol extracts were carried out in various solvent systems at 30°C using Silica gel 60 F_{254} pre-coated sheets as adsorbent (Table 3)

TABLE 3
TLC studies of śālmalīkaṇṭaka

Extractives	R_f values	
	U-V	Iodine
Petroleum ether (60-80°C)	0.32, 0.37, 0.50, 0.60.	0.18, 0.35, 0.48, 0.58, 0.70, 0.83
Chloroform	0.29, 0.34, 0.44, 0.54	0.14, 0.21, 0.34, 0.47, 0.56, 0.83
Ethanol	0.31	0.31

*Adsorbent - Silica gel 60 F_{254} pre-coated sheets;
Solvent system - Toluene:Ethyl acetate (93:7)

Discussion and conclusion

Pharmacognostical studies on the woody conical thorns of *Bombax ceiba* revealed the presence of abundant reddish brown tanniniferous content in ground tissue region in the form of globules/masses, and in some regions, continuous patches prominently, which is efficacious for skin disorders. TLC Studies also revealed the presence of a prominent spot in all the three extracts indicating the presence of reddish tannin content.

TABLE 2
Flurorescence analysis powdered drug

Sample + Reagent	OBSERVATION UNDER		
	Ordinary light	U-V long wave (365nm)	U-V short wave (254nm)
Powder as such	Brown	Greenish brown	Henna green
Powder + :			
- Water	Brown	Greenish brown	Henna green
- 50% HCl	Reddish brown	Dull brown	Henna green
- 4 N. NaOH	Coffee brown	Dull brown	Dark green
- 1N.NaOH in MeOH	Coffee brown	Dull brown	Dark green
- 50% KOH	Reddish brown	Greenish brown	Dark green
- 50% H_2SO_4	Bottle green	Dull brown	Henna green
- Con. H_2SO_4	Black	Greenish black	Black
- 50% HNO_3	Reddish brown	Brown	Dull green
- Con. HNO_3	Reddish brown	Brown	Dark green
- Acetic acid	Dark brown	Grey	Dull green
- Iodine water	Dark brown	Dull black	Dull green

TABLE 4
Contents of the extracts of śālmalīkaṇṭaka

Phytochemicals screened		Results
1.	Steroids	Negative
2.	Triterpenoids	Negative
3.	Flavonoids	Positive
4.	Tannins	Positive
5.	Sugar	Positive
6.	Saponins	Negative
7.	Alkaloids	Negative

Acknowledgements

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EFFECT OF SAMVARDHANA GHṚTA ON MOTOR DISABILITIES OF CEREBRAL PALSY

U. Shailaja and C.M. Jain*

Abstract: Cerebral palsy is an umbrella term encompassing a group of non-progressive disease that causes physical disability in human development. 40 patients of cerebral palsy were studied by randomly dividing them into 2 groups. One group was given mātrāvasti with Samvardhana ghṛta while the second group patients were administered Samvardhana ghṛta orally. The results of this study showed that mātrāvasti with Samvardhana ghṛta provided far better relief to the children of cerebral palsy in their gross and fine motor functions in comparison to when it was given orally.

Introduction

The term samvardhana is referred to in Kāśyapasamhita (Lehana chapter)[1] in the context of Samvardhana ghṛta, a medhya rasayana, which indicates growth and development of the child. Samvardhana vikāra include a wide range of developmental disorders related to mental, physical and social disabilities of hampering and crippling nature occurring during the course of samvardhana i.e. growth and development of child. Cerebral palsy is one among them. Therefore, cerebral palsy is considered as samvardhana vikāra.

'Cerebral' refers to the affected area of the brain i.e. cerebrum, and 'palsy' refers to disorder of posture and movement. Cerebral palsy is caused by damage to the motor control centers of the young developing brain and can occur during pregnancy (about 75%), during childbirth (about 5%) or after birth (about 15%) up to about age three. It is a non-progressive disorder, meaning the brain damage does not worsen and doesn't recover. Medical intervention is limited to the treatment and prevention of complications.

Nearly 15-20% of total physically handicapped children suffer from cerebral palsy and its prevalence among children is 2 per 1000 live births.[2] There are 25 lakhs of cerebral palsy children in India.[3]

Based on lakṣaṇas (symptoms), the chief doṣa involved in bālasamvardhana vikāra is identified as vāta, which produces this disease through madhyama mārga. Hence, this condition may be managed on the line of treatment of vātavikāra.

Samvardhana ghṛta is referred to in Kāśyapasamhita in the management of paṅgu (lame), mūka (dumb), aśruti (deaf) and jaḍata (mental retardation)[1], and all these features may also be present in the patients of cerebral palsy. Further, it is mentioned that the use of this ghṛta enables

*Dept. of Kaumarabhritya, SDM College of Ayurveda, Hassan, Karnataka 573 201

the suffering children to recover from these ailments very fast to perform their respective functions. Therefore, Samvardhana ghṛta was selected to evaluate its effect in the form of mātrāvasti and in oral route on the motor disabilities of cerebral palsy children.

Objectives: - To evaluate the effect of Samvardhana ghṛta administered orally as well as in the form of mātravasti in correcting the motor disabilities of cerebral palsy; and to compare the effects of both the groups to ascertain that which route of administration of Samvardhana ghṛta is better.

Materials and methods

40 patients of cerebral palsy (samvardhana vikāra) attended the Kaumarabhritya OPD and IPD of SDM College of Ayurveda, Hassan were registered for this study. The diagnostic criteria were based mainly on the signs and symptoms of the disease mentioned in the texts.

Inclusion criteria: - Patients of cerebral palsy between the age of 2 to 10 years; with mild to moderate physical disabilities.

Exclusion criteria: - Patients of cerebral palsy with severe physical disability; and suffering with other systemic diseases like hṛdroga and prameha.

Grouping: - 40 patients of cerebral palsy were randomly divided into two groups each comprising of 20 patients. Group A was treated with Samvardhana ghṛta administered orally in the dose of 5 ml twice a day with honey (taken in unequal quantity) as anupāna for 48 days. Group B were given mātravasti with Samvardhana ghṛta in the dose of 20 ml, once a day after taking breakfast. As per the procedure of vasti, these patients were subjected to sthānika abhyaṅga with mūrchita taila and sthānika svedana with nādīsveda, for 48 days.

Drug: - The trial drug was prepared as per Ghṛta kalpana[4]; it contained the following[1]:

Khadira	*Acacia catechu* - bark
Priśniparṇi	*Uraria picta* - root
Arjuna	*Terminalia arjuna* - bark
Saindhava	Rock salt
Bala	*Sida cordifolia* - root

TABLE 1
Effect of of Samvardhana ghṛta administered orally and as mātrāvasti on gross motor functions

Parameters	Mean Score		Change (%)	SD (±)	SE (±)	't'	P
	BT	AT					
I. Oral administration							
Crawling	2.20	1.50	31.8	0.80	0.179	3.90	<0.01
Sitting	1.80	1.00	55.6	0.89	0.20	4.00	<0.001
Standing	2.20	1.40	36.4	0.61	0.13	5.81	<0.001
Walking	2.60	1.70	34.6	0.30	0.60	13.6	<0.001
Claps hands	1.80	1.00	44.4	0.61	0.13	5.81	<0.001
II. Mātrāvasti							
Crawling	2.5	1.30	48.0	0.61	0.13	8.71	<0.001
Sitting	1.90	0.80	57.9	0.71	0.16	6.84	<0.001
Standing	2.10	0.80	61.9	0.47	0.10	12.36	<0.001
Walking	2.50	1.40	44.0	0.30	0.06	15.98	<0.001
Claps hands	2.05	0.75	63.4	0.70	0.10	12.36	<0.001

Atibala	*Abutilon indicum* - root
Kebuka	*Costus speciosus*
Kṣīra	Cow's milk
Ghṛta	Cow's ghee

Assessment criteria: - Evaluation of the effect of therapies was made on the gross and fine motor functions. Five parameters were adopted in the assessment of gross motor function viz. 1) crawls a distance of 5 ft or more, 2) sitting, 3) standing, 4) walk for minimum 5-10 steps and 5) claps hands.

- Not at all 3
- Can do with support 2
- Can do without support 1
- Can do independently 0

Five parameters were adopted in the assessment of fine motor functions i.e. 1) puts small object in to a container, 2) throws ball in any direction 3) uses thumb and index finger, 4) retains two one inch cubes in one hand for 30 seconds and 5) folds paper and insert in to envelope

- Not at all 2
- Does with help 1
- Does independently 0

Observations

Even though the incidence of cerebral palsy is not having any variation according to sex, the present study received maximum number was of male patients (72.5%). Majority of the patients of the study were falling between the age group of 2-4 yrs (65%) followed by 4-6 yrs (25%) and 8-10yrs (7.5%) and least in 6-8 yrs (2.5%). The parents of the maximum number of patients were belonging to middle socio-economic class (62.5%) followed by poor strata (25%) of the society. Only 25% of the patients were born with full maturity, while 70% of patients were born as premature babies.

The effect of the formulation administered orally as well as in the form of mātravasti found significant/highly significant in all the parameters of gross motor functions and fine motor functions (Tables 1&2).

TABLE 2
Effect of Samvardhana ghṛta administered orally and as mātrāvasti on fine motor functions

Parameters	Mean Score		Change (%)	SD (±)	SE (±)	't'	P
	BT	AT					
Oral administration:							
Puts small object in a container	1.7	0.7	58.9	-	-	-	-
Throws ball in all direction	1.7	1.05	38.2	0.48	0.10	5.94	<0.001
Uses thumb and index finger	1.9	1.25	34.2	0.81	0.18	3.17	<0.01
Retains 2 one inch cube	1.9	1.25	34.2	0.67	0.15	4.33	<0.001
Folds paper and inserts into envelope	1.8	0.6	66.7	0.76	0.17	6.98	<0.001
Mātrāvasti:							
Puts small object in a container	1.5	0.5	66.7	0.45	0.10	9.74	<0.001
Throws ball in all direction	1.5	0.6	60	0.71	0.16	5.6	<0.001
Uses thumb and index finger	1.6	0.5	68.8	0.55	0.123	8.9	<0.001
Retains 2 one inch cube	1.8	0.8	55.6	0.648	0.14	6.89	<0.001
Folds paper and inserts into envelope	1.8	1.1	38.9	0.65	0.146	4.75	<0.001

Discussion

Samvardhana vikāra mainly manifest in the form of vātavyādhi, for which vastikarma is the best treatment. Kaśyapa has mentioned oral administration of Samvardhana ghṛta for the management of samvardhana vikāra. It was found that the drug administered orally as well as in the form of mātrāvasti provided significant relief in all the parameters of gross motor functions and fine motor functions of the children suffering from cerebral palsy. However, comparison of the effects of the drug administered through both the routes showed that its administration as mātrāvasti provided comparatively better relief.

Vāta is explained as 'tantrayantradhara'[5] which explains the structural and functional integrity of the body governed by vāta. When vasti is administered, it may be helping to improve this integrity of the tantra and yantra by inherent action of vastikarma i.e. action at pakvāśaya and the therapeutic effect of Samvardhana ghṛta. Moreover, majority of the selected patients were 'paṅgu' (spastic diplegia) in which the sthānasamśraya of the vyadhi takes place in kaṭīsthāna.[6] Vasti may be acting in all the major vātasthāna from the pakvāśaya like kaṭi and sakti.

Most of the drugs contained in Samvardhana ghṛta are snigdha in guṇa, madhura in rasa and vipāka by virtue, which might have relieved the vitiation of vāta, thus provided significant relief to the patients. Further, almost all the drugs of this formulation are vātapittaghna and have bṛmhaṇa, medhya, hṛdya and śamana properties due to which this drug might have also alleviated vāta for the better prognosis.

Conclusion

- Samvardhana ghṛta administered orally as well as in the form of mātrāvasti provides significant relief in all the parameters of assessment of fine and gross motor functions of the children suffering from cerebral palsy.
- Samvardhana ghṛta administered as mātrā-vasti provides better relief in both the fine and gross motor functions of cerebral palsy children in comparison to when it is administered orally.

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EXPERIMENTAL EVALUATION OF HEPATOPROTECTIVE EFFECT OF KĀKAMĀCĪ (*SOLANUM NIGRUM* L.)

Sanjeev L. Athani* and A. Hari Krishna**

Abstract: Liver diseases are mainly caused by exposure to toxic chemical substances like antibiotics, carbon tetrachloride, chronic alcoholism, viral infections, etc. In spite of the tremendous advances made in modern medicine, no effective and safe hepato-protective medicines are available. In this context, an āyurvedic drug kākamācī (*Solanum nigrum* L.) was selected for the study on the basis of its wide usage in the treatment of kāmala. The drug is having the dīpana, pācana, sāraka and yakṛduttejaka properties. In this work, an attempt has been made to evaluate and to establish the hepatoprotective action of kākamāci and its efficacy as a single drug in the management of liver disorders.

Introduction

In India more than 87 medicinal plants are used in different combination in the preparation of 33–patented herbal formulations. Some of the plant constituents possessing hepato-protective activity are: Andrographolide (*Andrographis paniculata*), Silybin (*Sylibum marianum*), Picroside 1 & 2 (*Picrorrhiza kurroa*), Fumaric acid (*Sida cordifolia*), Catechin (*Anacardium occidentalis*) etc. Plants having liver protective property against toxic chemicals induced liver damage in experimental animals are *Azadiractha indica* A. Juss, *Andrographis paniculata* Nees, *Cichorium intybus* Linn, *Eclipta alba* Hassk, *Picrorrhiza kurroa* Royle ex Benth, *Swertia chirata* Buch-Ham, *Whitania somnifera* Dunal. etc[1]. Some of the poly herbal formulations verified for their anti hepato toxicity against toxic chemicals induced liver damage in experimental animals are: Liv-52, Liver cure, Livol, B.liv, Stmuliv, Hepex, Levomy, tefroli etc.

Development of hepato-protective drugs**: -** To treat liver disease of unknown causes or multiple causes, the combination of different herbs containing extracts or active fractions (purified compounds) with activities such as anti-hepato toxic, anti hepatitis viruses, choleretic and stimulation of hepatocyte regeneration has to be developed**.** The same treatment may not yield positive results in both severe and mild liver damages. In the case of severe liver damages most of the liver cells would have died or fibrotic changes would have occurred. Therefore, the formulations should contain in addition to the therapeutic agents, potent agents that can regenerate the liver by stimulating the surviving

** Shri J.G.C.H. Ayurveda Medical College, Ghataprabha*
*** Scientific In-charge of Animal House, A.L.N.R.M. Ayurveda Medical College, Koppa.*

cells to proliferate. Many antioxidants can protect from oxidative damages. However, these antioxidants, alone cannot serve as satisfactory drug to treat liver diseases and this has to be included in poly herbal formulations or multi drug therapy. The curative potentiality of poly herbal formulations containing scientifically validated plants/ extracts has to be tested again in the formulation form against severe and moderate liver diseases caused by diverse agents. The curative as well as preventive potentialities of the drugs have to be evaluated. Special formulations containing immuno suppressive herbs may have to be developed to treat auto-immunity included liver disorders[2]. Some important medicinal plants having anti-hepatotoxic activity are detailed in Table 1.

