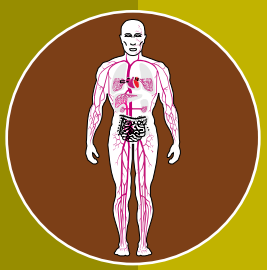
ISSN 0970 - 4086

Āryavaidyan

लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health



Vol. XXV., No.4
May - July, 2012

A QUARTERLY JOURNAL OF
THE ARYA VAIDYA SALA - KOTTAKKAL

āryavaidyan

A Quarterly Journal of
the Arya Vaidya Sala, Kottak

Vol. XXV., No. 4 | Regn. No. 55127/87 | May - July, 2012

Aryavaidyan is intended to encourage scientific writing and intellectual interactions among scholars, academicians, practitioners and students of ayurveda and allied subjects like Siddha, Unani, modern medicine, etc.

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learning other disciplines and
serving the preceptor - these factors
endow one with intelligence and memory

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Single copy	Rs. 35/-
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PRAMEHAGHNA PROPERTY OF *COSTUS PICTUS D. DON* - A COMMONLY KNOWN INSULIN PLANT

Christy Jose, Jollykutty Eapen and Jayasree P.*

Abstract: Medicinal plants and their bioactive constituents are used for the treatment of diabetes mellitus throughout the world, especially in countries where access to the conventional treatment of diabetes mellitus is inadequate. A few side effects associated with the use of insulin and oral hypoglycemic agents prompted us to search new bioactive principles from anti diabetic plants used in traditional medicine. Although several medicinal plants have gained importance for the treatment of diabetes, many remain to be scientifically investigated. *Costus pictus* D. Don is claimed to possess hypoglycemic activity. A preliminary phytochemical and pharmacognostical study was conducted to evaluate its acute toxicity and hypoglycemic activity.

Introduction

Costus pictus D. Don, a member of Zingiberaceae, family, is a succulent herb with long leafy spirally twisted stem 1- 3 meters in height and horizontal rhizomes with numerous roots, which acts as a root stalk. It is commonly called as 'Insulin plant', a perennial herb, cultivated as an ornamental in tropical gardens. It is a Mexican folk medicine, blooms basally in spring and terminally in summer. It is widely used by diabetic patients. (Fig I)

Objectives: - 1) Preliminary phytochemical and pharmacognostical screening of *Costus pictus*, 2) experimental study on the acute toxicity; 3) to study its hypoglycemic activity.

Pharmacognostical study

External morphology

Stem hirsute and green near apex, glabraous and purple towards base, 2-2.5m in height and 2-2.5 cm in diameter and hirsute at base; leaves elliptic, oblanceolate with a characteristic undulation to the edges and 15-34cm long. Apex acuminate 0-15mm long; base cunate rounded or slightly cordate. Upper surface glabrous to densely puberulous; sheath purplish to green, glabrous or rarely strigose 0-15mm width. The sheathing leaf base completely surrounds the portion of the stem above each node or internodal region. The bases of the sheaths are mottled with hieroglyphic markings. The leaves are spirally arranged; petiole 8mm in length, glabrous and purple at margin. The ligule is short, 2-4mm in length, glabrous or rarely strigose and truncate in shape. The inflorescence forms both terminally on a leafy stem and less often radically on a short nearly leafless stem. Most oftenly terminal cone, globose to ovoid 3-8cm in length

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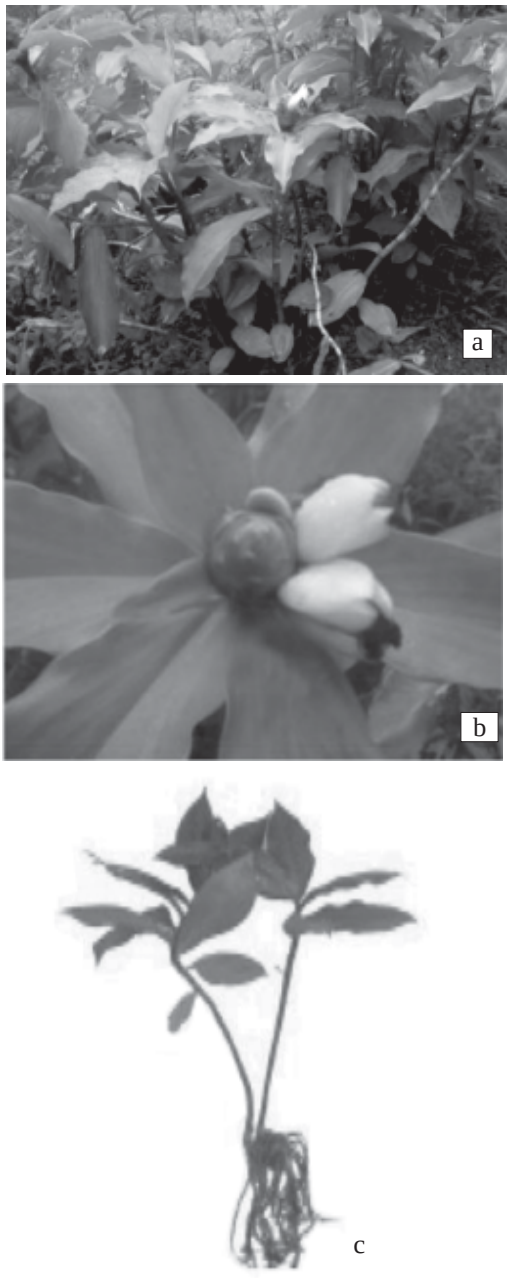

Fig. I. *Costus pictus* D. Don
a Natural habitat; **b** Inflorescence;
c Plant with rhizome & root

and 3-4cm in diameter. The flowers are produced from the axils of bracts in the cone, which are green in colour on upper side and reddish brown near base.

The major attraction of this plant is its light airy and tissue paper like flowers. They are light yellow in colour with reddish maroon stripes. Flowers do not produce aroma, but make a beautiful effect sitting on top of a tall spiraling stem. Calyx light yellow in colour, short funnel shaped, teeth 3, ovate 7mm long, glabrous or puberulous; orolla light yellow, 4-7cm long, glabrous, irregularly lobed, lobes narrow and obovate; labellum longer than corolla, 5.5cm wide, yellow with red streaks, pubescent within, trilobulate, mid lobule tridentate and dark yellow in colour, margin crenulate, mid lobe reflex. Stamen anther median on the process and with a broad filament forming an oblong petalloid process with the connective, 7-8mm long yellow coloured with dark red apex, narrowly elliptic, 4-4.5cm length and 0.9-1.5cm in width.

Gynoecium ovary three celled, ovules numerous on axile placentation; Style filiformand passes through a the central portion of the anther, stigma crescent shaped with a double lobed side branch, capsule globose or ovoid, seeds obovoid, aril short.

Microscopical charters

Leaf: - A transverse section of the leaf shows upper epidermis, merophyll and lower epidermis and a row of vascular bundles except at the region of midrib, where there is more than one bundle. Both epidermis layers are cutinized. The cells of the upper epidermis are polygonal in shape in surface view the no of stomata is very less than compound to the lower epidermis. Guard cells are kidney shaped with thick inner tangential walls. The stomata is surrounded by

four subsidiary cells of which too lie parallel to the long axis of the guard cell and the other two cells right angle to the long axis of the stomata at both ends lower epidermis consists of polygonal irregular cells. The structure of the stomata is similar to that of upper epidermis. The mesophyll cells are polygonal without chloroplast except around the vascular bundles, where the cells contain abundant chloroplast. Vascular bundles are collateral, conjoint and closed. Xylem towards the upper epidermis and phloem towards the lower epidermis. The lower epidermis is covered by minute epidermal hairs. (Fig. IIa-d & IIIa-c)

Stem:- T.S. of the ariel stem is circular in shape that shows an outer epidermis consist of more or less rectangular cells followed by parenchymatous ground issue, the cells of which contain abundant starch grains. The vascular bundles are arranged in a ring peripherally, each bundle is surrounded by sclerenchymatous cells and they are connected each other by a layer of sclerenchymatous cells. Inside this outer ring of vascular bundles numerous, collateral, conjoint, closed bundles are irregularly scattered in the ground issue. Starch grains are more or less oval in shape, which are of concentric type. (Fig. IVa-e)

Rhizome: - T.S. of the young rhizome is covered by a single layer of epidermis, followed by parenchymatous ground issue, which contain abundant starch grains which are slightly don gated and spherical. The starch grains do not bear any striations when the rhizome outer region produces 8-10 layers of cork cells. There is a distinct endodermis; inside the endodermis there is a broken ring of vascular bundles which encloses numerous scattered vascular bundles. In mature rhizome, cortical bundles are of the amphicribal type, with phloem encircling the xylem strand. (Fig. Va-d)

Root: - T.S. of the root is circular in shape. The young root shows an outer epidermis, which consist of a single layer of cell, followed by a broad cortex. But in mature roots, the formation of cork cambium from the 3rd layer of cortex can be seen. The cells of the ground tissue are homogenous. The endodermal cells are provided with casperian thickening at the radical walls as well as inner tangential walls. At the protoxylem points in the endodermis unthickened passage cells can be seen. The xylem vessels are elliptical or circular. In T.S. phloem are seen in between xylem. The pith is provided with slightly thickened cells which are polygonal in shape. (Fig. VIa&b)

Preliminary phytochemical study

Water-soluble extractives: - The water soluble extract of the drug mainly represents the percentage of organic constituents such as tannins, sugars, plant acids, mucilages and glycosides.

Alcohol soluble extractives:- The alcohol soluble extract mainly represents the percentage of organic constituents such as alkaloids, phenols, flavanoids, steroids and sugar, etc present in the drug. Various physicochemical parameters of the dried sample of leaves are shown in Table 1.