Materials and method

Selection of animals: - Albino rats were used as experimental model in this study. The reason for selecting albino rats is that the regeneration of liver after hepatic damage/partial hepatectomy almost completes within a week. The Sprague dawly type of albino rats, of either sex weighing between 150-200gm bred in animal house, were selected for the study. They were housed individually in polypropylene cages in well-ventilated rooms. The rats were kept under observation for seven days with standard laboratory diet. 30 animals were selected, which have been separated into 5 groups each with six animals.

Selection of hepatotoxic agent and hepatoguard: - Carbon tetrachloride is used as hepatotoxic agent in this study. Kākamācī leaf juice is selected as hepatogaurd

Method: - The experimental model suggested by Watanabe and Takita (1973) was adopted.

Drug administration: - The trial drug was given in the form of juice. The leaves of kākamācī, cleaned well in pure water, triturated in a kalva to small pieces and made into bolus; the bolus of kalka (kept in a clean cloth) was squeezed into a vessel and the juice collected.

TABLE 1
Some important medicinal plants having anti-hepatotoxic activity

Sl. No	Plant name	Scientific name	Part used	Formulation	Dose in animal
1.	Śarapuṅkha	*Tephrosia purpurea*	Leaf	Svarasa	1.5 ml
2.	Pippali	*Piper longum*	Fruit	Kaṣāya	2 ml
3.	Kāsani	*Cichorium intybus*	Seed	Hima	2.5 ml
4.	Punarnava	*Boerhaavia diffusa*	Root	Svarasa	2 ml
5.	Nirguṇdi	*Vitex negundo*	Leaf	Svarasa	2 ml
6.	Āmalaki	*Emblica officinalis*	Fruit	Kaṣāya	2.5 ml
7.	Nimba	*Azadirachta indica*	Bark	Kaṣāya	2.5 ml
8.	Saptaraṅgi	*Caesania esculenta*	Root	Kaṣāya	2.5 ml
9.	Nirguṇdi	*Vitex negundo*	Seed	Kaṣāya	2.5 ml
10.	Gudūci	*Tinospora cordifolia*	Stem	Kaṣāya	2.5 ml
11.	Dāruharidra	*Coscinium fenestratum*	Stem	Kaṣāya	2.5 ml
12.	Bimbi	*Coccinia grandis*	Leaf	Svarasa	2 ml
13.	Paṭola	*Trichosanthes lobata*	Plant	Kaṣāya	2.5 ml
14.	Pārijāta	*Nyctanthes arbor-tristis*	Leaf	Svarasa	2 ml

Dose determination: - 1) Carbon Tetrachloride: Carbon Tetrachloride (CCl_4) was given at the dose of 0.5ml/kg, intra peritoneal (i.p) for first five days to induce hepatotoxicity. 2) The juice of the trial drug: The human active dose of juice is half pala (24 ml) (according to Śārṅgadhara), which has been converted into rat dose i.e. 0.04 ml orally/day by using standard rat dose converting formula. (Human dose of svarasa is 24 ml/day - converted into rat dose by using the formula 0.018 ´ human dose x 5=rat dose/kg)

Procedure: - The animals were divided into five groups with 6 animals in each: i) Group-1 (Control/normal) - Distilled water was given orally from 1st day to 5th day to this group; ii) Group-2 (intoxicated control - liver damage) - In this group, Carbon tetrachloride (CCl_4) 0.5ml/kg i.p was administered for 5 days; iii) Group-3 (natural recovery) intoxicated control group. Here, animals were administered with CCl_4 0.5ml/kg i.p for 5 days. No drugs were administered for next 5 days; iv) Group-4 (curative group) treated with kākamācī. Animals were administered with CCl_4 0.5ml/kg i.p for 5 days followed by patra svarasa of kākamācī orally for 5 days in the dose of 4.32 / kg i.e. from 6th to 10th day; v) Group-5 (preventive group) treated with kākamācī. Here, 6 animals were treated with the kākamācī juice (4.32 mg/kg) along with CCl_4 (0.5 ml/kg) simultaneously. The effect of the extracts and the standard drug to prevent the development of liver damage with CCl_4 is tested in this model.

Biochemical parameters**: -** Blood samples were withdrawn on 6th day for 1st 2nd and 5th group and on 11th day for the remaining two groups (3rd and 4th) by intra-cardiac route to estimate the normal biochemical analysis i.e. to estimate enzyme levels viz. Alkaline phosphataes, SGOT/AST (Serum glutamic oxalacetate transaminase), SGPT/ALT (Serum glutamic pyruvate transaminase), Total serum bilirubin and Serum albumin. The serum enzyme activity was estimated by standard bio-chemical procedure using an auto-analyzer for all the groups.

Histo-pathological studies: - Animals were sacrificed on the day of withdrawal of blood from all the five groups and liver was isolated, sliced and washed with saline. Then it was preserved in 10% of formalin, for histopathological studies. Later the microscopic slides of the liver cells were photographed (Fig. Ia-e). Routine staining procedures using haematoxylin and eosin stain were done in the histopathological studies.

Result

The results were based on the bio-chemical values like Alkaline Phosphatase, Serum Glutamic Oxalacetate Transaminase (SGOT), Serum Glutamic, Pyruvate Transaminase (SGPT), Serum Total Bilirubin, Serum albumin and also Histopathological changes (microscopic)

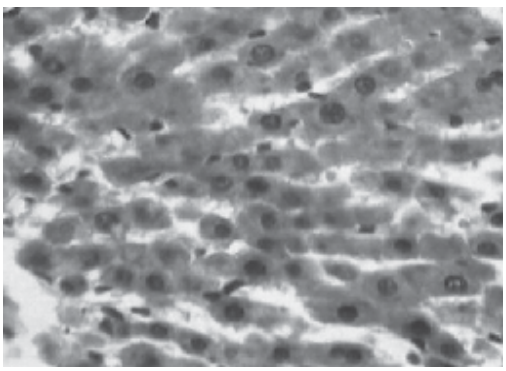
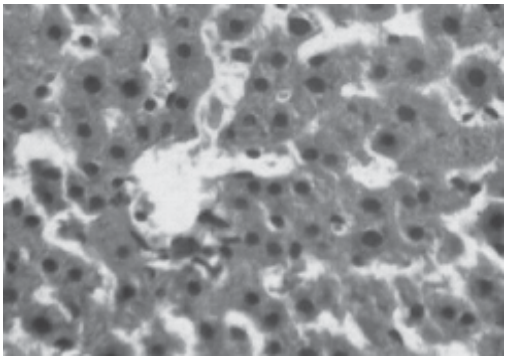


Fig. I a: Photo-micrograph of Liver (Preventive group-5) H&E Stain 40 X. treated with *Solanum nigrum* L. showing normal liver architecture with mild inflammation and congestion.



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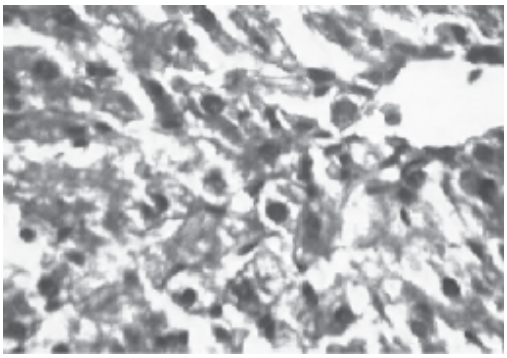

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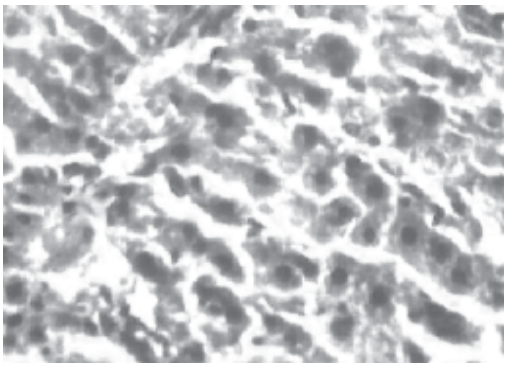

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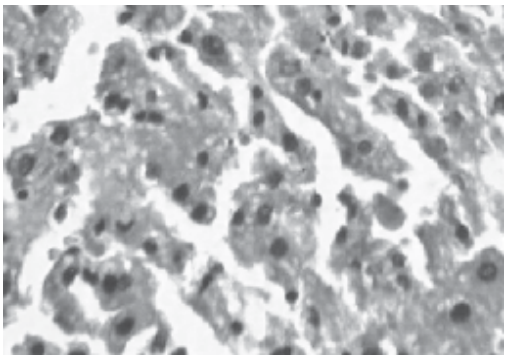

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Fig. I b-e: Photo-micrographs of liver

b Normal healthy liver (Group-1) H&E Stain 40 X; **c** Damaged liver with CCl_4 (Group-2) H&E Stain 40X showing severe necrosis, inflammation, congestion, bile duct proliferation, fatty changes with periportal necrosis; **d** Toxic control liver (Group-3) H&E Stain 40 X showing moderately necrosis, with mild edema; **e** Liver (Curative group-4) H&E Stain 40 X treated with *Solanum nigrum* L. showing normal liver architecture with mild inflammation.

present in the section of the liver sample of all animals (Table 2&3).

Conclusion

1. In present era, viruses, antibiotics, anabolic steroids, anti-inflammatory, chemotherapy and alcohol are the commonly responsible factors in the causation of hepatotoxicity. On the experiment study, the trial drug showed highly significant anti-hepatotoxic activity against CCl_4 induced hepatotoxicity on albino rats, which shows that this is very effective to reduce drug induced hepatotoxicity, causes from, anabolic steroids, anti-inflammatory, chemotherapeutics, alcohol in which similar hepatocellular damage occur. And these two trial drugs showed in this experiment anti-hepatotoxic property along with liver generation activity.
2. By comparing biochemical, histological and statistical analysis of all groups, the kākamācī showed significant therapeutic effect on hepatotoxicity. Among the two when it analysed statistically, the hypothesis of equal effective is rejected only for alkaline phosphate at 5% and accepted for the all other parameters at any level. But the observations reveal that the values are closer to the normal values for the kākamācī group than the other groups. Therefore on the basis of analysis it is concluded that kākamācī is more effective drug.
3. Effective formulations can be prepared by using this drug so that it can be used in various hepatic disorders. The efficacy of trial drug can be carried out for chronic hepatoxicity as this experimental study mainly concentrated on acute hepatotoxcicity only.

TABLE 2
Summary of bio-chemical values of each rat in each Group

Parameter / Group	Alk-p IU/Lt	SGOT IU/Lt	SGPT IU/Lt	T.B.* mg/dl	ALB* gm%
Group-I:					
- R1	100	70	29	0.34	2.58
- R2	108	76	32	0.37	2.69
- R3	95	65	28	0.42	2.72
- R4	105	68	34	0.32	2.37
- R5	102	73	35	0.28	3.3
- R6	117	71	27	0.30	4.7
Group-II:					
- R1	161	108	67	0.62	1.9
- R2	184	112	71	0.88	1.7
- R3	150	99	57	0.77	2.4
- R4	172	96	65	0.68	2.3
- R5	176	110	66	0.97	2.1
- R6	169	105	69	0.80	2.6
Group-III:					
- R1	159	96	66	0.68	1.9
- R2	152	100	72	0.80	1.6
- R3	173	107	60	0.70	2.6
- R4	165	109	65	0.68	2.2
- R5	163	99	69	0.96	2.0
- R6	156	105	60	0.86	2.5
Group-IV:					
- R1	107	77	36	0.39	3.6
- R2	113	80	40	0.46	3.4
- R3	122	79	38	0.42	3.8
- R4	126	82	45	0.42	4.0
- R5	190	83	46	0.49	4.2
- R6	115	86	39	0.50	3.9
Group-V:					
- R1	128	104	65	0.52	1.8
- R2	125	114	60	0.69	2.2
- R3	131	90	59	0.63	2.6
- R4	130	98	63	0.57	2.3
- R5	120	100	66	0.66	2.0
- R6	123	99	69	0.49	2.1

*TB - Total Bilirubin; ALB - Albumin

TABLE 3
Summary of bio-chemical values of all groups

Group	Drug and Dose	DT* (in days)	Bio-chemical parameters (mean & SD)				
			AP*	SGOT	SGPT	TB*	Albumin
G-1	Vehicle	1-5	112.83	72.67	30.833	0.338	3.06
		5.4056	3.834	3.311	0.50	0.351	
G-2	CCl_4 0.5 ml/kg	1-5	175.83	105	65.833	0.786	2.166
		4.0386	6.324	4.833	0.128	0.332	
G-3	CCl_4 0.5 ml/kg	1-56-10[1]	159.83	102.66	65.33	0.78	2.133
		4.5321	5.08	4.802	0.114	0.377	
G-4	CCl_4 0.5 ml/kg	1-5	117	81.16	40.66	0.446	3.816
	Kākamāci curative group 2ml/kg	6-10	4.4351	3.188	3.983	0.043	0.285
G-5	CCl_4 0.5 ml/kg	1-5	126.1	100.83	63.66	0.593	2.166
	Kākamāci preventive group 2ml /kg	1-5	5.6533	7.909	3.777	0.07	0.273

[1]No drug; * DT - Duration of treatment; AP - Alkaline phosphate; TB - Total Bilirubin

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CONCEPT OF SNEHAKALPANA
(A review on medicated oil and ghee preparations)

Rekha Chaturvedi and C. B. Jha*

Abstract: Medicated ghee and oils are broadly used for internal and external purposes. Almost all ayurvedic classics describe the fundamental principles of snehakalpana and its internal and external utility. In this paper all the details of snehakalpana have been compiled and presented systemically.

Introduction

Many preparations have been derived from plants, animals and minerals for the management of diseases. These derivatives are based on five basic plant preparations viz. juice, paste, decoction, cold and hot infusions. With the help of one or more of the five, many formulations have been derived such as vaṭika, guṭika, avaleha, āsava, ariṣṭa, ghṛta and taila. Each and every preparation has its own importance.

The word sneha denotes oily/fatty substances. Any material, which has an oily nature or contains oil either from vegetable or animal sources, is considered as sneha. Snehas get medicated with the contact of various solvents like water, fats, honey and alcohol. Soluble substances act with their pharmacological properties as a medicament.

The word kalpana denotes a process of preparation. This processing have a great role in the preservation of various properties of material. To preserve the properties of a plant material, derivatives have to be developed. In the snehakalpana process, materials are kept in contact with ghee or oil for certain periods. Necessary temperature is applied. Optimum fat-soluble contents of plants, animals and minerals get dissolved into it; thus ghee and oils get medicated. In this process, along with material, time and temperature play an important role to get desired quality and property.

Snehakalpana is a process where various things like decoction, paste, milk and perfuming substances are employed for preparation of oleaginous medicaments.

Sources of fat substances: - Snehas are obtained from two sources: 1) plant (sthāvara) and 2) animal (jaṅgama); these are known as source (yoni) of sneha. Caraka describes 18 types of plants that are considered as snehāśaya (sources of oil). Fish, quadruped animals and birds comes under the animal source (jaṅgama yoni). Curd, milk, ghee, meat, muscle fat and marrow are used as oleating (snehana) substances.

Deptt. of Rasa Shastra, Institute of Medical Sciences, Banaras Hindu University, Varanasi - 221005 (UP)

Types of sneha

Snehas are classified according to their action, dose, pāka (cooking), use and combination (Table 1).

General method of preparation: - One part of kalka, 4 parts of oil and 16 parts of dravadravyas are to be mixed and boiled on mandāgni till only oil part remains and then filtered and stored.

Advantages

Extracting the fat soluble active principles of plants and minerals, obtaining extra benefits of specific oil/ghee used, preserving the drug for a longer time and to enhancing and hastening the absorption of drugs when used topically in fatty medias - all these are the advantages of snehakalpana.

Ghṛta (ghee), taila (oil), vasa (muscle fat) and majja (marrow), are said to be best snehadravyas. Of them, ghee is the best because of its power to assimilate effectively the properties of other substances[1].

Ghṛta: - It is obtained from the class mammalian of the animal-kingdom especially cow, she-buffalo, goat and sheep. Āyurveda recommends ghee as the best choice for both food and medicinal purposes. In the āyurvedic terminology, 10 years' old ghee is known as purāṇa ghṛta, 111 years' old as kumbhasarpi and of beyond that as mahāsarpi. Ghee alleviates pitta and vāta. It is beneficial for rasa, semen and ojas. It is cooling, softening and improves voice and complexion[2].

Taila**:** - Taila means oily portion extracted from the drugs. Among oils, tila taila is the best for strength and unction. It is best amongst the drugs that pacify vāta[3]. Taila alleviates vāta and does not aggravate kapha. It promotes bodily strength, is beneficial for the skin. It is hot in potency, provides firmness and cleans female genital passage[4].

Vasa**:** - It is prescribed for the treatment of injury, fracture, trauma, prolapse of uterus, earache and headache. It is also useful for enhancing virility and for those who practice physical exercise.

Majja**:** - It enhances strength, śukra, rasadhātu, kapha, medodhātu and majja. It adds the physical strength especially of bones.

TABLE 1
Classification of sneha based on action, dose, cooking, use and combination

Action	Dose	Pāka	Use		Combination
			External	Internal	
Śodhana Śamana Bṛmhana	Hrasīyasi Hrasva Madhya Uttama	Mṛdu Madhya Khara	Abhayṅga Lepa Mardana Udvartana	Bhoja Pāna Nasya Vasti Samvahana Pādaghāta Murdhataila Gaṇḍūṣa Karṇapūraṇa Akṣitarpaṇa Pariṣeka Picu	Yamakasneha Trivṛtasneha Mahāsneha

Anupāna

Anupānas (additives) for sneha are: i) hot water for ghṛta, ii) yūṣa for taila and iii) maṇḍa for vasa and majja.

Seasonal indication

Different types of unctuous substances are indicated according to seasons i.e. i) ghee in śarada (autumn), ii) vasa and majja in vaiśākha (winter) and iii) oil in prāvṛta (rainy season)

Media of administration

Odana (rice), vilepi (gruel), meat soup, meat, milk, curd, gruel, pulse, vegetable soup, kamblik (soup prepared with curd water and mudga pulse) khada (prepared with curd milk and pulses), roasted grain flour, paste of sesamum and wine are the media of internal administration; and massage, enema, vaginal and urethral douche, gargle, ear oil, snuffing, nasal and eye-oleation are external.

Mūrcchana

It is a process adopted for enhancing the potency of ghee or oil to remove their bad odour and āmadoṣa[5]. By mūrcchana, sneha gets the potentiality to receive more active principles. Research shows that mūrcchana decreases the acid value and increases saponification value (of a ghee/oil). Reduced acid value indicates less percentage of free fatty acids and increased saponification value indicates higher content of low molecular weight fatty acids. Medicated ghee/oil preparations containing low molecular fatty acids are absorbed fast[6].

While doing snehamūrcchana, some specifications are to be followed such as i) it should be done on mandāgni (low fire) and ii) plant materials should be taken in coarse powder-form and make them wet or grind well to form a paste before adding into oil.

Drugs and decoction

Drugs used for snehakalpana can be divided into four parts: i) dravadravyas (decoction/juice/ water/ milk), ii) kalkadravyas (paste of drugs), iii) snehadravyas (oil /ghṛta) and iv) gandhadravyas (fragrant material).

Other dravadravyas: - Kṣīra, dadhi, takra, kañji, dhānyāmḷa, lākṣārasa, māmsarasa, etc. are also used as dravadravya. Milk should be taken in equal quantity to kaṣāya and curd in equal quantity to sneha. If the total number of dravadravyas is up to 4, each should be taken 4 times to sneha, if more than 4, then each should be taken in equal quantity to sneha.

Kalka: - By pounding the drugs with juice or any other liquid into a soft bolus or round lump-form is known as kalka. According to general principle, the quantity of the paste to be added is ¼th part with respect to the quantity of sneha. If sneha is to be prepared with only water/ decoction, meat juice and fresh juice of herbs, then the quantity of kalka should be one fourth, one sixth and one eighteenth times of the liquid respectively. If sneha is to be prepared with milk, curd, juice or buttermilk then the quantity of kalka should be added in one-eighth part to liquids. When puṣpakalka is to be added, its amount is one eighth of the quantity of sneha. In case a formula provides information about kvātha and not about kalka, then the same kvāthadravyas are to be added as kalka.

Snehadravyas:- Of the sthāvara sneha, tila taila is considered as the best and in jaṅgama sources, it is cow's ghee. These substances for the purpose of sneha preparation should be pure and free from rancidity. These sneha dravyas should be taken four times to the amount of kalkadravyas.

Gandhadravyas: - For perfuming the oils, many drugs like karpūra, candana, kastūri, kesara, dalcini, lavaṅga, etc. are used. They are generally taken in the quantity of one-eighth or sixteenth part of the oil, and made into fine powder and mixed with oil when the oil is lukewarm.

Snehapāka

Vessel used: - Wide mouthed and shallow tin coated copper vessel or iron pan or earthen vessel.

Agni: - Mṛdu (mild) or madhyamāgni (moderate) only.

Duration: - The preparation of medicated oils and ghṛta should not be complete within a day to increase absorption of fat soluble constituents of the drugs; thereby the potency of the sneha is enhanced. Pāka period depends on the nature of the liquid substances added to oil; it is 12 days for kvātha prepared with mūla (root) and vaḷḷi (creeper), 5 days for āranāḷa and takra, 3 days for svarasa, 2 days for dugdha and 1 day for vrīhidhānya and māmsarasa and kvātha. According to Hārīta, tailapāka is in 15 days and ghṛtapaka 7 days.

Types: - Āyurvedic classics mention different types of snehapākas (Table 2): 1) In āmapāka, sneha will not have any potency; it will be heavy for digestion and causes indigestion, 2) in mṛdupāka, sneha will have little quantity of moisture and produces crackling sound when kept on fire, 3) in madhyamapāka, sneha will be soft, devoid of moisture and kalka can be made into varti with fingers, 4) in kharapaka, kalka becomes hard and rough due to excess of heating, 5) in dagdhapaka, sneha will have hard and brittle kalka, and may cause burning sensation and have no therapeutic use, 6) viśeṣapaka is referred to in Hāritasamhita. It succeeds kharapaka and has no use.

Pātra or gandha pākas:- Pātrapāka is a process by which the sneha is flavoured or augmented by certain miscible substances. The fine powder form of the drugs is placed in a vessel into which the sneha is filtered and mixed well when it is in lukewarm state. These drugs are generally taken as one-sixteenth part of the sneha and all the drugs should be taken in equal quantity. Usually the following substances are used to give fragrance: Ela, gandhābiroja, tvak, lavaṅga, tamālapatra, uśīra, kesara, kastūri, śaileya, musta, kuṣtha and kaṅkola. For 4 sers* of the taila, one tola of each of the ingredients should be taken with the exception of the karpūra which should be 4 tolas. Most of the time gandhapāka-vidhi is mentioned for tailakalpana rather than ghṛtakalpana, because the tailas are extensively used for external application.

Sūryapāka (ādityapāka):- It is a specific pāka of sneha where taila is heated to low temperature by exposure to sun light for a specific time. This method is commonly used to prepare tailapāka of the drugs that have volatile property and are sensitive in nature; e.g. i) Sūryapāka kāśiśādi taila[8] and ii) Kuṭajapatra taila.

Snehasiddhalakṣaṇas: - 1) Kalka becomes wick-like when rolled between two fingers. There should not be any crackling sound when kalka is sprinkled on fire and will not stick to fingers[9]. Foam is observed when tailapaka completes and it subsides in ghṛtapāka. Specific colour, odour and taste of the ingredients become marked, 2) taila assimilates the properties dugdha, āranāḷa, dadhi, etc., which are added in it and becomes free from moisture, niṣphena (free from froth) and vimala (clear)[7] .

Sneha āvartana**:** - The process of snehapāka when repeatedly done for two or more times to

* 1 Ser = 8 palam (384g); 1 tola = 12g

achieve better therapeutic efficacy, is known as āvartana. As per the repetition of āvartana, it is known as daśāvartita, śatāvartita and sahasrāvartita.

Mātra of sneha:- i) General dose - 1 pala; ii) uttamamātra - 1 pala, iii) madhayamamātra - 3 tola (approx 36g) and iv) hīnamātra - 2 tola (approx. 24g).

Expiry of potency: - Four month or sixteen months (loss is in the qualities that are caused due to rancidity, loss of potency of drugs, etc.).

Standardisation of oil/ghee: - Following are the analytical specification of taila/ghee

- Description - colour and odour
- Rancidity
- Weight
- Refractive Index
- Viscosity
- Saponification value
- Iodine value
- Acid value
- Peroxide value
- Free fatty acids
- Shelf life
- Total fatty acids
- GLC/TLC/HPTLC with marker wherever available

Among the above, the viscosity, saponification value, iodine value and acid value are important to analyse the adulteration, and the GLC, Saponification value, iodine value, acid value are important to analyse the shelf life.

Identification test: - Ghee may be adulterated by addition of insoluble non volatile fatty acids. This can be tested by finding out the Polanski number (number of milliliters of 0.1n KOH required to neutralise the insoluble fatty acids,

TABLE 2
Uses of different snehapākas as mentioned in āyurvedic classics

Text	Different pakas with respect to their internal/external use				
	āma	Mṛdu/manda	Madhya/cikkana	Khara	Dagdha
Carakasamhita	-	Nasya	Pāna, Vasti	Abhyaṅga	-
Suśrutasamhita	-	Pāna	Nasya, Abhyaṅga	Vasti, Karṇapūraṇa	-
Aṣṭāṅgahṛdaya	No therapeutic use	Nasya	Pāna, vasti	Abhyaṅga	No therapeutic use
Gadanigraha	”	”	”	Abhyaṅga	”
Vaṅgasena	”	”	”	Abhyaṅga	”
Śārṅgadharasamhita	”	”	Bāhya Ābhyantara	Abhyaṅga	No therapeutic use
Bhāvaprakaśa	”	”	”	”	”
Bhaiṣajyaratnāvali	”	”	”	”	”
Yogataraṅgini	”	”	”	”	”
Hāritasamhita	”	-	Vasti, ābhyantara prayoga	”	-

non volatile with steam distillation, obtained from 5g of fat).

Modern review

Tailas in the form of medicine are used internally and externally since ages. Oil can be classified as: i) lipids or fixed oils (vegetable and animal fats and oils) and ii) essential oils and mineral oils.

Fixed oils: - Fixed oil is generally esters of fatty acids with glycerol including some fat soluble, water insoluble substances and grouped under the term lipids. Most of the fixed oils are of vegetable origin found in the seeds of plants occurring in the cells as drops or crystals (e.g. Castor oil, Almond oil, Oil of theobroma) and some are of animal origin (e.g. Cod liver, haulibut liver oil, Butter).

Nature of the fixed oils: - These are mixtures of Olein, Palmitin and Stearin with a small amount of other bodies in addition. They are insoluble in water, sparingly soluble in alcohol, freely in other, chloroform benzol, carbon di sulphide and turpentine. With alkalies they form soap and glycerin. Fats are fixed oil which remain solid at ordinary temperature, but differs from oil in the relative proportion of these basal ingredients; fats having more of the Stearin and Palmitin and oils more of the liquid Olein.

Chemical use: - It is limited to preparation of ointments or medicated creams where oil is mixed with warees (esters of monohydric alcohols and fatty acids of high molecular weight). Wax forms paste of the ointment; lipid soluble substances of the ointment are incorporated either by trituration or dissolved by application of gentle heat. The conventional medical practitioners use oils as demulcent and emollients as protective covering on injured surfaces. As regards to volatile oils these being readily soluble in body fluids and because of ready penetrating power through the dermal layer, can exert systemic action which make them effective counter irritant and anti inflammatory agents. Some of these act on carminatives on internal use.

Volatile oils: - The volatile are in steam. These oils are generally present in free-state in different parts of the plants. These are frequently associated with other substances such as gums and resins and tend to be rancid on exposure to air. The uses are: i) essential oils are mildly irritant, hence find important application as counter irritant to allay inflammation and pain, ii) therapeutic action (e.g. oil of eucalyptus), iii) flavouring (e.g. oil of lemon) and iv) cosmetics (e.g. oil of rose)

Ghṛta: - Ghṛta is obtained especially from cow, she-buffalo, goat, sheep and camel; medicated milk-fat or butter fat is known as ghṛta. It is prepared by heating butter to just over 100°C to remove water content by evaporation. The colour of ghṛta is yellow to white depending upon the carotene content. Ghṛta contains approximately 8% lower saturated fatty acids which make it easily digestible, and Vitamins A, D, E, and K. Vitamins A and E are anti oxidant. Vitamin A keeps epithelial tissue of the body intact keeps the outer lining of the eyeball moist and prevents blindness. It also contains 4-5% linoleic acid, an essential fatty acid, which promotes proper growth of human body. During preparation of ghee, protein Casein is removed as it elevates cholesterol. Ghṛta resists spoilage by micro-organisms or chemical action. The melting point of ghee is 35° C. Its digestibility co-efficient or rate of absorption is 96% which is highest of all oils and fats. Lipophilic action

of ghee facilitates transportation to a target organ and final delivery inside the cell, because cell membrane also contains lipids.