Successive solvent extraction: - It is the extraction of drug with organic solvents of increasing polarity is applied for the isolation of active constituents from and drug and their qualitative exhausting crude drugs are indicative of approximate measures of their chemical constituents. Largest percentage of extract obtained was acetone (8.4) and least

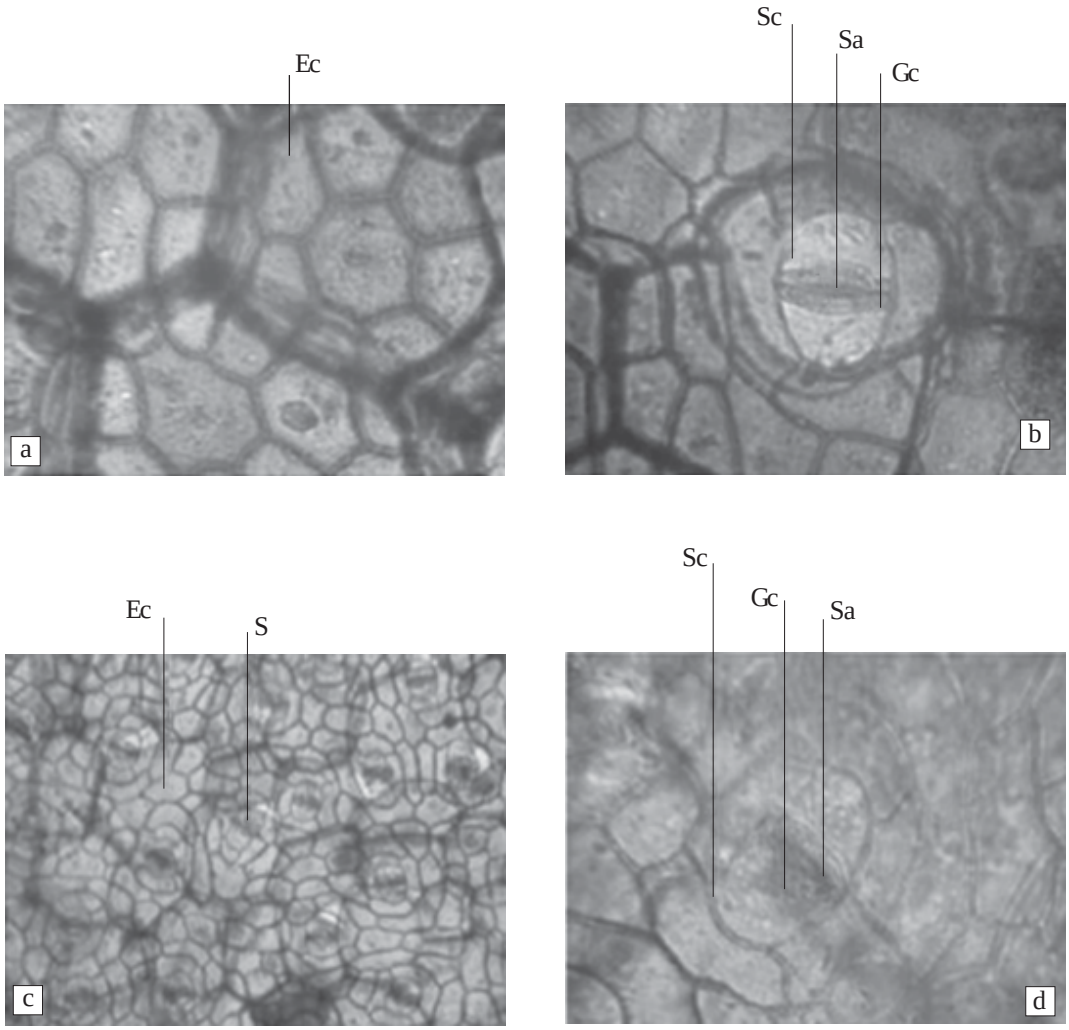

Fig. II a-d: *Costus pictus* D. Don - Leaf peel
a & b - Upper surface; c & d - Lower surface
Ec Epidermal cells; **Sc** Subsidiary cell; **Sa** Stomatal aperture; **Gc** Guard cell; **S** Stomata

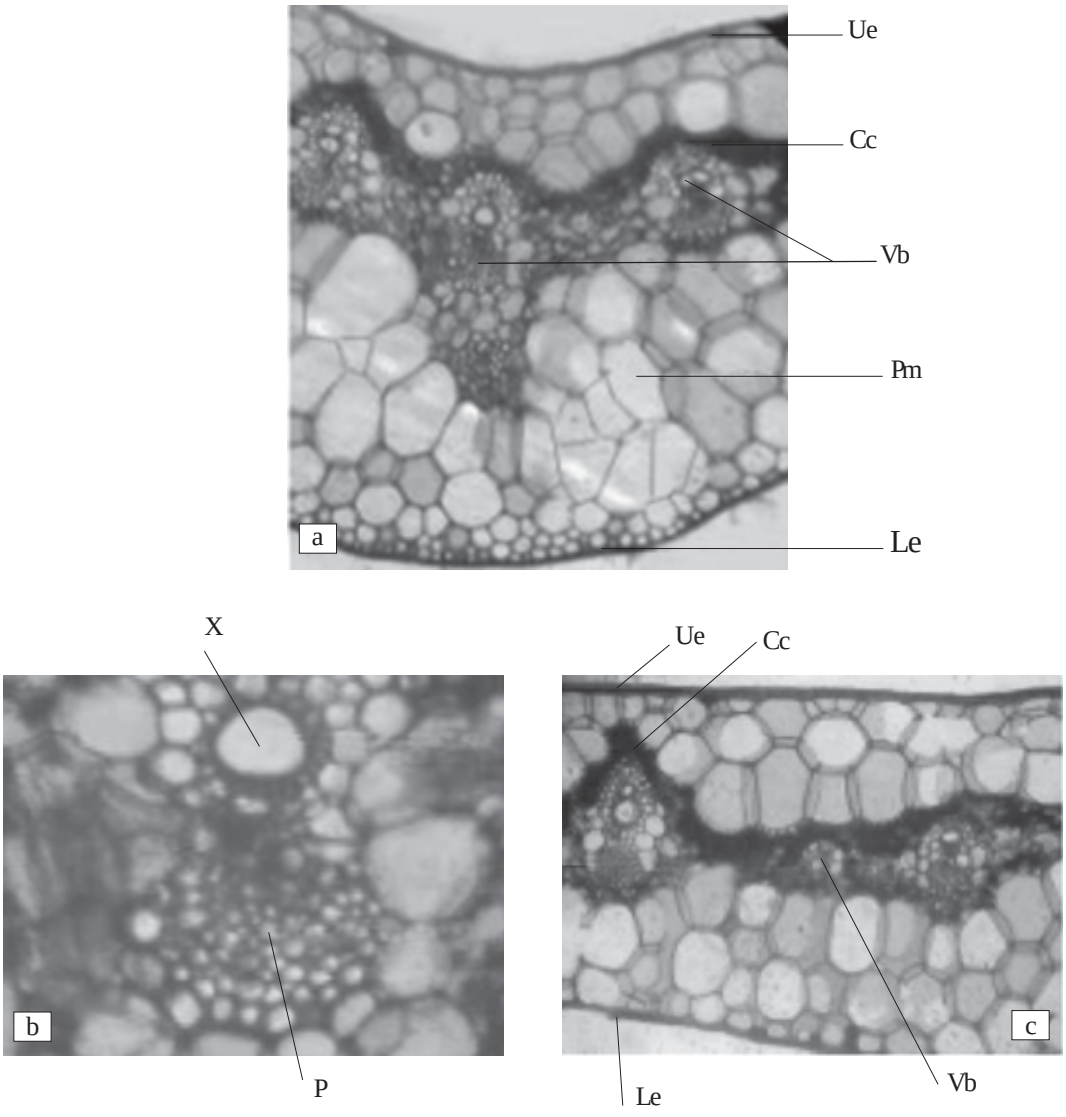

Fig. III a-c: *Costus pictus* D. Don - TS of leaf
a - Midrib; b - Laminar portion; c - Vascular bundle enlarged
Ue Upper epidermis; **Cc** Chlorenchyma; **Vb** Vascular bundles; **Pm** Parenchymatous mesophyll; **Le** Lower epidermis; **X** Xylem; **P** Phloem