Many researches have been conducted to standardise the snehakalpana:

1. Dr. H. C. Tiwari *et al* (1980) has tried to prepare Piṇḍataila by various methods and found that: Mūrcchana reduces acid value, saponification value and iodine value of tila taila, whereas in castor oil, saponification value and iodine value decreased and acid value increased. Piṇḍataila, prepared by tila taila showed higher acid value, saponification value, and iodine value as compared to the crude or mūrcchita oil used as basis. Tailas prepared by castor oil showed less iodine value although acid value and saponification value were increased.

   Mūrcchana caused a slight degree of saturation of the oils but the amount of free fatty acids increased in castor oil and decreased in tilataila. Piṇḍataila was tried for anti-inflammatory and analgesic action, and was found effective but statistically did not show any significant response. It gave minor relief in pain and improvement in stiffness of joints.

2. Dr. K. Shankar *et al* (1991) studied Kṣīrbala taila as par the reference of Sahasrayogam (Tailādhikar page 75). It was observed that temperature variation causes differences in acid value, saponification value, easter value and iodine value suggestive of the fact that rancidity, easterification as well as saturation of the oil is moderately effected even by a variation in the duration of heating.

   TLC study did not shown any difference between mṛdu, madhya and kharapāka.The visible and ultraviolet spectral studies also did not show any difference in mṛdu, madhya and kharapaka. Clinically, Kṣīrabala taila used by vasti and massage improves muscle power, tone and wasting.

Conclusion

Medicated ghee and oils are frequently used in āyurvedic therapeutics since vedic period. In Samhita period more systematic description about snehas and its use are mentioned. In Śāraṅgdharasamhita, more methodical way of sneha preparation has been mentioned. Sneha-kalpana is a way of preservation of medicinal properties in snehas particularly properties of plant and animal material. Its shelf-life period is more then a year. Snehana is an essential pre process of śodhana therapy under pañcakarma. Hence the importance of medicated ghee and oils can be understood.

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   sarvsnehottamā matā: ।
   eṣu cevottamam sarpi:
   samskārasyānuvartanāt ।।
2. Ghṛtam pittānilaharam
   rasaśukraujasām hitam ।
   nirvāpaṇam mṛdukaram
   svaravarṇa prasādanam ।।
3. Sarveṣām tailajātānām
   tiltailam viśiṣyate ।
   balārthe snehane cāgrya-
   meraṇḍam tu virecane ।।
4. Mārutaghnam na ca ślṣma-
   vardhanam balvardhanam ।
   tvacyamuṣṇam sthirakaram
   tailam yoniviśodhanam ।।
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EFFICACY OF VACĀDI CŪRṆA IN OBESITY - A CLINICAL STUDY

Meenakshi Shukla*, Shekhar Singh Rathore** and Asutosh Tiwari*

Abstract: The prevalence of overweight and obesity is increasing worldwide at an alarming rate. It shortens the lifespan and causes major and minor disorders. This study was done to evaluate the efficacy of Kalpitayoga Vacādi cūrṇa on obesity with special reference to vyādhiviparīta cikitsā siddhānt. The study showed good effect of the trial drug to counteract the samprāpti (pathogenesis) of medoroga (obesity) to reduce its related complications.

Introduction

Obesity is a common medical and social problem which has acquired global dimensions. Its incidence is gradually increasing very fast. Environmental, behavioural and unwholesome food habits are the major cause of obesity. Modernisation and urbanisation of society is another major problem. Contrary to the common belief, it is not a disease of modern era but has been described two thousand years ago by Caraka (Carakasamhita, Sūtrasthānam 21).

The main causative factor of sthaulya (obesity) are: excessive intake of food, change in dietary habits, less energy expenditure, psychological factors like stress, depression, indulgence and genetic predisposition. It can be regarded as - 1. Overweight (B.M.I. - more than 25 but less than 30), 2. Obesity (B.M.I. - more than 30) and 3. Morbid obesity (B.M.I. - More than 40). There are a number of factors that influence body fat:

1. Age: - Most prevalent in middle age. After the age of 30, lean body mass starts to decline with the specific action of growth hormone and is replaced by fatty mass. In lean young men, usually body fat is less than 20% which, later, may rise to >25%; and in young women body fat may be less than 30% which may rise to >35%.
2. Sex: - Women are more prone to obesity. Young adult women's body contains fat approximately 15% of body weight. Moreover puberty, pregnancy, menopause and cyclic hormonal changes attribute towards obesity in females.
3. Race: - Certain races are more prone to become fatty, e.g., Dutch, South Germans, South Italians, Hebrews, Indian and Some African races.
4. Other factors: - Environment, subordinate factors of hereditary, urbanisation, etc. cause obesity.

*Dept. of Basic Principles, NIA, Jaipur-302002; ** Rajiv Gandhi Ayurvedic College, Bhopal

Disease review

In āyurvedic classics, sthaulya (obesity) is the condition where tīkṣnāgni (excessive digestive fire) is found along with medodhātvāgnimāndya (lessened fat tissue fire). Incompatibility between the above two main levels of agni is suggestive of gravity of obesity. Whereas, kapha is the main doṣa and meda (fat tissue) is the main dūṣya. Due to obstruction of śrotas (micro channels) by meda, the vāta in āmāśaya (stomach) gets aggravated and it increases agni (digestive fire) consequently. This agni rapidly digests food and the person frequently becomes hungry. This overfeeding does not nourish the entire body; only medodhātu (fat-tissue) of inferior quality is formed in excess and further dhātus (tissues) are not nourished equally as compared to medodhātu, and subsequently obesity results.

The causative factors of obesity are:

- Exogenous - Overfeeding and dietary habit.
- Endogenous - Endocrine factors.
- Iatrogenic - Contraceptive pills, Tricyclic antidepressants, Glucocorticoids, Medroxy progesterone, Cyproheptadine phenothiazines.
- Miscellaneous - Age, sex, occupation, socio-economic status, environmental factors, psychogenic factors.

Aims and objectives

- To evaluate the effect of śodhana, dīpana and lekhana karmas of Vacādi cūrṇa in obesity;
- Effect of dietary recommendation and exercise in obesity.

Materials and methods

Clinically diagnosed patients were selected from the O.P.D. of N.I.A, Jaipur. Two groups with equal number of patients were made. Group A

TABLE 1
Relief in sign and symptoms before and after treatment

Sl. No	Symptoms	Group A (10)			Group B (10)		
		AT	BT	Relief %	AT	BT	Relief %
01	Aṅgacalatva	28	18	35.71	29	14	51.72
02	Abhyavaharaṇa śakti	25	15	40.00	28	12	57.10
03	Kṣudraśvāsa	27	13	51.85	29	11	62.00
04	Gātrasāda	24	18	25.00	25	12	52.00
05	Daurgandhya	20	09	55.00	18	06	66.66
06	Svedādhikya	21	10	52.38	28	11	60.70
07	Atipipāsa	21	11	47.61	27	11	59.20
08	Snigdhāṅgata	14	09	35.70	21	09	52.30
09	Daurbalya	25	18	28.00	22	10	54.54
10	Ālasya	06	04	33.33	16	07	56.25
11	Nidrādhikya	24	19	20.80	21	14	33.33
12	Karapādadāha	13	19	17.40	17	13	23.52
	Total			53.13			75.51

was given only Vacādi cūrṇa and Group B Vacādi cūrṇa with some diet correction along with half an hour of regular exercise.

Inclusion criteria

- Age 16 to 60
- Both sex
- Standard hight- weight chart
- Body Mass Index (B.M.I.)

Exclusion criteria

- Hypothyroidism
- Long term steroid therapy
- Severe hypertension
- Diabetic patient
- Renal, hepatic and cardiac patients

Drug administration

Vacādi cūrṇa, i.e. vaca, triphala, kaṭukā, pañca-kola and miśreya (all in equal quantity) made into powder-form, was administered with lukewarm water before meal in the dose of 2 - 5g (BD) for 30 days.

Assessment criteria

Assessment of the therapy was done on the basis of relief in the sign and symptoms as well as objective criteria weight, B.M.I., Body circumference and Biochemical parameters (Table 1).

Observation

In both the groups, the effect on weight, BMI,

TABLE 2
Effect on weight, B.M.I., hip/waist circumferences, etc

Effect on various parameters	Mean Score		% Relief	Mean	SD +	SE +	t	P
	B.T.	A.T.						
1. Weight (in kg)								
Group A	78.9	77.0	2.41	1.9	2.33	0.74	2.56	< 0.002*
Group B	77.2	74.1	4.01	3.1	1.34	0.42	7.4	< 0.001**
2. B.M.I.								
Group A	30.06	29.28	2.29	0.78	0.68	0.21	3.7	< 0.001**
Group B	30.26	29.06	3.95	1.19	0.54	0.17	7	< 0.001**
3. Hip circumference (in cm.)								
Group A	102.9	107.5	1.36	0.7	0.67	0.21	3.3	< 0.001*
Group B	108.3	106.7	1.48	1.6	1.63	0.52	3	< 0.010**
4. Waist circumference (in cm.)								
Group A	105.4	104.6	2.08	0.8	0.63	0.2	4	< 0.001**
Group B	102.5	99.3	3.12	3.2	1.03	0.34	9.4	< 0.001**
5. Serum cholesterol (mg%)								
Group A	165.9	158.6	4.51	4.7	1.16	0.37	12.7	< 0.001**
Group B	183.7	173.7	5.43	16	2.3	0.72	13.8	< 0.001**
6. Serum Triglycerride (mg%)								
Group A	122.5	117.7	3.91	4.8	1.14	0.36	13.3	< 0.001**
Group B	134.4	125.2	6.91	9.3	3.2	1.01	9.2	< 0.001**

* Statistically significant; ** Highly significant

hip/waist circumferences, serum cholesterol and serum triglyceride was observed significant/ highly significant (Table 2).

Discussion

• Vaca, one of the main ingredients in Vacādi cūrṇa, is referred to in Carakasamhita as one of the impor-tant drug in Lekhanīya mahākaṣāya.

• The drug lessens kapha-vāta duṣṭi, corrects medo-dhātvāgni-māndya and digests āmadoṣa. Moreover it removes the obstruction in the path of vāta and reliefs the symptoms of obesity.

• As fat is 1.5 times heavier than lean body mass, reduction in body weight, B.M.I., hip/ waist circumferences and skin fold thickness depends on proportion of fat. The drug corrects medo-dhātvāgni-māndya and checks the process of medo-vṛddhi (increased fat proportion). It exercises by its lekhana karma (scraping property) on the principle of 'harṣa-hetur viśeṣaca'. Being karma-viruddha (opposite action) it reduces medas effectively when applied along with oral medication and hence provided better results in Group B.

Conclusion

There is involvement of all the three doṣas in sthaulya (obesity), but vitiation of kapha-vāta and meda is of prime importance. Sedentary life style, lack of exercise, faulty dietary habits, urbanisation, genetic predisposition, etc. precipitate the disease. Vacādi cūrṇa along with exercise and diet restriction reduces the obesity and its related complications.

This study was carried out in a small sample for better exploration. It is proposed that extended clinical studies of Vacādi cūrṇa should be pursued on larger scale to get more accurate conclusion.

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PREPARATION OF LAUHABHASMA - STANDARD OPERATING PROCEDURES

P. K. Sarkar, P. K. Prajapati and A. K. Choudhary*

Abstract: It is the need of time to develop standard operating procedures (SOP) of manufacturing process of āyurvedic medicines. There are no standard formats of standard operating procedures for manufacturing metallic and mineral preparations. Here, an attempt has been made to introduce standard operating procedures for the preparation of Lauhabhasma.

Introduction

Setting up of standard operating procedures for preparation of āyurvedic medicines is the need of time. The standard operating procedures have to be followed from the selection of raw materials to the final product. There should be a standard method of preparation, that can be followed uniformly, and ensure the shelf life of the drugs. Each and every step in the procedure needs to be defined in correct perspective qualitatively as well as quantitatively.

Development of standard operating procedures (SOPs) should be performed in three phases. In the first phase, preparations are to be made by classical and modern equipments and methods. The finished product should be analyzed physico-chemically to confirm batch to batch uniformity. In phase two, it is necessary to lay down pharmacopoeial standards for the preparation; three different batches of the same preparation should be prepared and a minimum of three readings of each step must be taken as parameters for fixing the standards. Phase three is carried out for stability tests of finished product, depending upon the nature of the drugs involved. It involves organoleptic evaluation, determining the microbial load and percentage of medicament which should be studied at regular intervals.

Format for developing standard operating procedures of preparation of formulations containing only plant drugs are available; there is no ready format for metallic and mineral drugs. The present study is intended to develop SOPs for the manufacturing process of Lauhabhasma and its pharmacopoeial standards. Each step of the process or each unit operation was considered as independent processing. A pharmaceutical proforma was prepared and every minute, fact and observation regarding these processes were recorded. The bhasma was prepared by convenient method by adopting

*Dept. of Rasasastra & Bhaisajyakalpana, I. P. G. T. & R. A., Gujarat Ayu, University, Jamnagar- 361008.

classical as well as modern equipments.

Objectives: - To develop standard operating procedures of preparation, and to introduce pharmacopoeial standards of Lauhabhasma.

Materials and methods

The study has been carried out in two phases: i. Pharmaceutical contrive and ii. Analytical contrive

Pharmaceutical contrive

To introduce SOPs (Standard Operating Procedures) for quality bhasma preparations, it is mandatory to prepare the bhasma as per classical texts and also by mechanized methods; comparison of the finished products should be performed by analytical parameters. Hence Lauhabhasma was prepared by traditional gajapuṭa and by mechanized methods in Electric Muffle Furnace (EMF). Analysis of the final products was carried out physico-chemically.

Raw material**: -** Raw lauha, tilataila, takra, gomūtra, kaññji, kulatha (*Macrotyloma uniflorum*) seed, triphala, hiṅguḷa and kumāripatra.

Procurement and authentication: - Scarp lauha, tila taila and gomūtra were collected locally and takra, āranāḷa/kañji, kulathakvātha and triphala-kvātha were prepared according to classical reference. Wrought iron and steel are considered as tīkṣṇalauha for their similar characteristics. According to the classics, small pieces of tīkṣṇa lauha that are obtained during preparation of weapons like swords etc. are recommended for preparation of Lauhabhasma[1].

Processing: - There are two steps - i. Śodhana i.e. sāmānya and viśeṣa and ii. māraṇa.

The validation processes of śodhana of lauha are: a) sāmānya sodhana[2] and b) viśeṣa śodhana[3] (Rasaratnasamucchaya 5/13 and 5/103).

Equipments: - 1) Iron ladle of 25 cm diameter and 3 cm depth for heating of 500 g material, 2) For quenching of red hot material, a stainless steel vessel of 20 cm diameter and 15 cm of depth (containing gravimetrically same amount of media to the material), 3) A heating device i.e. hearth of 25 cm diameter and 45 cm high; coal was used as fuel, that can impart as much heat to make the material red hot.

Ingredients**: -** Raw lauha and medias (tila taila, takra, gomūtra, kañji/āranāḷa, kulathakvātha, triphalā kvātha). The weight of material was 500g in each batch and the amount of media was gravimetrically same to the material in each nirvāpa (heating and quenching) process.

Procedure**: -** The material was heated on an iron ladle till it was completely red hot. The red hot material was quenched immediately in the gravimetrically same amount of media. It was collected after 20 minutes of quenching (after becoming cool). These processes were repeated 7 times in each media. Every time fresh media was taken. After śodhana in each media the material was allowed to dry completely.

Observation: - Time taken to get the lauha to a complete red hot state was 12.49 minutes (avg.). During this time, the average temperature of hearth was 1104.66^{0}C, of ladle - 903.99^{o}C and of lauha - 766.55^{o}C. Average increase in weight of lauha during sāmānya śodhana was 119.33g (23.87%). During viśeṣa śodhana, the increase in weight was 34.87g (5.63%).

Precautions**: -** Lauha was strongly heated up to red hot state and this state was perceived accurately. It was poured carefully into the media to check the loss and then allowed to cool down after quenching. Every time fresh media was taken; temperature, weight, volume and time were recorded carefully.

Māraṇa of lauha:- The validation process of māraṇa of lauha was done according to classical reference[4] (Rasendrasārasamgraha 1/356-357).

Equipments: - 1) Iron mortar and pestle for levigation. (Mortar 38 cm length, 25 cm breadth and 11 cm depth; pestle 22 cm length, 6 cm diameter lower surface with 5 ltr end runner capacity); 2) Traditional gajapuṭa (for incineration) having 56 cm length, breadth and depth; 3) Cow-dung cake - 250 Nos. in each puṭa (weight - 20 times more than the material in each time); 4) Electric Muffle Furnace (EMF) (hearth - 52 cm length, 23 cm breadth and height); 5) Earthen saucer (20 cm diameter).

Ingredients**: -** Śuddha lauha (1 part), śuddha hiṅguḷa (1/12th part) and kumāri svarasa (Q.S.) [amount of drug (śuddha hiṅguḷa) for incineration - 1/12th part in each puṭa; amount of media for levigation - Q.S. for continuous 6 hours levigation.]

Procurement: - Hiṅguḷa śodhana was done by lavigating the powdered hiṅguḷa with nimbu svarasa (lemon juice). It was repeated 7 times, and then allowed to dry completely[5]. Kumāri svarasa was extracted from fresh leaves of kumāri (*Aloe barbadensis*), collected from institutional garden.

Process: - Puṭapāka (incineration); repetition - 7 times; duration of levigation - 6 hours.

Procedure**: -** The material and śuddha hiṅguḷa was mixed properly. Continuous 6 hours levigation was performed by adding kumāri svarasa. Pellets were prepared, kept on earthen saucer and allowed to dry. It was covered by another earthen saucer and the junction was sealed by mud-smeared cloth and allowed to dry. Saucer was subjected to incineration until self cooling. The material was collected and powdered. These processes were repeated 7 times.

Observation**:** Average increase in weight of lauha during māraṇa was 60.73g (9.28%). The highest temperature in EMF was 780.5^{o}C (avg.) and 948.3^{o}C in traditional gajapuṭa; Time taken to reach the highest temperature in EMF was 2.73 hours (avg.) and it was 1.58 hours (avg.) in gajapuṭa. Time taken for self-cooling in EMF was 45.06 hours and in gajapuṭa it was 44.60 hours (avg.)

Precautions**:-** Lauha and hiṅguḷa were mixed properly; continuous 6 hours levigation was given; pellets and cloth-smeared saucers were dried properly; levigated mass was collected carefully to check the loss; in electric muffle furnace temperature was regulated properly; in gajapuṭa, firstly 2/3rd of puṭa was filled by cow dung cakes then saucer was kept and finally 1/3rd part was filled by cakes; it was ignited from the bottom; material was collected carefully after incineration; weight, temperature were recorded carefully; suddha hiṅguḷa was taken in each puṭa.

Analytical contrive

For the purpose of pharmacopoeial standards the raw lauha, both in processed materials and final product (Lauha bhasma), were analyzed physico-chemically and the comparison of the final products obtained from classical and mechanized methods was drawn.

Results: - Physico-chemical characters, organoleptic characters, etc. were noted and recorded (Table 1)

Physicochemical changes of media

Media plays an important role in the physico-chemical changes of the material during śodhana. Specific media is used for śodhana of

TABLE 1
Physico-chemical characters, organoleptic characters, etc.after marana process

- Raw lauha
  - Loss on drying (110°C):00.22% w/w
  - Ash value : 99.01% w/w
  - Acid insoluble ash : 11.28% w/w

  Phase identification (XDM*)
  - Major phase : Iron (Fe)
  - Minor phase : Iron oxide (Fe 21.34 O 32)
- Śuddha lauha

  Phase identification (XDM)
  - Major phase : Magnetite (Fe_3O_4)
  - Minor phase : Iron oxide (Fe_2O_3), Iron (Fe)
- Lauha after first puṭa
  - Particle size : 116.00 mm (VMD*)
- Lauha bhasma
  - Organoleptic characters

    Śabda : No perceptible sound while chewing
    Sparśa : Smooth, no coarse particle felt
    Varṇa : Pakva jambūphalavarṇa (purple)
    Rasa: Tasteless; Gandha : No specific
  - Physico-chemical characters

    Loss on drying (110^{0}C) : 00.31%w/w
    Ash value : 99.63%w/w
    Acid insoluble ash : 27.80%w/w
    Carbon di sulphide soluble extractive: 00.09%
    Qualitative test for mercury : Negative
    Qualitative test for iron : Positive
  - Total iron (U-VSM*) : 29.00%w/w

    Ferrous ion:18.00%w/w; Ferric ion:11.00%
  - Element content (ICP method) (mm/kg):

    Iron (Fe): 227470; Sulphur (S): 20200
    Manganese (Mn): 3720; Zinc (Zn): 113
    Phosphorus (P): Below detection limit
  - Phase identification (XDM)

    Major phase : Iron oxides (FeO&Fe_2O_3)
    Minor phase : Iron sulphide (FeS), Iron manganese oxide hydroxide [d-(Fe 0.67 Mn 0.33)OOH]
  - Particle size : 7.89 mm (VMD)

XDM- X-Ray Diffraction Method
VMD - Volu-metric Mean Diameter
U-VSM - UV Spectrophotometric Method

particular material. The quality of media may also change after śodhana. Hence, the media left after śodhana were also analyzed by using few suitable parameters to observe any change (Table 2).

Physico-chemical analysis of kumārī svarasa

Bhāvana dravya (levigation drug) plays an important role in bhasma preparation as a source of trace elements etc. and its quality may affect the quality of bhasma. Kumārī svarasa was used for levigation of Lauha bhasma. The physico-chemical analysis of kumārī svarasa was also carried out. The total solid content (% w/w) was 10.86 and total ash (% w/w) was 02.08.

Discussion

During śodhana of lauha same amount of liquid media was taken gravimetrically for quenching, because for quenching, it is essential that the

TABLE 2
Physico-chemical changes of medium during śodhana

Media	Para*	During śodhana	
		Before	After
Tila taila	RIT	1.480	1.481
	SGT	0.9837	0.9854
Takra	pH	3.5	4.0
	TSC	4.46	4.82
Gomūtra	pH	8.5	9.0
	TSC	4.60	4.83
Āranāḷa/kañji	pH	3.0	3.5
	TSC	4.36	5.18
Kulathakvātha	pH	7.0	7.0
	TSC	2.93	3.50
Triphalākvātha	pH	3.0	3.0
	TSC	9.97	11.14

*Parameters:- RIT - Refractive index at room temperature; SGT - Specific gravity at room temperature; TSC - Total solid content (% w/w)

material should dip into the liquid media completely; and it was observed that iron scraps were dipped completely into same amount of media. Lauha was heated to red hot state, because the desired changes take place at this state of lauha (iron is converted to ferroso-ferric oxide at red hot state by reacting with atmospheric oxygen)[6]. After heating, it was instantly quenched in the liquid media. Instant quenching is important because repeated immediate cooling after heating leads to breaking of the material.

During śodhana, the colour of lauha became black. This is because during red hot state lauha reacts with atmospheric oxygen and steam to form ferroso-ferric oxide. Ferroso-ferric oxide is black in colour, and reaction of lauha occurs mainly on surface, so lauha flakes became black after during śodhana. At the early stage of śodhana, cracks were seen at the surface of lauha-flakes and finally these became coarse powder. Repeated heating and cooling of lauha-flakes cause disruption in compression-tension equilibrium and leads to cracks on the flake surface. During red hot state compounds are formed on the surface of lauha-flakes. Expansibility differs from metal to compound on heating (generally expansibility of compound is less than metal). So on repeated heating, the cracks seen on the surface, leads to breaking of lauha-flakes into coarse powder.

After śodhana, weight of lauha was increased to 28% to 34% (Table 3). Some part of lauha may be converted to ferroso-ferric oxide (Fe_3O_4) during red hot state. This compound formation may case increase in weight after śodhana. Some inorganic part of the media may also cause increase in weight after this process.

During māraṇa, in first two batches lavigated doughy mass was taken in a saucer by the help of a spoon, and quadrangular shaped cakrikas were prepared. This is because to check the loss of the material, although, thickness of the cakrikas (1 cm) was more than that of traditional method (0.5 cm), which may cause less heat flow through the mechanical cakrikas according to Fourier's law[7]. But in the traditional method cakrikas were kept in two layers means one cakrika on another, so the thickness became same (1 cm.), but there was a layer of air between two cākrikas leads to more heat loss due to increased length of pathway, and this phenomena is supported by the distribution of particle size of the final product of traditional method, which was much higher than that of mechanical method.

In electric muffle furnace, 750°C as a highest temperature for 1 hour duration was given. This particular temperature pattern was followed as a result of a pilot study for preparation of Lauha bhasma, which was carried out before going through the dissertation work. Cow dung cakes were taken for traditional method as much that can fill the gajapuṭa completely.

The colour of Lauha bhasma was purple (pakva-jambūphalavarṇa). Lauhabhasma may be considered as a mixture of ferrous oxide, ferrous

TABLE 3
Physico-chemical analysis of Lauha bhasma prepared by different methods

Lauha	Weight (in g) after the process			
	Initial	SS	VS	Māraṇa
Batch I	500.00	643.20	672.40	745.40
Batch II	500.00	636.00	650.00	691.40
Batch III	500.00	578.00	640.20	708.00

SS - Sāmānya śodhana; VS - Viśeṣa śodhana

sulphide, ferric oxide and other trace elements, Ferrous oxide and ferrous sulphide are black in colour and ferric oxide is red in colour. Combination of all these compounds makes the bhasma purple in colour.

The weight of śuddha lauha was increased up to 11% after māraṇa (Table 3). Iron combines directly when heated with sulphur (dissociation product of hiṅguḷa) to form ferrous sulphide (FeS)[8]. Some part of lauha may be oxidized to ferroso-ferric oxide during red hot state. These compounds may cause increase in weight. Inorganic content of kumari svarasa (2.08% w/w) also causes increase in weight of Lauha bhasma. It has been reported that increase in number of putas causes decrease in total iron content and increase in other trace elements in the Lauhabhasma[9].

Comparison of the finished products

Preparaed by different methods:- The bhasma was prepared by classical, mechanical and mixed methods, and all the finished products were analyzed by employing suitable physico-chemical parameters. The data reveals that though there was no considerable change in loss of drying and ash value, the particle size vary widely (Table 4)

Comparison on analytical parameters:- Lauha bhasma prepared by all the three methods is having almost similar value in loss on drying and total ash. But the mean particle size of Lauha bhasma prepared by classical method is markedly higher than that of mechanized and mixed methods. There are two possibilities i) improper grinding (bhāvana) and ii) improper heating. First possibility may be discarded because in both classical and mixed method levigation was performed manually, and the mean particle size of bhasmas prepared by mixed method is almost similar to that of mechanical method. But the second possibility may be taken as a cause because heating pattern in traditional gajapuṭa was non-homogeneous, some times it showed the highest temperature at 1080°C and in some puṭa it was 760°C. So it may be recommended that if a sophisticated modern instrument is available for preparation of bhasmas like electric muffle furnace, then it must be taken in consideration for preparation of quality bhasma products.

TABLE 4
Physico-chemical analysis of Lauhabhasma prepared by different methods

Classical	Lauha bhasma		
	Classical	Mech.	Mixed
Loss on drying	00.36	00.38	00.31
Ash value	99.57	99.10	99.63
Particle size (mm)*	88.40	06.93	07.89

*Volumetric mean diameter

Conclusion

1. The procured basic materials (lauha and other drugs) may be considered as of required characteristics as per authentic references and may fulfill the criteria of quality of raw materials.
2. For sāmānya and viśeṣa śodhanas of lauha, Rasaratnasamucchaya 5/13 and 5/103 respectively can be referred to as standard process.
3. Rasendrasarasamgraha (1/356-357) can be referred to as easy, convenient and standard method for preparation of Lauha bhasma.
4. The temperature pattern (highest 750°C for 1 hour) adopted in EMF may be considered as standard heating pattern.
5. Lauha bhasma should be considered as combination of iron (22.7%) as major element

and sulphur, manganese and zinc as trace elements and contains more ferrous ion than ferric ion.

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STANDARDISATION OF TRAYODAŚĀṄGA GUGGULU

K.R. Gopala Simha and V. Laxminarayana*

Abstract: Trayodaśāṅga guggulu is a traditional āyurvedic medicine used in vāta vyādhis (neurological, musculo-skeletal disorders) like gṛdhrasi (sciatica), kaṭiśūla (low back pain) and manyāstambha (cervical spondylitis). Standardisation of Trayodaśāṅga guggulu has been done according to modern scientific quality control measures.

Introduction

In āyurveda, Trayodaśāṅga guggulu (TG), a polyherbal formulation, has been indicated for vātavyādhis (neurological, musculo-skeletal disorders) like gṛdhrasi (sciatica), kaṭśūla (low back pain), bāhuśūla (periarthritis), and anugraha (lock jaw) and manyastambha (cervical spondylitis). Practitioners usually do the identification of different herbs used in the preparation of TG according to āyurvedic parameters. The preparation of TG is by traditional methods as given in Ayurvedic Formulary of India (AFI)[1]. Due to lack of modern pharmacopeial standards for the processing of TG, the medicine prepared using traditional methods may not have the desired quality and consistency. Hence there is a need for standardisation of TG according to scientific parameters including organoleptic characters, chemical analysis, chromatographic pattern and microbial screening.