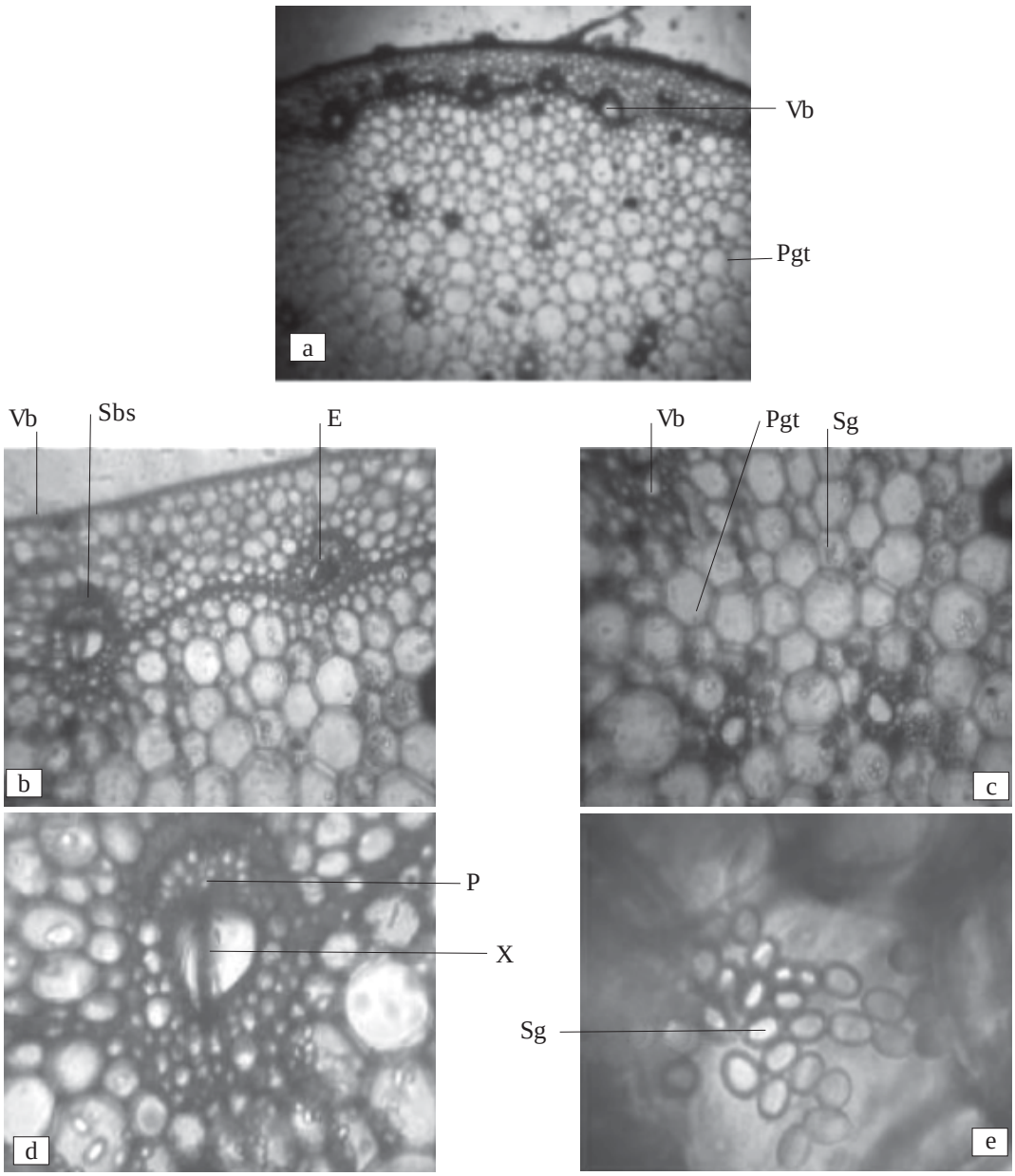

Fig. IV a-e. *Costus pictus* D. Don - TS of Ariel stem
a - Under lowpower; b - Outer region; c - Inner region; d - Vascular bundles enlarged; e - Starch grains enlarged
Vb Vascular bundles; **Pgt** Parenchymatous ground tissue; **E** Epidermis; **P** Phloem; **X** Xylem; **Sg** Starch grains

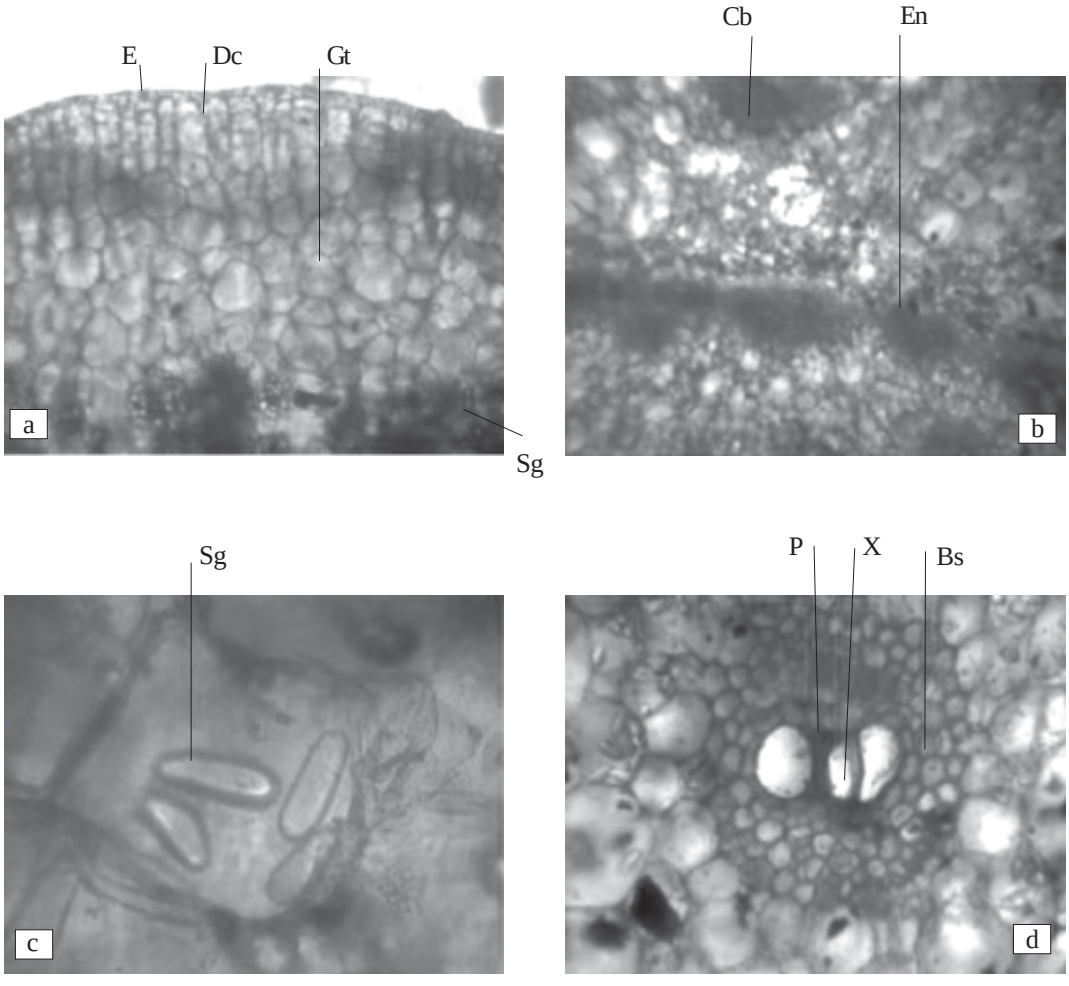

Fig. V a-d. *Costus pictus* D. Don - TS of rhizome
a - Cortical portion; b - Cortical & stelar portion; c - Starch grains enlarged;
d - Vascular bundles enlarged
E Epidermis; **Dc** Developing cork; **Gt** Ground tissue; **Sg** Starch grains;
Sb Cortical bundles; **E** Endodermis; **P** Phloem; **X** Xylem; **Bs** Bundle sheath

TABLE 1
Physicochemical parameters of dried sample

	Parameters	%
01.	Moisture content	Nil
02.	Volatile oil content	Nil
03.	Total ash	11
04	Water insoluble Ash	8
05.	Acid insoluble Ash	1.3
06.	Fibre content	9.3
07.	Total sugar	17.2
08.	Reducing sugar	14.8
09.	Hot water extracts	15.53
10.	Cold water extract	13.4
11.	Cold alcohol extracts	14

cyclohexane (2.1). The alcoholic extract was 7.5% and petroleum either 5.7%. This indicates the presence of chemical constituent and its amount in the rhizome.

Qualitative chemical examination: - Steroids are present in all the four extracts. Alkaloids are absent in all extracts by both tests is Mayer's reagent test and Dragendroff's reagent test. Phenols are present in alcoholic & acetone extracts. Saponins are present in both alcohol and acetone extracts. (Table 2)

TLC analysis**: -** For TLC study all the extracts of drug were spotted in different solvent system. The plates were allowed to develop and the spots were visualized in UV & iodine. The spots were detected on the following solvent systems: i) Acetone: benzene (9:1); ii) N-Hexane: acetone (9:1); iii) Cyclohexane : ethylalcohol(4:1)

Pharmacological study

Selection of animals: - 30 healthy rabbits of both sexes, weighing 1500-2000gm, were collected from the animal house of Agadatantra Department, Government Ayurveda College, Thiruvananthapuram.

Standard drug: - Metformin**.**

Test drug: - Expressed juice (svarasa) of leaves of *Costus pictus.*

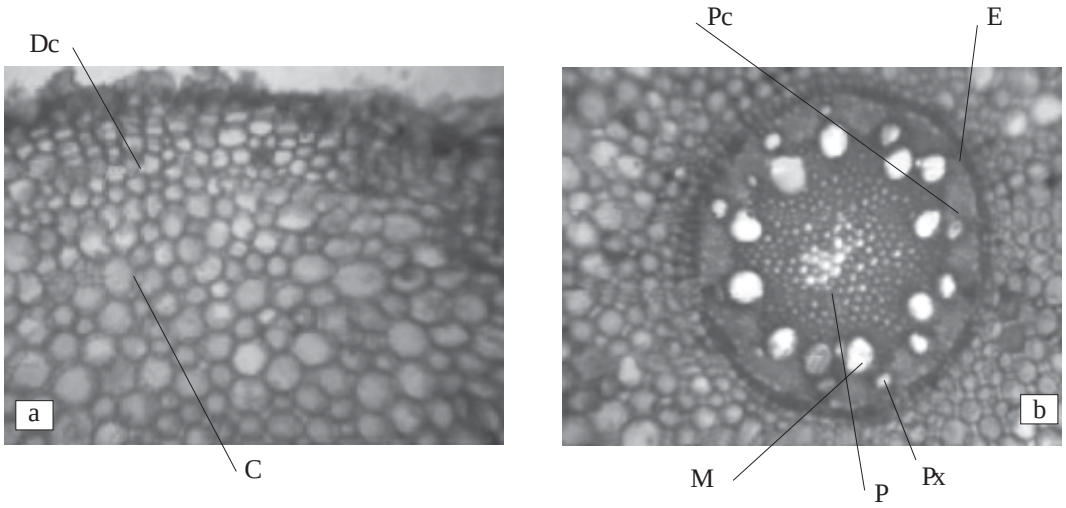

Fig. VI a&b. *Costus pictus* D. Don - TS of root
a - Cortical portion; b - Stelar portion
Dc Developing cork cambium; **C** Cortex; **E** Endodermis;
Pc Pericycles; **P** Phloem; **M** Metaxylem; **Px** Orotoxylem

TABLE 2
Qualitative chemical examination

Constituents	Pe	C	A	Al
1. Steroids	+	+	+	+
2. Alkaloids:				
Mayer's test	-	-	-	+
Dragendroff's	-	-	-	+
3. Phenols	-	-	+	+
4. Flavanoids	-	-	-	-
5. Saponins	-	-	+	+

P - Petroleum ether; C - Cyclohexane; A - Acetone; Al - Alcohol

Preparation: - Fresh leaves of *Costus pictus* were collected and cleaned well with water; allowed to drain-out water, pounded well and squeezed through a cloth.

Dose: - According to Sarngadharasamhitha, the dosage of svarasakalpana is half pala (24ml approx.) This is considered as the human dose. The effective dose for rabbit was calculated by using the table constructed by Paget G.E. and Barnes T.M. in the evaluation of drug activities. Based on this, the following doses were calculated:

TD I (Test drug I) - 1.12ml/ kg body wt.
TD II (Test drug II) - 0.56 ml/kg body wt.
TD III (Test drug III) - 2.24ml/kg body wt.

Procedure: - The animals were observed for one week for normal behavior, food habits, etc. and to accustom with new conditions. As the first step, normal fasting blood sugars of all rabbits were taken. All rabbits were fasted before collection of blood sample and the samples were collected from marginal ear vein. After that, normal rabbit feed was given. Two days after collection of blood sample, Alloxan monohydrate solution was given through central ear vein (in order to induce diabetes) and watched for 24 hours. Occasionally hypoglycemic convulsions were observed after giving alloxan intravenously. Such conditions are met by oral glucose feeding and dextrose IV injection. From next day onwards, rabbits were observed for seven days. All rabbits were weighed before alloxan injection. During this period, they showed increased intake of food and water. Seven days after alloxan injection, all the animals were weighed. Very small number showed decrease in weight. On the seventh day, fasting blood samples were collected. The rabbits showing more than double of their fasting blood sugar values were selected for further study. Twenty five rabbits were taken and grouped into five each. They were marked and separated for identification. First group was treated with TD I (test drug sample 1), which was the expected effective dose. Second and third group were treated with test drug sample II (TD II) and test drug sample III (TD III) respectively. TD II was half of the effective dose, while test TD III double the effective dose. The fourth group was treated with standard drug Metformin. The fifth group was kept as control and treated with distilled water. Blood samples were taken on 4^{th}, $8^{th}$and 15^{th} day after drug administration. Results were noted. After experimental period animals from each group were sacrificed after giving anesthesia. Liver, kidney, spleen, and heart were isolated and preserved in separate containers and given for histopathological examination.

Collection of blood: - Both ears were shaved for removing hair and swabbed with a disinfectant. The ear was grasped between the thumb and the index finger in a well restrained animal. Using a 20 gauge level up, veni-puncture was made at a site immediately proximal to the thumb along the marginal vein which was relatively immobile.

A very gentle aspiration was applied in order to avoid collapse of the vein.

Precautions: - Rabbit showed abnormal variation in normal fasting blood sugar value was avoided. Pure hygienic conditions were maintained throughout the study in order to prevent infection.

Experimental study on acute toxicity

Aim: - Determination of median lethal dose (M LD) or LD 50 by giving single doses of drug to each animal on one occasion. Also, to determine the therapeutic index that is the ratio between pharmacologically effective dose and the lethal dose.

Animals: - 30 healthy albino mice of either sex weighing 20-30gms were equally divided into 5 groups.

Drug: - Fresh leaves of *Costus pictus* were ground well and filtered to pass it through tuberculin syringe without hindrances.

Dose:- The drug (svarasa) was administered orally in the following doses: a) Group1- distilled water; b) Group 2 - 0.0062ml/ gm body wt; c) Group 3 - 0.0094ml/gm body wt; Group 4 - 0.0125ml/gm body wt. and Group 5 - 0.0156ml/ gm body wt.

Procedure: - The drug was administered orally using a tuberculin syringe. The animals were kept in different cages and watched continuously for 2 hrs; then normal feed was given. During the course of study, animals were given drinking water and watched occasionally for 4 hrs for 7 days. During this time any change in behavior and mortality was noted.

Observation and interpretation

Experimental study

After the administration of drug, the animals were observed closely for any abnormality in their behavior as well as death. One animal died in each group and all the animals showed normal behavior and health throughout the period of study. Signs recorded during the acute toxicity were as follows:

Motor activities	Normal
Tremor	Nil
Convulsions	Nil
Pilo-erection	Nil
Muscle spasm/relaxation	Nil
Catatonia	Nil
Spasticity	Nil
Anesthesia	Nil
Sedation	Nil
Analgesia	Nil
Arching and rolling	Nil
Salivation	Nil
Writhing	Nil
Respiration	Normal
Depression	Nil

Pramehaghna property: - Before induction of alloxan, no special features were found in the physical condition of animals. After alloxan induction, symptoms like increased frequency of urination; excessive thirst and excessive food intake were noted. Reduction in weight was noted in some animals. After seven days, the fasting blood sugar values were taken. From the high blood sugar values it was inferred that the animals became diabetic. Blood sugar was monitored on 5^{th}, 10^{th} and 15^{th} day.

Analysis: - ANOVA test was conducted to test the homogeneity of mean blood sugar of different groups. Normal FBS was found to be almost same in all groups. FBS after alloxan induction was also found to be the same. The average value of normal FBS and FBS after alloxam induction in different groups are shown in the Table 3.

Effectiveness on FBS: - Group treated with TDI

TABLE 3
Average value of FBS
Normal and after alloxan induction

Group	Mean	SD	N	F
1. FBS - Normal				
Effective dose	146.2	12.0	5	
Half dose	151.7	7.6	5	
Double dose	148.0	9.0	5	0.668
Standard	144.2	8.5	5	
Control	151.9	8.8	5	
2. FBS after				
Effective dose	299.8	30.3	5	
Half dose	331.1	25.3	5	
Double dose	320.8	20.2	5	1.066
Standard	298.7	26.3	5	
Control	319.6	45.3	5	

$p > 0.05$

showed substantial reduction in blood sugar values on 5th, 10th & 15th days. Maximum diminution was observed on15th day with $p<0.001$. On comparison of FBS value on 5th day with that of 10th & 15th day, reduction noticed was significant. Reduction noticed on comparison of FBS values on 10th &15th was not significant. Drug showed better action on first 10 days. In group treated with TDII, maximum lowering of blood sugar was noted on 15th day. While comparing FBS values on different days, no significant changes were observed. So it was noted that the drug showed better results on first five days. In TDII group, maximum lowering of blood sugar was noted on 15th day. Group

TABLE 4
Effect of the drug on Fasting Blood Sugar (FBS) in each group during the course of treatment

Group	Mean	SD	No	Mean diff.	t	p
1. Test dose I (TDI)						
- After alloxan induction	299.8	30.3	5			
- After 5th day of treatment	194.1	21.0	5	105.72	7.40	p<0.01
- After 10th day of treatment	151.4	30.5	5	42.67	8.14	p<0.01
- After 15th day of treatment	133.2	18.4	5	60.87	3.94	p<0.05
2. Test dose II (TDII)						
- After alloxan induction	331.1	25.3	5			
- After 5th day of treatment	196.6	25.6	5	134.49	13.22	p<0.001
- After 10th day of treatment	213.7	4.4	5	117.46	10.48	p<0.001
- After 15th day of treatment	195.8	35.1	5	135.33	8.30	p<0.01
3. Test dose III (TD III)						
- After alloxan induction	320.8	20.2	5			
- After 5th day of treatment	190.5	23.7	5	130.25	7.18	p<0.01
- After 10th day of treatment	181.3	32.4	5	139.46	7.37	p<0.01
- After15th day of treatment	178.4	38.9	5	142.34	7.48	p<0.01
4. Standard						
- After alloxan induction	298.7	26.3	5			
- After 5th day of treatment	186.3	36.3	5	112.40	12.25	p<0.001
- After 10th day of treatment	193.8	20.6	5	104.94	23.22	p<0.001
- After 15th day of treatment	178.0	24.6	5	120.74	9.19	p<0.001
5. Control						
- After alloxan induction	285.1	7.2	2			
- After 5th day of treatment	277.6	31.7	2	7.55	0.27	p>0.05
- After 10th day of treatment	305.0	7.1	2	19.88	1.96	p>0.05
- After 15th day of treatment	295.0	21.2	2			

treated with TDIII showed utmost decline in FBS value on 15th day. Group treated with standard drug metformin showed reduction in blood sugar values on 5th, 10th & 15th days. In all assessments, numerical values found significant with $p<0.001$. Changes found comparison of FBS values on 5th &10th, 5th &15th and 10th & 15th day were not significant with $p > 0.05$. In control group, three animals died after 1st assessment. This may be due to shooting rise in blood sugar. No significant changes were found in FBS value throughout the study period. The effect of the drug on FBS in different groups is shown in Table 4.

On analysis of FBS values on 5th day, it was found that group treated with TDIII showed better results. From next day onwards TDI group showed more reduction. When FBS values on 5th & 10th day are compared, noted decline was found only in group treated with TD1. No significant changes were noted on comparing values on that of 5th & 15th day. While comparing FBS values on that of 10th & 15th day, no significant difference were noted. On comparison with standard values, it was noted that TDI is better hypoglycemic agent. The efficacy of Standard & TDII found almost similar. Result obtained on comparison of Standard with that of TDIII was almost same that obtained with TDIII. When compared with Control, Standard is good hypoglycemic agent.

Histopathological examination: - Mainly changes were noticed on group treated with TDI and TDIII. Group treated with TDIII showed necrosis of hepatic cells, central vein dilatation of hepatic lobules, congestion of liver, tubular degeneration of kidney, atrophy and necrosis of glomeruli, congestion of spleen, white pulp and red pulp necrosis. Group treated with TDI showed mild degeneration of hepatic cells and tubular degeneration of kidney. In other groups no notable changes were noticed.