The current work deals with details following standardisation guidelines involving 'Good Manufacturing Practices' (GMP) provided by the Central Council for Research in Ayurveda and Siddha (CCRAS) [2] for the preparation of āyurvedic medicines; and by international bodies like World Health Organization (WHO) and European Agency for the Evaluation of Medicinal Products (EMEA).

Materials and methods

The formulation TG consists of specific morphological parts of thirteen herbal ingredients and cow ghee[1] (Table 1). The ingredients in the formulation, except guggulu, are taken one part each. The principal ingredient guggulu is taken (in purified form) in a quantity equal to the total quantity of the ingredients.

Raw material

Identification and collection:- The raw material was procured from the local market in dry-form and from a nearby forest and scientifically identified. The preliminary identification was made based on the āyurvedic parameters: varṇa (colour), gandha (odour), ruci (taste), ākṛti (shape) and parimāṇa (size), and dried. Samples of the raw material were then examined for probable

*Sodhana Trust, 3rd Floor, Gautam Towers, Secunderabad - 500 003, Andhra Pradesh, India

adulterants[3a] such as plant material of similar appearance, which was found to be absent. Foreign matter[3a, 4a] found adhering to the surface of the raw material was removed.

Morphological examination:- Organoleptic evaluation through further identification of sensory characteristics like colour, odour, taste, shape, size, texture and fracture was done. In macromorphological evaluation, the plants were arranged according to their morphological characteristics. Identification of the correct part (for example, leaf) of the plant to be used was done so as to avoid the use of a possible similar looking part (for example, bract) of the plant. Microscopic evaluation and cytomorphological evaluation were performed later.

Treatment of raw material:- The plant material (including guggulu) was cleaned - physical cleaning - by using a sterilized cloth duster to remove dust and by blowing air to remove minute sand particles. The material was treated with water containing the mixture of anti-microbial agents; it was then dried in an air drier at 60°C.

Qualitative analysis:- Phytochemical consti-

TABLE 1

Ingredients of Trayodaśāṅga guggulu

Sanskrit name*	Scientific name*	Part used	Quantity
Babbūla	*Acacia arabica* Willd.	Stem bark	1 part
Aśvagandha	*Withania somnifera* Dunal	Root	1 part
Hapuṣa	*Juniperus communis* Linn.	Fruit	1 part
Guḍūci	*Tinospora cordifolia* (Willd.) Miers ex Hook.f. & Thoms.	Stem	1 part
Śatāvari	*Asparagus racemosus* Willd.	Root	1 part
Gokṣura	*Pedalium murex* Linn.	Fruit	1 part
Vṛdhadāru	*Argyreia speciosa* Sweet	Root	1 part
Rāsna	*Alpinia galanga* Willd.	Rhizome	1 part
Śatapuṣpa	*Pimpinella anisum* Linn.	Fruit	1 part
Sati	*Hedychium spicatum* Ham.ex Smith	Rhizome	1 part
Yavāni (pārasīka)	*Hyoscyamus niger* Linn.	Fruit	1 part
Śuṇthi	*Zingiber officinale* Rosc.	Rhizome	1 part
Guggulu	*Commiphora mukul* (Hook.ex Stocks) Engl.	Plant exudate	12 parts
Ghṛta	Cow ghee	-	1 part
Herbs used in purification of guggulu:			
Āmalaki	*Emblica officinalis* Gaertn.	Fruit	4 parts
Vibhītaki	*Terminalia bellirica* Roxb.	Fruit	4 parts
Harītaki	*Terminalia chebula* Retz.	Fruit	4 parts
Gudūci	*Tinospora cordifolia* (Willd.) Miers ex Hook.f. & Thoms.	Stem	24 parts

* The nomenclature for herbs given above has been adopoted from the compendium Medicinal Plants Used in ayurveda, (Rashtriya Ayurveda Vidyapeeth,Govt.of India,NewDelhi),1998.

tuents like gums, volatile oils, resins, tannins, sugars, alkaloids, fixed oils, mucilage, starch, steroids contained in each of the ingredients (except ghṛta) of TG were identified through qualitative chemical analysis (Table 2). Thin layer chromatography (TLC)[3a, 4c] was done and Rf values were calculated.

Quantitative analysis:- The raw material was assessed through quantitative analysis of the parameters foreign organic matter; moisture content; water, methanol, ether, chloroform, hexane, ethyl acetate, petroleum ether soluble extractive values; pH; total ash; acid insoluble ash; and sulphated ash[5]. Their quantities were calculated and found to be well within the available standard values/ranges. The test done for crude fiber was in accordance with the recommendation of the United States Pharmacopeia (USP) [6].

Microbial analysis:- In a polyherbal formulation like TG consisting of a number of ingredients, although microbial screening could be done for the raw material, the same was considered and performed later for the finished product.

TABLE 2

Phytochemical constituents in the herbal ingredients of Trayodaśāṅga guggulu

Name	G	Vo	R	T	S	A	Fo	M	St	Ste
Babbūla	+			+						
Aśvagandha	+	+	+	+	+	+	+		+	
Hapuṣa		+	+		+					
Guḍūci	+			+		+		+	+	+
Śatāvari	+				+			+		
Gokṣura	+	+	+	+	+	+	+	+		
Vṛdhadāru			+	+						
Rāsna	+	+	+	+		+	+		+	
Śatapuṣpa		+			+		+	+		
Sati		+	+		+		+	+	+	
Yavāni	+	+		+		+	+			
Śuṇthi	+	+	+	+	+	+		+	+	
Guggulu										

*G - Gums, Vo - Volatile oils, R - Resins, T - Tannins, S - Sugars, A - Alkaloids, Fo - Fixed oils, M - Mucilage, St - Starch, Ste - Steroids.

Packing and storage: The approved raw material was packed in sterilized air-tight polybags and plastic containers and stored in a cool place[1b]. Hygienic conditions[5] were maintained by regular disinfecting of the work areas and weekly fumigation.

Pulverization

The 12 ingredients in the formulation (Table 1) were dried at 60 ºC and were individually pulverized and sieved through 100 mesh to obtain respective fine powders. Each of the powders was taken in equal quantities (by weight) and thoroughly mixed together to get a homogenous mixture.

In addition to the cleaning and purification procedures used for guggulu along with the other ingredients, purification procedures with the help of a decoction[7] of triphala and guḍūci were adopted [1b] to get rid of minute impurities that are generally present in guggulu.

Preparation of decoction

Purification of guggulu was done with a decoction prepared with triphala [the three myrobalans: harītaki (*Terminalia chebula)*, vibhītaki (*Terminalia bellirica)*, āmalaki (*Emblica officinalis*)] and guḍūci (*Tinospora cordifolia*). The ratio (by weight) of guggulu: triphala: guḍūci is 1:1:2. Guḍūci was taken in fresh form. It was cleaned with distilled water and purified with the anti-microbial agents. Microbial screening was done and the microbial content was found to be within the limits.

Each of the triphala constituents was taken in an equal quantity in the form of coarse powder (40 mesh) to form triphala mixture, and added to (pounded) guḍūci twice the quantity of triphala mixture. The resultant material was mixed in water

(sixteen times the quantity of the material) that was then heated at a temperature of 70ºC till ¼ of the original quantity remained. This liquid was allowed to cool for the sediment to settle and then filtered.

In-process tests: - The prepared decoction was tested for specific gravity, pH and total solids and the values obtained were consistent in all the batches (Table 3). In particular, the test for total solids was done to ensure that all the water-soluble constituents from triphala and guḍūci got extracted into the decoction, which was then considered standardised.

Purification of guggulu

The physically cleaned guggulu (taken in a quantity equal to that of the triphala mixture) in raw form was mixed with the standardised decoction of guḍūci and triphala for purification (śodhana). This mixture was heated to 60-70ºC with continuous stirring so that guggulu mass got dissolved. (Note: During this process a small quantity of ghṛta was added to prevent charring of the material). The resultant mixture was filtered through a thin cotton cloth. The material still remaining in the cloth was repeatedly treated with hot water and filtered, for completion of the filtration process. The filtrate obtained was decanted to get rid of any finer impurities. The resultant liquid was appropriately heated to remove the water content and for guggulu to remain in the form of a pasty material. At this stage some amount of ghṛta was added to this guggulu and heating continued till a semi-solid consistency was attained.

Pounded guggulu: The guggulu of semi-solid consistency was repeatedly pounded in a mortar adding necessary amount of ghṛta, this time for making pounded (kuṭṭita) guggulu [8].

Preparation of TG

The homogenous mixture of twelve ingredients was mixed in the kuṭṭita guggulu to get a whole mass. The whole mass was continuously pounded in a mortar now adding remaining part of ghṛta in small quantities and TG of pill making consistency was obtained.

Pill making:- Nearly uniform sized pills of TG were made by hand and dried in an air drier, and further dried at 60ºC (not beyond 60ºC, to prevent cracking) to remove excess moisture content.

Packing and storage

Pills were packed in amber coloured, sterilised glass bottles that were labeled and coded and tightly closed with screw caps. The same were stored inside cool and dry shelves. Hygienic

TABLE 3

In-process tests for Triphala and Gudūci decoction

Parameter	Batch-1	Batch-2	Batch-3	Batch-4	Batch-5	Batch-6	Mean ± SD
Specific gravity[a] at 29ºC	1.01	1.00	1.00	1.00	1.00	1.00	1.00 ± 4.08E-03
pH[b]	4.32	4.34	4.31	4.38	4.39	4.34	4.35 ± 3.20E-02
Total solids[c] w/w (%)	28.05	28.05	28.18	28.04	28.14	28.13	28.09 ± 5.91E-02

[a] The medium used for extraction is water with specific gravity equal to 1. Since the extract contains active constituents that are not highly water-soluble, specific gravity of the extract is expected to be slightly more than 1.
[b] The extract contains mainly acids and tannins, so pH is expected to be acidic.
[c] This test was performed to check whether the process of extraction is complete or not. As it comes out, the solubility of all the ingredients, on the average, is indeed in the range 26 - 28%

conditions were maintained.This procedures were adopted for the six batches of TG prepared.

Results

Statistical analysis was done. Mean, SD, SE values, range and median values were calculated and recorded (Tables 3&4). As part of standardisation procedure, the finished product TG was tested for relevant physical and chemical parameters and also subjected to microbial screening through quality control measures.

Quality control analysis:- Quality tests for the finished product were performed for the parameters[2] resin content, ash content and acid-insoluble ash and they were found to be close to or within standard ranges/values (Table 4). Also, tests for moisture content, pH, sulphated ash[5] and crude fiber[6]; and for soluble extractive values in water, methanol, ether, ethyl acetate, hexane, chloroform and petroleum ether were done. In addition, TLC[3b] was done (Fig. 1) with methanol extract of TG. Petroleum ether and ethyl acetate (3:1) was used as the mobile phase and iodine vapors as visualising agent. Rf values were calculated.

Batch-to-batch consistency:- To check expected batch-to-batch consistency as part of standardisation of TG, recordings of TLC were obtained for six consecutive batches (Fig 1). Twelve spots for each of the batches in TLC plates were spotted.

TABLE 4

Quality tests for the finished product Trayodaśāṅga guggulu

Parameter	Std. value	Obtained value (in 6 batches)						Mean ± SD
		1	2	3	4	5	6	
Pill weight (mg)	-	634	610	637	642	593	591	617.83±22.85
Hardness (kg)	-	8.4	6.0	5.4	6.3	6.35	6.55	6.5±1.01
Resin content % w/w	7-10	8.53	8.31	8.47	8.42	8.42	8.26	8.40±0.10
Ash content % w/w	< 8.5	6.32	6.76	6.58	6.42	6.54	6.48	6.52±0.15
Acid insoluble ash % w/w	< 3	0.04	0.10	0.02	0.08	0.08	0.02	5.67*
Moisture Content % w/w	-	4.41	4.69	4.62	4.65	4.69	4.97	4.67±0.17
PH	-	4.49	4.34	4.65	4.46	4.48	4.60	4.50±0.11
Water soluble extractive % w/w	-	34.68	34.53	34.67	34.55	34.66	34.55	34.61±7.01*
Methanol soluble extractive % w/w	-	30.36	30.43	30.72	30.78	30.67	30.59	30.59±0.17
Ether soluble extractive % w/w	-	20.44	20.78	20.88	20.48	20.93	20.75	20.71±0.20
Ethyl acetate soluble extractive % w/w	-	8.63	8.70	8.55	8.67	8.42	8.21	8.53±0.19
Hexane soluble extractive % w/w	-	15.65	15.95	15.71	15.56	15.85	15.57	15.72±0.16
Chloroform soluble extractive % w/w	-	22.60	22.55	22.88	22.58	22.72	22.92	22.71±0.16
Petroleum ether soluble extractive % w/w	-	15.80	15.84	15.72	15.82	15.98	15.98	15.86±0.10
Sulphated ash % w/w	-	7.87	7.74	7.57	7.72	7.96	7.70	7.76±0.14
Crude fiber % w/w	-	5.87	5.42	5.44	5.22	5.29	5.34	5.43±0.23
TLC (observed no. of spots)	-	12	12	12	12	12	12	
Rf values: 0.03; 0.09; 0.18; 0.27; 0.35; 0.50; 0.62; 0.69; 0.75; 0.83; 0.93; 0.96								

*E-02

Testing for heavy metals:- The finished product TG was analyzed for presence of heavy metals[4d] (by atomic absorption spectroscopy, at Sipra Labs Ltd., Hyderabad). The values were: mercury (<0.1ppm); lead (0.45ppm); cadmium (<0.028ppm); arsenic (<2.0ppm). The values are well within the acceptable limits[9]

Stability of the finished product:- Stability of the finished product was checked by testing for various parameters including resin content, ash content and acid insoluble ash[2] for a sample of a batch of TG at different times across a period of two years. The results found to be within the acceptable ranges/values and constant over the tested intervals of time (Table 5). Microbial screening for the finished product at different times showed that the counts for bacteria, fungi and coliforms were pathogen free and within the acceptable ranges. Quality tests, microbial analysis and stability tests were done for the six batches of TG prepared.

Solubility: - The present formulation is a natural product having many herbal ingredients with a wide range of phytochemicals. Hence it is of interest to know the solubility details of the formulation.