Conclusion

From these findings we can conclude that the drug *Costus pictus* D. Don has evident hypoglycemic activity. Histopathological examination shows that the drug has progressive adverse effect on liver, kidney and spleen. No acute toxicity was found.

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HEPATOPROTECTIVE EFFECT OF HERBOMINERAL DRUGS IN CHRONIC HEPATITIS B PATIENTS - A CLINICAL EXPERIENCE

Pragya Singhal*

Abstract: With an aim to explore the hepatoprotective effect of herbomineral preparations on Chronic Hepatitis B patients, a total of 14 patients of chronic liver disease were given a combination of herbomineral drugs for 4 months. Liver function tests were done every 2 months after initiating the treatment. Serum was analysed for hepatitis B infection markers i.e. HbsAg, HBeAg, before starting treatment and after 4 months of the treatment. A significant reduction of ALT values from 71.36±10.566 to 38.64±2.678 and a significant HBeAg loss of 28.5% were observed.

Introduction

Udararogas are caused due to accumulated doṣas which obstruct the channels carrying sweat and water and vitiate prāṇavāyu, agni and apānavāyu as a result of which udararogas are manifested. Signs and symptoms of the paittika type of udararogas are very similar to liver cirrhosis i.e. burning sensation, fever, thirst, fainting, diarrhoea, giddiness and yellowish discolouration of nails, eyes, face, skin, urine and stool, appearance of network of veins with blue, yellow, green and coppery colour; burning sensation, sensation of pain and perspiration. The condition gets converted to jalodara because of immediate maturation of the process of pathogenesis (kṣiprapāka).

It is estimated that 400 million people worldwide are chronically infected with hepatitis B virus (HBV), as indicated by the presence of hepatitis B surface antigen (HBsAg) in serum for longer than 6 months. These patients are at substantially increased risk of cirrhosis and hepatocellular carcinoma (HCC) diseases that lead to one in every 40 deaths worldwide - approximately 1 million each year. The risk of cirrhosis and hepatocellular carcinoma increases in proportion to the serum level of HBV DNA in patients with chronic hepatitis B. Up to one million people die every year from the complications of HBV infection.

Prevalence of hepatitis B surface antigen in India varies from 1 to 13% with an average of 4.75%. Sustained suppression of viral replication has been shown to improve clinical outcomes, and since eradication or 'cure' of HBV is not possible, virologic control becomes a primary goal of treatment.

Material and methods

A treatment protocol was carried out in 14 patients of chronic liver dise'ase which were

*Clinical Registrar (Kayachikitsa), Ch. Brahm Prakash Ayurved Charak Sansthan, New Delhi

either admitted in the wards or seen in the Outpatient Department of Ch.Brahma Prakash Ayurved Charak Sansthan, New Delhi, between October 2010 - March 2012.

Diagnostic cūriteria: - Patients with HBV infection showing symptoms and raised biochemical markers (alanine aminotransferase and aspartate aminotransferase) above normal level.

Inclusion criteria: - Patients aged 18-60 years, with their serum alanine aminotransferase (ALT) levels above normal limits and who had positive serum HBsAg; and those whose duration of illness is more than 6 months.

Exclusion criteria: - Patients aged over 60 years or less than 18 years, pregnant or lactating women who had other hepatic viral infection, autoimmune hepatitis and drug induced hepatitis or alcoholic hepatitis; and those with severe complications of cardiovascular, renal or hematopoetic system.

Treatment protocol: - A combination of the following herbomineral drugs was used:

- Āryogyavardhini vaṭi - 2 tab twice daily
- Guḍūci cūrṇa - 3 gm twice daily
- Haritakīcūrna - 5-10 gm at bedtime
- Citrakādi vaṭi - 2 tab twice daily, before meals
- Phalatrikādi kaṣāya - 40 ml
- Syrup containing kuṭaki and bhūmyāmalakī svarasa

Assessment criteria

- The symptoms and signs of patients were recorded in detail once in a month, before and during the treatment.
- Liver Function Test: Liver Function Test was done every 2 months during treatment, including examinations of levels of serum proteins, total bilirubin and activities of alanine aminotrasferases (ALT) and aspartate aminotransferases (AST)
- Markers of Hepatitis B: Serum was assayed for HBsAg and HBeAg.

Observations and results

Out of 14 patients 8 patients were males and 6 females between the age group of 25 to 54 years with mean age of 40.86±10.302. The demographic characteristics of the patients at the baseline are shown in Table 1.

TABLE 1
Demographic characteristics of the patients at the baseline

Charecteristics	n=14
1) Age (in years)	
- Mean	40.86 ± 10.302
2) Sex:	
- Male	08
- Female	06

Clinical response: - There was improvement in clinical symptoms such as abdominal pain, loss of appetite and recurrent ascitis. Patients also showed marked improvement in general condition. (Table 2-4)

Discussion

The combination of herbomineral drugs showed better results in terms of improvement in clinical signs and symptoms and laboratory parameters. Patients with decompensated liver disease showed marked improvement in general condition and improvement in loss of appetite. Recurrence of ascitis is common after withdrawal of anti-diuretic medications, but it has been observed in most of the cases treated with herbomineral preparations that frequency of recurrence of ascitis has decreased. Thus the herbomineral drugs have shown better efficacy in their hepatoprotective action.

TABLE 2
Response of herbomineral drugs on Liver Function Tests

Parameters	Before Treatment	2 months (F1)	4 months (F2)
AST(IU/L)	58.86 ± 7.156	45.29 + 5.837	40.43 ± 4.926
ALT(IU/L)	71.36 ± 10.566	44.21 ± 4.4758	38.64 ± 2.678
Serum bilirubin (mg%)	2.193 ± .7830	1.514 ± .4418	1.250 ± .2929
Total proteins (g%)	6.257 ± .2409	6.407 ± .2269	6.564 ± .1865
Serum albumin (g%)	3.214 ± .2656	3.293 ± .2336	3.529 ± .2054
Serum globulin (g%)	2.90 ± .2512	2.693 ± .1859	2.60 ± .1664
Alkaline phosphatase IU/L	145.36 ± 24.914	127.43 ± 23.343	109.86 ± 21.216

TABLE 3
Paired 't' test

Parameters	BT-F1	F1-F2	
AST	13.571 ± 7.176 (t=7.076)		18.429 ± 5.906 (t=11.675)
ALT	27.143 ± 11.727 (t=8.660)	5.571 ± 4.702	32.714 ± 11.918 (t=10.720)
Sr. Bilirubin	.6786 ± .5605 (t=4.530)	.2643 ± .320	.9429 ± .6345 (t=5.560)
Total Proteins	.1500 ± .1092 (t=5.140)	.1571 ± .1089	.3071 ± .1859 (t=-6.182)
Sr. Albumin	.0786 ± .0975 (t=-3.015)	.2357 ± .3079	.3143 ± .3207 (t=-3.667)

Guḍūci (*Tinospora cordifolia*) is well known for its immunomodulatory and antioxidant action. Stanley *et al* (2001) has observed that the root extract of guḍūci exhibits antioxidant action in rats. Citrakādi vaṭi was given to improve the appetite as udararoga are caused due to agni-mandya. In udararoga, there is an obstruction of doṣāas due to sroto-avrodha; haritaki, which (*Terminalia chebula*) clears the channels and it also acts as a purgative.

Āryogyavardhini vaṭi besides being a good appetizer, contains copper which is indicated in liver disorders (like cirrhosis). Dange *et. al* has observed that recovery in biochemical markers (i.e. Serum Bilirubin, AST and ALT levels) found in significantly lesser days with Āryogyavar-dhini vati. Singh *et. al* (2000) found antioxidant action of kuṭaki (*Picrorhiza scrophulariiflora*) in rats. Pandey *et. al* has observed anti-inflammatory action of kuṭaki. Bhūmyāmalaki (*Phyllanthus amarus*) has activity against Hepatitis B virus. Venkateshwar *et. al* (1987) has observed that bhūmyāmalaki has antiviral action against Hepatitis B *in vitro*.

High morbidity and mortality have been found in India among HBsAg positive patients. The goals of treatment in Chronic Hepatitis B infection are sustained viral suppression, normalization of ALT levels, and improvement of liver histology leading to long term reduction in the risk of cirrhosis and hepatocellular carcinoma. Though the patients showed loss

TABLE 4
Viral Markers

Viral factors	BT (+ve)	AT	
		2 months	4 months
HBsAg	14	14	14
HBeAg	14	11	10

of HBeAg viral markers, normalization of ALT levels and improvement in liver histology, absence of Hepatitis B surface antigen had not been observed in the study.

Conclusion

After four months of treatment, liver function tests showed a trend towards normalization. The values of ALT, AST and Bilirubin levels decreased from initial value, statistically significant. Virological marker HBeAg turned negative in 4 patients after 4 months of treatment, but absence of HBsAg viral marker was not observed. In summary, this trial demonstrated that 4 months treatment with herbomineral drugs resulted in clinically significant biochemical benefits in patients with Chronic Hepatitis B infection.

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MEASUREMENT OF RŪKṢAGUṆA OF VĀTADOṢA IN ŚVĀSAROGA PATIENTS AND HEALTHY SUBJECTS - AN EXPERIMENTAL COMPARATIVE STUDY

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Abstract: In medical science accurate details of physiological and pathological attributes are utmost important. In āyurveda, vātadoṣa is one of the fundamental factors responsible for health as well as diseases. Measurement of rūkṣaguṇa (dryness) of vāta, i.e. absence or less moisture, and its opposite but complementary factor i.e. snighda (moisture) was measured in two groups of śvāsa patients and healthy subjects. For this study, two self developed devices viz. DMMT and DMM were introduced along with the established Spirometer and Peak Flowmeter. This study to measure the rūkṣabhāva of vātadoṣa in expired air was based on the concept of trya pramāṇās i.e. āptopadeśa, anumāna and pratyakṣa, described in the classics as well as formulas and theories described in modern science.