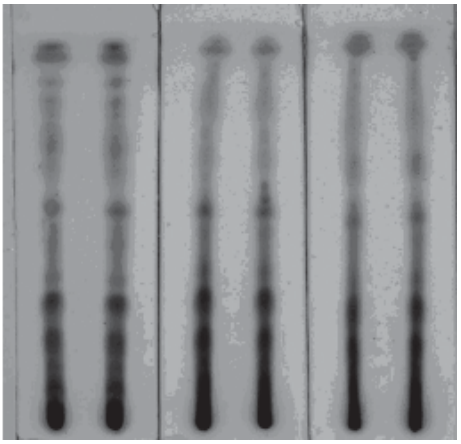

Fig. I. TLC for six consecutive batches of Trayodaśāṅga guggulu

The solubility was determined by applying a personal model, with occasional manual agitation. Two beakers were taken, one containing 50 ml of 0.1N HCl (nearly equivalent to the gastric pH) and another 50 ml of 2% NaOH (nearly equivalent to the intestinal pH). The process was continued at the room temperature, about 37°C.

A pill of 500 mg was placed in the beaker containing the acid medium (0.1 N HCl) for about 3 hrs. The residue left thereafter in the acid medium was placed in the beaker containing the alkaline medium (2 % NaOH) for 2 hrs. Thereafter, the residue left in the alkaline medium was tested for fiber content and for chemical constituents, if any.

It was found that 81 % of the pill (by weight) was dissolved in the acid medium and 14 % was dissolved in the alkaline medium. The residue that remained passed the test for fiber content and no chemical constituents were seen.

Microbial analysis:- Microbial analysis[3c] of the finished product was done. Pathogens viz. *E. coli*, *S. aureus*, *Salmonella*, *Shigella* and *P. aeruginosa* were absent. Total aerobic count was done and bacteria (range 300, median 722.50), fungi (yeast: range 3, median 5; moulds: range 8, median 9.50) and coliforms (range 4, median 5) were within limits.

Discussion

The standardisation of Trayodaśāṅga guggulu was possible keeping the quality protocol intact and the procedures in accordance with āyurvedic system.

A step that was followed during the processing of TG was the pounding of guggulu done

repeatedly with addition of small amounts of ghṛta to make kuṭṭita guggulu. Also, continuous pounding of the powder mixture and guggulu mass was done while adding one part of ghṛta as an ingredient of the formulation to get the finished product TG. The importance of repeated pounding could be: to regulate their release inside the body, thereby enhancing absorption of the medicine and to presumably facilitate synergistic action among the various active constituents in TG. The ghṛta used in the processing of TG is supposed to minimise potential adverse effects (like gastric irritation) during absorption.

There are no standard ranges available for the parameters i.e. moisture content, pH, soluble extractives, sulphated ash, crude fiber for TG. The mean value obtained for each of these parameters was consistent across the six considered batches with minimum SD. Further, the corresponding values of SE were low. So, the inclusion of these parameters along with their respective values could be considered for laying down new pharmacopeial standards while preparing TG according to traditional methods.

The occurrence of same twelve spots in TLC plates (Fig 1) confirms the consistency of the finished product. Such a stipulation for obtaining TLC, including the number of spots and corresponding Rf values, could be considered and laid down as part of standardisation guidelines for preparation of TG.

It was found that the solubility of 81% of the medicinal formulation in acid medium was completed in 3 hours which is more or less equal to the gastric (pyloric) emptying time. It was further found that 14% of the medicine was

TABLE 5

Stability tests of Trayodaśāṅga gugguluu

Parameter	Std. value*	Obtained value for a batch of TG - tested on		
		04.04.2006	24.02.2007	26.05.2008
Average pill weight (mg)	-	634	638	696
Hardness (kg)	-	8.40	8.50	8.50
Resin content % w/w	7 to 10	8.53	8.42	8.51
Ash content % w/w	< 8.5	6.32	6.40	6.40
Acid insoluble ash % w/w	< 3	0.04	0.06	0.02
Moisture content % w/w	-	4.41	4.35	4.37
pH	-	4.49	4.38	4.50
Water soluble extractive % w/w	-	34.68	35.00	35.62
Methanol soluble extractive % w/w	-	30.36	30.84	31.16
Ether soluble extractive % w/w	-	20.44	20.57	20.50
Ethyl acetate soluble extractive % w/w	-	8.63	8.61	8.47
Hexane soluble extractive % w/w	-	15.65	15.81	15.92
Chloroform soluble extractive % w/w	-	22.60	22.77	23.21
Petroleum ether soluble extractive % w/w	-	15.80	15.91	16.28
Sulphated ash % w/w	-	7.87	7.98	7.46
Crude fiber % w/w	-	5.87	5.79	5.30
TLC (observed no. of spots)	-	12	12	12

*Ref. No.2

dissolved in the alkaline medium in a period of 2 hours which is usually the time taken by any material, including medicines, to pass through the intestine. The rest 5% was found to be fiber. So, the acid soluble constituents (81%) as also the alkali soluble constituents (14 %) became available for therapeutic action in the body. It appears that all in all 95 % of the total chemical constituents present in the formulation becomes available for therapeutic action.

The values obtained for heavy metals mercury, lead, cadmium and arsenic were well within the acceptable limits, so that the finished product TG is suitable for use in treatment. It is known[1b] that the potency of products containing guggulu is maintained for two years when prepared with ingredients of plant origin. TG was found to be stable over a period of two years, and this is more than indicative that the medicine has not lost its therapeutic value.

Conclusion

The āyurvedic medicine Trayodaśāṅga guggulu has been standardised by modern scientific quality control measures. The example could be used to lay down a new set of pharmacopeial standards for the preparation of TG.

Acknowledgements

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MANAGEMENT OF ANŪRJATAJANYAŚVĀSA (ALLERGIC ASTHMA) BY ŚAṬHYĀDI YOGA

Nisha Gupta*, Om Prakash Upadhyaya* and Vaidya Banwari Lal Gaur**

Abstract: Anūrjatajanyaśvāsa or allergic asthma is a life-threatening disorder of the prāṇavahaśrotas. Fatality of it is compared with 'akṣiviṣa' (poisonous effect of even breath or vision of a snake). It is a type of tamakaśvāsa (bronchial asthma). Its immediate dreadfulness and aggressiveness can result in death within minutes if not attended with emergency measures. Anti-allergic drugs like antihistamines are given to such patients but their repeated and prolonged use produces certain adverse effects. Evaluation of the efficiency of a safe alternative in āyurveda was the chief objective of this clinical trial. Śaṭhyādiyoga, mentioned in śvāsaroga of Carakasamhita, was tried safely in 20 patients of allergic asthma and the results were highly significant.

Introduction

Anūrjatajanyaśvāsa (allergic asthma) or atopic asthma or extrinsic asthma, is a type of tamakaśvāsa (bronchial asthma). Bronchial asthma is a life threatening psychosomatic disorder as the attack is precipitated by some forms of emotional stress. Asthma is defined as "A disease characterised by an increased responsiveness of the trachea and bronchi to various stimuli and manifested by wide spread narrowing of the airways that changes in severity either spontaneously or as a result of treatment".

Dyspnoea, cough and wheeze are the cardinal symptoms of bronchial asthma. This is early recognisable and is usually familial. The etiological factors which trigger the attack are known as allergens. Generally it occurs in atopic individuals who have a tendency to form IgE antibodies to commonly encountered allergens. Most of the allergens that provoke asthma are air-borne and they must be reasonably abundant to induce a state of sensitivity. Allergic asthma may be seasonal or non-seasonal. The seasonal one is observed in children and young adults whereas non-seasonal comprises of allergy to dust, pollen, wool, cotton, etc. those are present in the environment.

In allergic asthma, attacks are usually episodic with periods of complete relaxation between. The wheezing may be seasonal at first. Attacks vary in frequency and duration. Wheezing is often provoked by exercise and is usually worst at night. Attacks may be precipitated by allergens, latter, tend to produce chemical mediators like histamine, bradykinin, prostaglandins, etc. to induce clinical manifestations of allergic asthma.

* National Institute of Ayurveda, Jaipur; ** Rajasthan Ayurveda University, Jodhpur

Śaṭhyādiyoga is a classic drug formulation referred to in Carakasamhita indicated for tamakaśvāsa. Allergic asthma being a form of tamakaśvāsa this composition was successfully tried in patients of allergic asthma.

Aim and objective: - The chief objective of the present study was to evaluate the efficacy and safety of Śaṭhyādi cūrṇa in allergic asthma.

Materials and methods

Selection of patients:- 20 Patients of allergic asthma were scrutinised from the OPD and IPD sections of N.I.A. Hospital, Jaipur.

Inclusion criteria

- Patients presenting with symptoms like dyspnoea, cough and wheeze
- Patients with high eosinophil count
- Patients with hereditary predisposition to allergies

Exclusion criteria

Patients of -

- less than 10 years and more than 60 years
- pulmonary tuberculosis
- cardiac asthma
- other diseases of lungs

Research design: - A clinical study with group comparison and pre and post test design. Śaṭhyādi yoga was given to 20 patients in the dose of 10g twice a day with honey for two months.

TABLE 1
Statistical results based on triad symptoms

Symptom	Mean		SD ±	SE	't' value	P <	%
	BT	AT					
Dyspnoea	2.9	1.4	.512	.115	13.04	.001*	51.72
Cough	2.5	1.3	.523	.117	10.25	.001*	48
Wheeze	2.6	1.1	.68	.15	9.75	.001*	57.6

* Significant

Assessment criteria

- Subjective symptoms were scored and compared according to standard methods.
- Laboratory findings were compared before and after the treatment.

Observation and results

Majority of patients were males and belonged to 10-25 years age group. Majority were educated and belonged to middle class. 100% patients were of dvandvaja prakṛti - i.e. vāta-pitta (VP), vāta-kapha (VK) or pitta-kapha (PK) constitution. Among them maximum were of VP by 45%, followed by 35% of PK and least of VK i.e. 20%. 35% patients were found positive history of skin disorders and 55% were found suffering from allergic rhinitis. 50% patients were having hereditary predisposition. 25% of patients were sensitive to dust allergy, 10% to pollens and 5% to wool and cotton.

Statistical results based on the triad symptoms are detailed in Table1. All the patients showed significant relief in three symptoms. Also satisfactory improvement was observed in other symptoms of the disease as mentioned in Caraka samhita. Reduction in number of episodes (frequency of attack) was also a remarkable finding. Statistical results based on laboratory findings are detailed in Table 2. Eosinophil count and ESR showed significantly fall in values after treatment.

Discussion

Although there is not any direct reference to allergic asthma in āyurvedic texts, some review of its aetiological agents can be seen which seems to relate it as a part of tamakaśvāsa[3]. Therefore, the symptoms and management are also no more different from that of tamakaśvāsa. It was derived hypothetically that allergic

asthma is vāta-kapholbana (that which manifest vāta-kapha) disorder with vitiation of pitta-sthāna. Allergy is a familial disorder which always occurs in persons suffering from vitiation of digestive fire; which latter results in persistent lowering of jaṭharāgni and dhātvāgni (digestive and tissue fire), hence produce āma (undigested matter). This āma being small in proportion is unable to manifest the disease usually[1].

Keeping the pathogenesis (samprāpti) and digestive fire (agni) status of the disease in view, Śaṭhyādiyoga, as referred to in Carakasamhita was selected[2]. This formulation consists of three drugs śaṭhi (*Hedychium spicatum*), puṣkaramūla (*Inula racemosa*) and āmalaka (*Phyllanthus emblica*). These drugs are pungent and bitter in taste, acrid (kaṭu) in post-digestive taste (vipāka), hot in potency (vīrya) and light (laghu) and sharp (tīkṣaṇa) in properties. This formulation seems to act at three levels: i. at the site of kha-vaiguṇya for regeneration, ii. on prāṇavaha śrotas by anulomana of prāṇavāyu and iii. on the immune system by regulation of agni. Total process of breaking down of pathogenesis (samprāpti vighaṭana) at three sites is shown in the diagrammatic presentation (Fig. 1).

The alcoholic extract and different extractives of śaṭhi are assessed for effects on respiration, isolated smooth muscles and trachea chains. It can counteract the effect of spasmogens like acetylcholine and histamine. On the other hand,

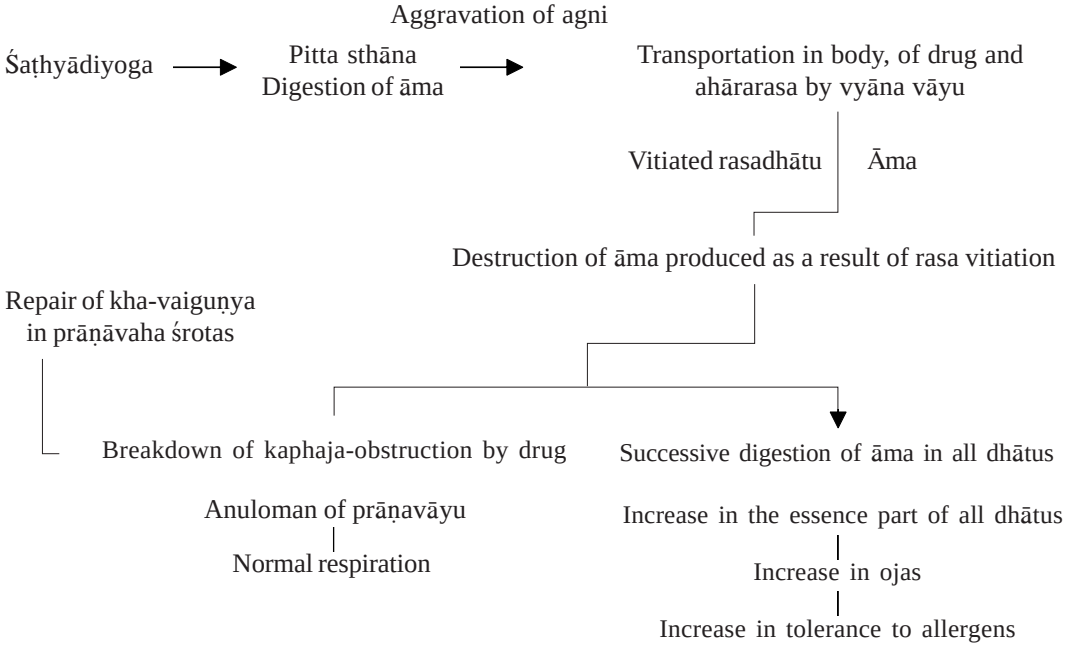

Fig. 1. Diagrammatic presentation of breaking down of pathogenesis in allergic asthma

TABLE 2
Statistical results based on laboratory findings

Finding	Mean		SD ±	SE	't' value	P <
	B.T.	A.T.				
1. Hb%	12.37	12.68	0.80	0.17	1.52	0.10
2. TLC	6450	6158	1065.10	238.27	1.225	0.10
3. Neutrophils	51.6	54.95	6.54	1.46	2.29	0.05
4. Lymphocytes	40.5	40.9	6.64	1.48	0.67	*
5. Eosinophils	7.6	3.65	3.993	0.89	4.43	0.001
6. ESR	41.75	20.95	24.23	5.42	3.83	0.001

* Insignificant

root extract of puṣkaramūla shows anti-inflammatory and potent antispasmodic activity. The extract has potent anti hydroxytryptamine, which show antihistaminic activities. Hence anti allergic and anti asthmatic properties of these drugs have been established by recent studies.