Introduction

In the medical field, whether physiological or the pathological attributes, the importance of measurement is placed first and foremost. In āyurveda, this is called as māna or parimāṇa. Ācārya Caraka's definition of āyurveda[1] and the description of parādi guṇas as the key to successful treatment,[2] corroborate its importance. Caraka has set apart a separate section named Vimānasthāna to guide the work of measurement, qualitatively as well as quantitatively.

Although Caraka mentions the añjali pramāṇas[3] for pitta and kapha doṣas, all the other samhitas and authoritative texts, except Padmapurana,[4] are quite silent over the subject of vātadoṣa pramāṇa. Since vātadoṣa is in invisible (avyakta) form, it is advised to be detected by āptopadeśa and anumāna pramāṇa. But if guṇa-guṇī abheda is considered, vāta can be measured in terms of its specific guṇas as rūkṣa, śîta, cala, etc. If rūkṣādi measurement and standardisation is possible in healthy state, its deviation from standard values in diseased state can be estimated and guṇa-dependent treatment contrary to cause can be planned for that particular state which may show quick and positive effects.

Vāta is invisible but may be traced in expired air as prāṇavāta. Therefore, vātapradhāna śvāsa patients along with healthy subjects were selected to measure the rūkṣaguṇa of vāta.

Rūkṣa and snigdha guṇas i.e. dryness and moisture, are opposite in nature but complimentary to each other. If one is measured,

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other can also be assessed with the same result. This is the main theme of the present study.

Aim & objective: To measure the guṇas, mainly rūkṣa guṇa of vāta, in śvāsa patients and healthy subjects comparatively.

Materials and methods

Source:- 30 patients, having the characteristic features of vātika śvāsa, were selected from the OP/IP Departments of National Institute of Ayurveda, Jaipur; and 30 healthy subjects were selected from the local community, by simple random-sampling technique. The subjects were equally divided into two groups: Group I (śvāsa patients) and Group II (normal, Control).

Inclusion criteria: - i) age in between 16 to 70 years; ii) śvāsa patients with vāta predominant symptoms and iii) those meets the subjective - objective parameters mentioned in the texts.

Exclusion criteria: i) age <16 years or > 70 years; ii) śvāsa patients with kaphadoṣa dominant symptoms; iii) cases of cardiac asthma, pleural effusion, bronchiectasis, abscess and achexia.

Āyurvedic research methodologies:-[5] i) Pratijña - to measure the rūṣkṣaguṇa of vāta; ii) hetu - dravyatva of vâta; iii) udāharaṇa - añjali pramāṇa of kapha and pitta;[3] iv) upanaya - as kapha and pitta are measurable, vâta may also be measured; v) nigamana - rūkṣaguṇa of vâta can be measured via expired air.

Modern research methodologies: - i) Questionnaire, ii) Spirometer and Peak Flowmeter, iii) self-developed devices viz. DMMT and DMM.

Questionnaire: - On the basis of effects and symptoms produced by rūkṣaguṇa of vâta i.e. hardness, dryness, moisture absorption, śoṣaṇa, etc., a questionnaire (10 questions) was designed and adopted. The reply was marked as 'yes' or 'no'. Each 'yes' carried 10% marks. Thus out of 100% of positive reply was estimated.

Spirometer and Peak Flowmeter: - Both of the groups were examined by Spirometer and Peak Flowmeter for Forced Vital Capacity [FVC], Forced Expiratory Volume [FEV_1] and Peak Expiratory Flow Rate [PEFR] that reveals the condition of lungs and thus the picture of pranavaha srotas was sketched. With the help of results, rūkṣaguṇas of vâta was evaluated.

Self-developed devices: - In DMMT (Device for Measurement of Moisture and Temperature), Digital Thermo-Hygrometer was used to measure the temperature and relative humidity (RH) of expired air in both the groups; and in DMM (Device for Measurement of Moisture) calcium chloride ($CaCl_2$) was used as hygroscopic material to measure the moisture content.

Assessment: - The following formulas were adopted to calculate DMMT and DMM.

- DMMT

  $RD = 100 - RH$; where RD is relative dryness (saapeksha ruksta) and RH relative humidity.

  $\% DT = \frac{DBAT}{BT} \times 100$; where DT is difference in temperature, DBAT - Difference Before and after Temperature and BT is Before Temperature.

- DMM

  $MC\ (gm) = BWC - AWC$; where MC is Moisture Content, BWC - Before Weight of $CaCl_2$ and AWC is after weight of $CaCl_2$.

  $AMC = SVP(E_S)\ milibar = 6.11 \times 10^{(7.5\,t/23.7+t)}$; where AMC is Absolute Moisture Content; SVP Saturation vapor pressure; 't' temperature in Celsius.

AVP(E) milibar = (RH x Es) / 100; where AVP is actual vapor pressure; RH relative humidity.

Calculation of vapor density by Gas Law: *D = P/TR*; where D is density in kg/m^3; P - Pressure in Pascal's and T - Temperature in Kelvin.

Now, P = E x 100; T = t + 273; R = Rw = 461.5 J Kg/Kelvin. Actual Vapor Density = Absolute Moisture Content in kg/m^3

Student's uunpaired "t" test was applied for statistical evaluation. The above described values such as RD (%), AMC (kg/m^3), PEFR (L/min), FVC (L), FEV_1(L) and Moisture (gm) were evaluated by statistical method and then analysed for status of rūkṣaguṇa.

Results and discussion

Based on āyurvedic texts and literature, a hypothesis was adopted that rūkṣa and śīta guṇas[4] of vāta are mainly responsible for srotosamkoca (constriction) and stambhana (bronchoconstriction and obstruction) which are the main pathology responsible for dyspnea.

According to rūkṣaguṇa based questionnaire (consists of 10 questions), maximum (90%) rūkṣa bhāva was found in 13.3% of patients; while minimum (40%) in 6.7% and 80% rūkṣabhāva in 23.3% patients. (Table 1) This result reveals that in śvāsaroga, vātadoṣa is vitiated by its rūkṣa bhāva that produces bronchoconstriction.

It has already proved that airway fluid loss has a similar broncho-constrictor effect to histamine (Scharf, S.M., *et al*); and that histamine, a potent bronchoconstrictor, and other proinflammatory bronchoconstrictor mediators, including cysteinyl-leukotrienes, releases from mast cells and other airway cells under hyperosmolar conditions (Silber G. Proud, *et al*). These findings underline the bronchoconstrictor potential of airway dehydration or increased rūkṣa bhāva.

Maximum Relative Dryness (RD) observed was 69% and minimum 31% in Group I; whereas in Group II, maximum and minimum was 48% and 25% respectively. Expired air of śvāsa patients was found relatively drier than healthy subjects. The difference of 'p' value (<<<0.001 i.e. null hypothesis was rejected) found in between two groups were proved to be significant with regard to absolute moisture content and moisture content. There was a significant difference in FVC and FEV_1 (p <<<.001) and in peak flow measurements (p<<< .001) between the two groups. These results reveal the genesis of obstruction in respiratory pathway of svasa patients that is due to either mucus over secretion or inflammation and broncho-constriction (Tables 2&3). In this study vâta pradhāna śvāsa patients were screened, hence here obstruction was considered mainly due to bronchoconstriction produced by rūkṣaguṇa of vâta. Hence it is proved that airway dehydration may trigger bronchoconstriction.

Dry air may cause inflammation by damaging

TABLE 1
Score obtained from ruksa questionnaire

Score		Patients	
Value	%	No.	%
4	40	2	6.7
5	50	7	23.3
6	60	7	23.3
7	70	3	10.0
8	80	7	23.3
9	90	4	13.3
Total	30	100	

epithelium and cilia. According to a recent experimental research on guinea pigs, dry air was found responsible for widespread loss of cilia on scanning electron microscopy associated with detachment or sloughing of the epithelium, subepithelial vascular congestion, edema, and cellular infiltration on light microscopy. The data demonstrated a short exposure of the trachea to dry air causes marked epithelial lesions and local inflammation (Barbet, J.P. and Chauveau, M. *et. al*). This acute and chronic inflammation can affect not only the airway caliber and airflow but also underlying bronchial hyper responsiveness, which enhances susceptibility to bronchospasm (Cohn *et. al*, 2004).

TABLE 2
Values of different parameters in both the groups

Group I - svasa patients			Group II - healthy sub.		
Parameters	No.	%	Parameters	No.	%
1. RD			RD		
60 - 70	7	23.3	25 - 30	10	33.3
50 - 60	17	56.7	30 - 35	5	16.7
40 - 50	5	16.7	35 - 40	5	16.7
30 - 40	1	3.3	40 - 45	8	26.6
Total	30	100	45 - 50	2	6.7
2. AMC			AMC		
0.5 - 0.8	10	33.4	1.8-2.2	6	20.0
0.8 - 1.0	8	26.7	2.2-2.6	20	66.7
1.0 - 1.2	7	23.3	2.6-3.0	3	10.0
1.2 - 1.4	4	13.3	3.0-3.4	1	3.3
1.4 - 1.6	1	3.3			
Total	30	100		30	100
3. PFR			PFR		
50 - 100	7	23.3	300-350	7	23.3
100 - 150	15	50	350-400	17	56.7
150 - 200	3	10	400-450	5	16.7
200 - 250	5	16.7	450-550	0	0
			550-600	1	3.3
Total	30	100		30	100
4. MC			MC		
0.001 - 0.01	9	30.0	0.05 - 0.10	12	40.0
0.01 - 0.02	11	36.7	0.10 - 0.15	8	26.7
0.02 - 0.03	8	26.7	0.15 - 0.20	4	13.3
0.03 - 0.04	1	3.3	0.20 - 0.25	5	16.7
0.04 - 0.05	1	3.3	0.25 - 0.30	1	3.3
Total	30	100		30	100

RD - Relative dryness (%); AMC - Absolute Moisture Content (Kg/m^3); PFR - Peak Flow Rate; MC - Moisture Content (gm).

TABLE 3
Statistical presentation

Parameters	SD	SE	t	p
1. FVC	0.32	0.08	15.08	<<<.001
2. FEV_1	0.25	0.07	20.31	<<<.001
3. PEFR	50	12.91	18.95	<<<.001
4. RD (DMMT)	55.27	11.34	1.67	< 0.10
5. AMC (DMMT)	0.25	0.06	22.40	<<<.001
6. MC (DMM)	0.04	0.01	11.6	<<<.001

FVC - Forced Vital Capacity; RD - Relative dryness; Forced Expiratory Volume; AMC - Absolute Moisture Content; PFR - Peak Flow Rate; MC - Moisture Content

Conclusion

Rūkṣaguṇa of vâta may be compared with absence or less moisture. When the moisture content (snigdha) of a subject is measured, the opposite, but complementary factor i.e. dryness (rūkṣa) can also be assessed in terms of relatively less amount of moisture. The results of present work and data show the decreased moisture or increased ruksa bhava or airway dehydration in expired air of śvāsa patients as compared to healthy persons.

It can be concluded that in diseased condition (śvāsa), vâta is in imbalanced state or become a pathological attribute since the rūkṣaguṇa of vâta is increased. This vitiated rūkṣabhāva is the prime factor responsible for constriction

(srotosamkoca) that produces difficulty in breathing, chest tightness, wheezing, etc., the cardinal features of śvāsaroga.

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SOME INDIGENOUS HERBS EFFECTIVE IN RESPIRATORY ALLERGIC DISORDERS - A REVIEW

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Abstract: Respiratory allergic disorder comes under Type I hypersensitivity (anaphylactic) reaction. Typical complaints include intermittent nasal congestion, itching, sneezing, clear rhinorrhea, conjunctional irritation, loss of sense of smell and taste, headache, etc. It mainly includes allergic rhinitis and allergic asthma. Āyurvedic herbs are good alternative to the conventional therapy without any side effects. There are various antiallergic and bronchodilator herbs that have been clinically and experimentally proved their efficacy to compact with this disorder. This paper is a review of various studies.

Introduction

Respiratory Allergic Disorders (RAD) do social, economical and psychological impact on the family. Children with respiratory allergic disorders experience frustration, anxiety and physical, social and emotional disturbances that affect learning and ability to integrate with peers (Nelson, 2004).

RAD comes under Type I hypersensitivity (anaphylactic) reaction. Typical complaints include intermittent nasal congestion, itching, sneezing, clear rhinorrhea, nasal congestion, conjunctional irritation, loss of sense of smell and taste, headache, wheezing, coughing and dyspnoea, The treatment modalities, in the modern medicine for respiratory allergic disorders include antihistamines, bronchodilators, mast cell stabilizers, corticosteroids, etc. These medicines give only symptomatic relief and most of the time these are associated with untoward effects like tachycardia, tremors, headache, hypokalamina, sedation, weight gain, growth retardation, oral thrush, reflex coughing, poor school performance, etc.

Āyurveda has the treasure of various herbs possessing multifold properties like rasāyana, āmapacana, dīpana, kāsahara, śvāsahara, kaphanissāraka, śothahara, viṣaghna, jvarahara, etc. These drugs are better alternative to the conventional therapy. The antioxidant, immunomudulatory, antiallergic, bronchodilator, anti tussive, mucolytic, adaptogenic, antistress, anti inflammatory and anxiolytic activities of some drugs that are clinically and experimentally proved by various scholars, are briefly reviewed here.

Śiriṣ (*Albizia lebbeck*)

The decoction of stem bark of śiriṣ has found to be effective against bronchospasm induced by

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histaminic acid phosphate and show to exert di-sodium cromoglycate like action on mast cells. A considerable fall of TLC ($p>0.01$), Eosinophil count ($p>0.001$), ESR ($p>0.01$) and increase in the level of PEFR ($p<0.001$) has reported in a study where the effects of treatment based on the subjective parameters were highly significant (Swamy, G.K *et. al*, 2000).

Aqueous extract of both stem bark and flowers significantly reduce bronchospasm induced by micro-aerosols of histamine acid phosphate and acetycholine chloride (Annual report, CCRAS 1975-80). The hot aqueous extract of siris and its butanolic fraction administered once daily for a week in mice, immunized previously with sheep red blood cell (SRBC), at the dose levels tested (6.25, 12.5 and 25mg/kg p.o.) has shown that *A. lebbeck* treated mice developed higher serum antibody titers compared to the vehicle treated group and the effect was comparable to the standard drug Muramyl dipeptide (MDP). Delayed type hypersensitivity response suppress in SRBC immunized mice treated with *A. lebbeck* extract (Barua, C.C *et. al*, 2000).

Guḍūci (*Tinospora cordifolia*)

The efficacy of guḍūci extract assessed in a randomized double blind placebo controlled trial in 75 patients of allergic rhinitis for 8 weeks has reported 100% relief in sneezing, 69% in nasal discharge, 61% in nasal obstruction and 71% in nasal pruritis. (Badar V.A. *et. al*, 2005)

Guḍūci considerably reduce the frequency of attacks in asthmatics. It reduce severity of symptoms particularly cough and wheezing (Kulkarni K., 1998). The effect of stem extract of guḍūci studied on the contractile response due to various agonists (such as histamine, 5-HT, bradykinin, prostaglandin $E_1$and $F_{2\acute{a}}$, cholino-memitics and KCl) on smooth muscles of rat in the dose of 100 to 600 µg/mg has showed potentiating effects of guḍūci. NA induced responses are suggested due to an uptake blocking effect of guḍūci or to an inhibition of metabolism by COMT since MAO inhibition would also produce potentiation of 5-HT responses. (Patel S.R *et. al*, 1947)

In an investigation of the immunobiological activity of ethanolic extract of guḍūci, it has found that it improves the phagocyte function without effecting the humoral or cell mediated immune system. The active principles of guḍūci possess anticomplimentary and immuno-modulatory activities. Syringin (TC-4) and cardiol (TC-7) inhibit the *in-vitro* immuno-haemolysis of antibody coated sheep erythro-cytes by guinea pig serum. The compounds also give rise to significant increases in IgG antibodies in serum (Kapil A., *et al*, 1997).

Tulsi (*Ocimum tenuiiflorum*)

The ethanolic extract (50%) and volatile oils (from fresh leaves) and fixed oil (from seeds) have anti-asthmatic activity and protect guinea pigs against histamine and acetylcholine induced preconvulsive dyspnoea (De. *et. al*, Indian drugs, 1993). In a study, the drugs administered orally in cough-induced healthy male guinea pigs (500 ±150g) has showed significant anti-tussive activity of both the extract and aqueous extract showed a higher activity than the methanol (Nadig Pratibha, D. *et. al*, 2005).

Bhattacharya, S.K. *et.al*, (2001) has reported the antioxidant activity of extract of fresh leaves of tulasi. It has reported that the methanol extract and an aqueous suspension of tulasi shows analgesic activity in the mouse hot plate procedure, and the methanol extract causes in increase in the tail withdrawn reaction time of a

sub analgesic dose of morphine. Both preparations reduce typhoid paratyphoid A/B vaccine induced pyrexia. (Godhwani, S., *et.al*, 1987)

Haridra (*Curcuma longa*)

Anti asthmatic property of curcumin, a natural product from the rhizomes of tulasi tested in the guinea pig models of airway hyper responsiveness showed that curcumin is effective in improving the impaired airways features in OVA sensitized guinea pigs (Ram, A., *et.al*, 2003). Antioxidant and anti-inflammatory activities of curcumins I-III from tulasi assessed experimentally has showed significant result (Ramsewak R.S. *et.al*, 2000). The volatile oil of the plant inhibit trypsin as well as hyalurodinase enzymes.

Āmalaki (*Phyllanthus emblica*)

The anti-tussive activity of āmalaki tested in conscious cats by mechanical stimulation of the laryngopharyngeal and tracheobronchial mucus areas of airways has showed higher dose (200 mg/kg body wt.) of this substance preorally effective, especially in decreasing the number of cough effect, frequency of cough and intensity of cough attacks in inspirium (IA+) and expirium (IA-) (Nosalova, G., *et.al*, 2003).

A study on the inhibitory activity of amalaki leaf extracts against human polymorphonuclear leukocyte (PMN) and platelet functions has showed that the leaves have inhibitory activity on PMNs and platelets, which confirm its anti-inflammatory and antipyretic properties. (Vormisto, A.I., *et. al,* 1993)

Haritaki (*Terminalia chebula)*

The aqueous extract of haritaki is able to protect cellular organelles from the radiation-induced damage. A study on mice has evaluated the anti stress and endurance promoting properties of the extract in hypoxia test and swimming performance. The aqueous extract inhibits immediate hypersensitivity reaction in vivo and in vitro (Lee J.K. *et al*, 2001). The observations supports that the plant possesses promising anti-stress and endurance promoting activities. (Anand R, *et al*. 1999)

Kaṇṭakāri (*Solanum virginianum*)

It is an experctorant. It increases the production of demulcent respiratory tract fluid that covers and protects the irritated bronchus. The increased secretions also help in liquefaction of thick and viscid sputum. The beneficial effect of the drug in bronchial asthma may be attributed to the depletion of histamine from bronchial and lung tissue. (Oman drugs, 2005 http:// www. Omandrugs.com / herbal main htm)

Bhārṅgi (*Clerodendron serratum*)

Gupta, S.S., *et. al*, (1968) has reported the antihistamine activity of the extract of bhārṅgi. It has found to accord protection to sensitized guinea pigs against histamine as well as antigen (egg albumin). The protective effect of the augmentation of anti allergic activity in the lung tissues as the lung extracts from the treated animals fount to be inhibited histamine and SRS.

Śarapuṅkha (*Tephrosia purpurea*)

It has reported that the extract of the ariel parts of śarapuṅkha administered orally at doses of 50,100 and 200 mg/kg, significantly reduce the elevated WBC count in response to antigen challenge in sensitized mice. The extract also significantly inhibits eosinophil infiltration without any significant change in the mononuclear cell population. The inhibitory effect of ethanolic extract of on late phase allergy could be attributed to the inhibition of leukotrine synthesis (Anagha Gokhale *et. al*, 2000).