Conclusion

Clinical study of 20 patients revealed that āvaraka kaphadoṣa or types of vāta and āvrīyamāṇa prāṇavāyu are completely responsible for allergic asthma. For the management of disease, both śaṭhi and puṣkaramūla have a diminishing effect on kapha and vata and therefore are anti-asthmatic. Honey was used as additive that also reduces kapha. Excellent results were obtained during the trial with complete regression of symptoms; frequency of attacks was also reduced.

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EXCERPTS FROM CIKITSĀMAÑJARI - LX

P. Unnikrishnan*

Abstract: Discussion on various type of eye diseases and their treatments continues. Efficacy of the treatments like puṭapāka and formulations like Pañcāmṛta ghṛta and Ananta ghṛta are explained here.

Conch shell (śaṅkha) ground in honey applied as collyrium relieves sub-conjunctival bleeding (lohita) and pterygium (arma). Application of Candanādi powder (detailed earlier) in powder form or mixed with honey (in paste form) is effective. Application of Eḷanīrkuzhampu as collyrium is recommended. Addition of pītarohiṇi and karpūram in the preparation of Eḷanīr-kuzhampu makes it an effective remedy for pterygium (arma).

Make a pill from the fine powders of rohiṇī (*Cpotis teeta*), pippali (*Piper longum*), tutham (Coper sulphate), kamala (*Nelumbo nucifera*), and utpala (*Nymphaea nouchali*) ground in the kaṣāya of dārvi (*Berberis aristata*). Application of this on the eye relieves pterygium caused by pitta and ulcers on the sclera.

A paste prepared from the fine powders of the following, applied as collyrium relieves pterygium (arma), timira (cataract) and diseases of the sclera.

Godantādi:

Godanta	Cow's teeth
Candanam	*Santalum album*
Śankha	Conch
Sphaṭika	Crystal glass
Saindhavam	Rock salt
Rohiṇī	*Cpotis teeta*
Indu	Borneol camphor
Haridra	*Curcuma longa*
Marica	*Piper nigrum*

Fine powders of the above, made to a paste in the kaṣāya of Eḷanīrkuzhampu and rolled into pills, on application as collyrium using breast milk or the expressed juice of pūvānkuruntala (*Vernonia cinerea*), relieves all the diseases cited above.

Vitiated pitta, situated at cornea (kṛṣṇa) or lens (dṛṣṭi) splits the layers giving rise to pain, redness and lachrymation. In this disease, cornea appears indented and bright-red in colour called kṣataśukḷa, which is difficult to cure. The following diseases affect the cornea (kṛṣṇa).

- Kṣataśukḷa
- Śuddhaśukḷa
- Ajakā
- Sirāśukḷa
- Pākātyayaśukḷa

Pitta placed on cornea and lens splits the layers

*"Sivam" Vaidyaratnam Road, Nayadippara, Kottakkal-676 503

and causes pain, edema and redness; cornea appears reddish and slightly indented. This condition is known as kṣataśukḷa. When the disease affects the second layer, pain, edema and redness are increased; cornea appears as if punctured by a needle. This condition is manageable only (yāpya). When the third layer is affected, ulcers are present and the condition becomes incurable. Śuddhaśukḷa is caused by deranged kapha; it appears white like a conch shell in the cornea and there is little pain also. This is curable. Red painful abscess, purulent and haemorrhagic secretions, cornea elevated or protruded, black in colour resembling the excreta of goat; these are the characteristic features of ajakā, caused by vitiated rakta. This disease cannot be cured. Vitiated doṣas and blood causes pain, redness and warmth in the cornea. Vessels of the eye become engorged and secretions from the eye may be warm or cold, watery or dense. Burning sensation and lachrymation is also seen. This disease called kṣataśukḷa, is incurable. Combined action of doṣas and blood on the cornea and lens makes them appear white like the sclera, and the shape may resemble tuvaraparippu (*Cajanus cajan* - seeds). Edema, redness, pain and lachrymation will be present. This disease called pākātyaya-śukḷa should not be treated since it is very painful.

Of all the five śukḷas specified above, where there is loss of vision (liṅganāśa), grey or red in color, critically elevated or indented, lachrymating, old, split in the middle and ulcerated are not to be treated.

Cornea indented or appearing as if punctured, ulcerations present, lachrymation profuse and warm; these are the features of vraṇaśukḷa.

In the treatment of the five śukḷas cited above, depending on the deranged dosa, a kaṣāya prepared from varā (*Terminalia chebula, Emblica officinalis* and *Terminalia bellirica*), is used when dryness (rūkṣaṇa) is required, and medicated ghee prepared from varā is used when unction (snehana) is to be done. Ingestion and irrigation of the above drugs are also effective. Ghee medicated with drugs of bitter (tikta) taste can also be used for the purpose. Purgation is also advised. Blood letting on specific points of the face and irrigation of affected parts are also indicated.

Tarpaṇa (already described), puṭapāka and mukhalepa are recommended. As a result of tarpaṇa, the eye gets additional unction and become indolent. Puṭapāka is advised to relive the excess quantity of sneha.

Puṭapāka

Puṭapāka is a treatment done after tarpana to restore the visual ability and efficiency. Unctuous or oily puṭapāka (snehana) is done in diseases caused by deranged vata; fraying puṭapāka (lekhana) is indicated in diseases associated by kapha; and in diseases that cause debility of the eye due to vitiated vata and pitta, satiative (prasādana) puṭapāka is performed. Satiative puṭapāka is done in the healthy also to enhance the visual ability.

The components of puṭapāka are: meats, marrow, liver, intestines, heart and fats of different animals, drugs and liquids. The animal components, drugs and liquids may vary depending upon the three purposes mentioned above viz. snehana, lekhana or prasādana. The liquid for snehana is milk, it is whey (mastu) for lekhana and for prasādana it is ghee and breast milk or milk.

Prepare a bolus weighing one vilva (48 g) with animal parts and drugs ground to a thick paste

in suitable liquid. Cover the bolus with the leaves of urubūka (*Ricinus communis*) for snehana, vaṭa (*Ficus benghalensis*) for lekhana and ambhoja (*Nelumbo nucifera*) for prasādana. This material is then to be covered with clay and put in fire. When the bolus becomes ember-coloured, take it out from the fire and remove the clay covering after cooling. Use the expressed juice of the contents for retention on the eyes as done in tarpaṇa for variable periods depending upon the results desired; hundred seconds for lekhana, two hundred seconds for lekhana and three hundred seconds for prasādana.

Mukhalepa literally means application of medicated paste on the face. In this context, it can also be application of medicated paste over the eyelids without affecting the cilia, termed puṛampāṭa.

Intake of ghee medicated and potentially upgraded (āvartana) thrice with the kaṣāya of trivṛt (*Operculina turpethum*) alleviates kṣataśukḷa.

Snehapana (unction), nasya (nasal medication) and application of rasāñjana (collyrium) relieve painful indentations of the eyes caused by disease. Painless indentations or depressions of the eyes can be relieved by tarpaṇa and puṭapāka.

Consumption of ghee medicated with triphala; blood letting and purgation; application of eye drops (aścyotana), application of medicinal paste on the face (mukhalepana), tarpaṇa and putapāka are to be done in the treatment of śukḷa depending on doṣas.

After blood letting, the residual consolidated doṣas present on the eye are to be removed by application of leech. Painless and depressed śukḷa is to be elevated and normalised by snehapana, nasya and consumption of meat soup prepared from animals that live in dry land (jāṅgaḷa). Tarpaṇa, puṭapāka and consumption of ghee medicated with the roots of taṇḍulīyaka (*Amaranthus spinosus*) and milk are also effective.

Tarpaṇa is the best treatment for all eye diseases. Irrigation with goat's milk added with sugar relieves vitiated blood and pus. Ghee medicated with the expressed juice of parpaṭika (*Hedyotis corymbosa*) as liquid component and the fine paste of the following as solid component, on consumption, relives pain on the eye.

Candana	*Santalum album*
Yaṣṭī	*Glycyrrhiza glabra*
Dārvī	*Berberis aristata*
Kṣīridruma	*Ficus racemosa* *Ficus microcarpa* *Ficus religiosa* *Ficus benghalensis*
Udakanda	*Nelumbo nucifera* *Nymphaea nouchali* *Nymphaea alba* *Kaempferia rotunda*

Pañcāmṛta ghṛta

Medicate one kuḍaba (192 ml) ghee with the expressed juice of the following as liquid components; and a fine paste prepared from dārvī, candana, yaṣṭyāhva - 1 karṣa (12 g) each as solid component. This ghee, termed Pañcāmṛta, propounded by Videhapati, is used for tarpaṇa for the management of vraṇaśukḷa (corneal ulcer), arma (pterygium) and syanda (inflammatory and lachrymatory diseases).

Tatākasuktisara	Bivalve* (meat juice)
Śigrupatra	*Moringa oleifera* - leaf
Nantyāvarta-prasūna	*Tabernaemontana divaricata* - flower

* Shell-fish found in paddy fields and lakes

Tālarasa	*Borassus flabellifer* (stem juice)
Kṣīra	Milk

Ananta ghṛta

Tarpaṇa and nasya with ghee of goat's milk, medicated with the fine paste of the following ground in goat's milk, relieves initial stages of cataract (timira and kāca), painful conditions of the eye (netraruja), abhiṣyanda, glaucoma (adhimanda) and corneal ulcer (vraṇaśukḷa). This medicine, termed Ananta ghṛta, is capable of relieving almost all diseases of the eye.

Ananta	*Hemidesmus indicus*
Candana	*Santalum album*
Sita	Sugar
Madhuka	*Glycyrrhiza glabra*
Utpala	*Nymphea alba*
Mṛṇāḷa	*Nelumbo nucifera*
Vidāri	*Pueraria tuberosa*
Kaśeruka	*Cyperus esculentus*

Medicated ghee prepared with the expressed juice of karuka (*Cynodon dactylon*) and milk as liquid components, and candanam and iraṭṭimadhuram (*Glycyrrhiza glabra*) as solid components, is also effective. Fine powder of tatākaśuktikṣāra (bivalve - ash) mixed with honey can be used as collyrium.

Irrigation with breast milk is indicated in vraṇaśukḷa, ajakā, etc. Irrigation with expressed juice of tālavṛnta (inflorescence of *Borassus flabellifer*) mixed with honey relieves vraṇaśukḷa and ajakā. Irrigation of the eyes with the liquid of candana and jīraka (*Cuminum cyminum*) mixed with breast milk relieves pricking pain of the eyes. Irrigation of the eyes with a kaṣāya prepared from the following mixed with honey relieves pus.

Nellittol	*Emblica officinalis* - bark
Amṛtu	*Tinospora cordifolia*
Karimpuvēr	*Saccharum officinarum* - root
Uśīram	*Vetiveria zizanioides*
Paccoṭṭi	*Symplocos laurina*
Kaṭu	*Picrorhiza scrophulariiflora*
Maramañjaḷvalka	*Berberis aristata* - bark
Yaṣṭī	*Glycyrrhiza glabra*
Kataka	*Strychnos potatorum*
Taṇḍulīya	*Amaranthus spinosus*

Prepare a kaṣāya from the following drugs crushed and mixed in twelve nāzhi* of tender coconut water, and reduce to one fourth (4 nāzhi) and filter. This liquid is effective for irrigation of the eyes. Honey can also be mixed with this kaṣāya if necessary. This relieves diseases of the eyes.

Triphala	*Terminalia chebula*
	Emblica officinalis
	Terminalia bellirica
Kataka	*Strychnos potatorum*
Dāru	*Cedrus deodara*
Rātri	*Curcuma longa*

Irrigation with kaṣāya prepared from the following relieves roughness in the eyes.

Āvaṇakku	*Ricinus communis*
Ceṛucīra	*Amaranthus spinosus*
Karimpinvēr	*Saccharum officinarum* - root
Āmalakavalka	*Emblica officinalis* - bark
Guḷūci	*Tinospora cordifolia*

Irrigation with a kaṣāya prepared from the following mixed with honey relieves eye diseases.

Mridvīka	*Vitis vinifera*
Madhuka	*Glycyrrhiza glabra*
Suradru	*Cedrus deodara*

*1 nazhi = 192 ml

Candana	*Santalum album*
Abda	*Cyperus rotundus*
Sevya	*Vetiveria zizanioides*
Akṣa	*Terminalia bellirica*
Āmala	*Emblica officinalis*
Harītaki	*Terminalia chebula*
Lodhra	*Symplocos laurina*
Tarurajanī	*Berberis aristata*

Irrigation of eyes with the kaṣāya prepared from ceṛucīra, āvaṇakku, etc. (detailed earlier) and tēṭṭāmparal (*Strychnos potatorum*) relieves pricking pain, pain and pus formation.

Bidalaka or puṛampāṭa is an application of medicinal paste above the eyelids, excluding cilia. A medicinal paste prepared from the following in milk, on application above the eyelids cures diseases of the eyes.

Ikṣumūla	*Saccharum officinarum* - root
Madhuka	*Glycyrrhiza glabra*
Añjana	Black antimony
Dārvī	*Berberis aristata*
Lodhra	*Symplocos laurina*
Gairika	Red ochre
Paṭu	Rock salt
Harītaki	*Terminalia chebula*
Āmalaki	*Emblica officinalis*
Vibhītaka	*Terminalia bellirica*

Fine powders of the above drugs, mixed with butter can also be applied on the eyelids. This is good for the relief of pus and vitiated blood.

NOTE TO THE CONTRIBUTORS

Contributions to Āryavaidyan are requested to be made in the following format:

- The article should be authentic and not published earlier.
- Contributions in the form of a research paper, review article, clinical observation or a book review are welcome from the fields of Āyuṛveda and allied subjects, naturopathy, Siddha, Unani, Homoeopathy, Yoga, Modern medicine, drug research, pharmacognosy, botany, phytochemistry and pharmacology. Publication will be made on the basis of the recommendation of an expert body.
- The main title, indicative of the content, should be brief. An abstract, not exceeding two hundred words, be prefixed to the article. English equivalents may be provided to Sanskrit terms [e.g. vīrya (potency), guṇa (property), etc]. Correspondence address including e-mail, and affiliations, if any, of the author be attached to the text.
- Tables, minimized to the extent possible, with suitable reference to the context can be attached to the matter.
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- Reference matter may be arranged in the following order - Author, Text, Edition, Publisher, Pages and Year, etc. Example:

    1. John Bernar Hentory, *Clinical diagnosis and management by laboratory methods*, 17th Ed., WB Saunders Company, Philadelphia, pp 172-175, 1989.

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