Śarapuṅkha causes relaxation in the isolated guinea pig trachea. It does not interact with acetylcholine but it inhibits the contractile action of histamine on isolated tracheal rings. Kapil K. Soni *et. al,* (2004) has reported the spasmolytic activity of the drug.

Śaṭhī (*Hedychium spicatum*)

The powdered rhizome of śaṭhi administered in divided doses of 10 gm to 25 to patients with recurrent paroxysmal attacks of dyspnoea for 4 weeks, completely relieved dyspnoea, cough and restlessness in all the patients (Chaturvedi and Sharma, 1975). Sahu, R.B., *et. al,* (1979) has reported the efficacy of powder of śaṭhi in tropical pulmonary eosinophilia. Investigation of the biological activity of rhizomes indicates that they possess anti-inflammatory and analgesic activity (Srimal R.C., *et. al*, 1984)

Puṣkaramūla (*Inula racemosa*)

Alcoholic extract of the root of puṣkaramūla studied for its anti allergic effect in 10 experimental models to type I hypersensitivity, in albino rats has showed significant protection against egg albumin induced PLA. The study suggests that puṣkaramūla possesses potent anti-allergic properties in rats. (Srivastava S, *et. al*, 1999). Hermandez, *et. al*, (2001) has reported the anti-inflammatory activity of the drug.

Yaṣṭī madhu (*Glycyrrhiza glabra*)

Murray M.T., *et. al*, 1995, reports that glycyrihzin administered in animal inhibited experimentally induced allergenic reactions. The flavonoid components of its root exhibits antispasmodic activity (Evaus, 1989). Glycrrhiza exhibits expectorant action. This action is produced due to a reflex expectorant action from the GIT mediated by embryonic neural link between membranes of GIT and respiratory track (Wohmulth H, *et.al*, 1998). The anxiolytic activity of hydroalcoholic extract of roots and rhizomes of yaṣṭīmadhu assessed using different paradigms Diazepam or ondansetron served as standard anxiolytic agents found to be effective in alleviating anxiety in animals (Ambawade, S, *et. al*, 2001)

Śuṇṭhi (*Zingiber officinale*)

The rhizome has significant antihistaminic property (Toyoda J., *et. al*, 1984). Its anti-inflammatory activity in carrageenin-induced rat paw oedema has reported. The active principles gingerol, dihydrogingerdione and gingerdione are potent inhibitors of prostaglandin synthesis which confirm the mechanism of anti-inflammatory effect. (Horvey, D.J., 1982)

Arkapatri (*Tylophora indica*)

The anti-allergic effect of arkapatri compared with that of disodium cromoglycate on perfused rat lung in sensitized rats by observing the changes in the volume of the perfusate per minute showed significantly increased the rate of flow. The action may be due to direct bronchodilator property and membrane stabilizing and immuno-suppressive effects (Nayampalli SS, *et. al*, 1979). A double-blind placebo-controlled crossover trial in 195 individuals with asthma given either placebo or 40 mg of a Tylophora alcohol extract daily for 6 days has showed that people taking tylophora had less asthma symptoms (Shivpuri, D.N., *et. al*, 1972). Tylophora has anti-inflammatory, antiallergic, and antispasmodic actions. The major constituent in tylophora is the alkaloid tylophorine. Laboratory research has shown this isolated plant extract exerts a strong anti-inflammatory action. Test tube studies also suggest that tylophorine is able to interfere with the action of mast cells, which are key

components in the process of inflammation. (Gopalakrishnan, C., *et. al*, 1980)

Pippali (*Piper longum*)

Anti allergic activity of the fruit of pippali has been testified. It effectively reduces passive cutaneous anaphylaxis in rats and protects guinea pigs against antigen-induced broncho-spasm (Jennings, K, *et. al*, 1978). A study involved of 240 children of different age groups suffering from frequent asthma attacks has reported that long-term administration of long pepper fruits significantly reduce the frequency and severity of asthma attacks. (http//www. A: manual - introduction I. com.). Pippali kṣīrapāka, a drug prepared from pippali and milk, tried in patients of bronchial asthma showed good to moderate response in 8 patients. (Upadhyaya S.D., 1982). Piperine possesses potent antidepressant-like properties that are mediated in part through the inhibition of MAO activity and therefore represent a promising pharmaco therapeutic candidate as an antidepressant agent. (Lee SA, *et. al*, 2005)

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PHARMACOLOGICAL ACTIVITIES OF AQUATIC FERN *AZOLLA PINNATA* WITH SPECIAL REFERENCE TO ITS ANTIBACTERIAL ACTIVITIES - A BRIEF EVALUATION

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Abstract: *Azolla* is most frequently studied genus of ferns in the world because of its economic importance. The present investigation is undertaken to evaluate various pharmacological activities of *Azolla pinnata* R. Br. with special reference to its antibacterial activity. Aqueous and ethanolic extracts of *Azolla pinnata* were used for the study. The extracts were subjected to series of phytochemical tests and the extract impregnated discs were prepared as per standard method. The extracts were screened for *in vitro* antibacterial activity against all four bacteria by disc diffusion and well diffusion method. The aqueous and ethanolic extracts were positive for the presence of alkaloids, glycosides, resins, proteins and saponins. It was found that both the extracts of *A. pinnata* did not have any antibacterial activity against different bacteria as compared to reference drug i.e. ciprofloxacin.

Introduction

Fern and fern allies have always been the cynosure of botanists, horticulturists and nature lovers since ancient times (Shah N.C. and Singh S.C., 1990). This fascinating group of pteridophytes is distributed in the Himalaya, Western Ghats, Vindhya, hilly areas of Bihar, Orissa and other parts of Madhya Pradesh as well as in the Aravalli area (Morton C.V., 1996). *Azolla* is most frequently studied genus of ferns in the world because of its economic importance. The *Azolla* has been used for various purposes viz. as livestock feed (Preston *et al.,* 2008), as a companion plant in rice paddies, as larvicide (Okech *et al.,* 2009) and to control mosquito larvae in rice fields. The use of *Azolla* as a feed resource for fish, swine and poultry had been tested with favourable results (Castillo *et. al*, 1981; Alcantara and Querubin, 1985). The present investigation is undertaken to evaluate various pharmacological activities of *Azolla pinata* with special reference to its antibacterial activity.

Materials and methods

The whole plant was collected and dried under shade and grinded into fine powder with the help of mixer (Fig 1 a&b). Aqueous and ethanolic extracts were prepared and extractability percentage determined as per the method suggested by Rosenthaler, (1930). The ethanolic extract was obtained with the help of Soxhlet's apparatus using ethyl alcohol. The aqueous and ethanolic extract were subjected to series of chemical tests for the presence of various active

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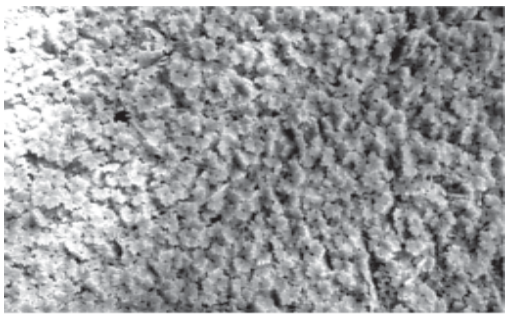
principles namely alkaloids, glycosides, proteins, reducing sugar, tannins, resins, phenolic compounds, saponins (Prabhuji *et al.*, 2005).

Extract impregnated discs were prepared as per standard method. The weight of aqueous extract impregnated on each disc ranged from 21.57 mg to 23.14 mg with the mean weight 22.43 mg while weight of ethanolic extract in each disc ranged from 8.14 mg to 9.28 mg with the mean value of 8.66 mg. Pure cultures of *Escherichia coli, Staphylococcus aureus, Pseudomonas* spp. and *Salmonella* spp. were periodically sub-cultured and maintained on nutrient agar and in nutrient broth. The two extracts were screened for *in vitro* antibacterial activity against all the four bacteria by disc diffusion and well diffusion method as described by Bauer *et. al*, (1966) and Cruickshank (1975).



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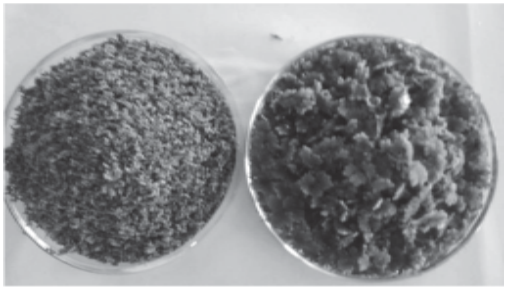

b

Fig.I a. *Azolla pinnata*
b. Dried and fresh *Azolla pinnata*

Results and discussion

The physical properties and extractability percentage of different solvent extract of *A. pinnata* are as follows:

- Extractability % of aqueous - 18 (4.5G)
- Extractability % of ethanolic - 16.25 (3.25G)

The result of qualitative phytochemical tests employed with the alcoholic hot extract of *A. pinnata* for the presence of active principles such as alkaloids, glycosides, resins, reducing sugar, tannins and phenolic compounds is summarised in the Table 1. The aqueous extract and ethanolic extracts were positive for the presence of alkaloids, glycosides, resins, proteins and saponins.

The quantity (weight) of aqueous extract impregnated in the disc was 22.43 (mg) and the weight of ethanolic extract was 8.66 (mg). The zone of inhibition by different extract and the antibiotics ciprofloxacin against *Escherichia coli, Staphylococcus aureus, Salmonella* spp., *Pseudomonas* spp. is shown in Tables 2&3. Both, the aqueous and alcoholic extracts showed no zone of inhibition by disc diffusion and well diffusion method respectively.

It was found that both the extracts of *A. pinnata* did not have any antibacterial activity against

TABLE 1
Phytochemical tests for aqueous and alcoholic extract of *Azolla pinnata*

Phytoconstituents	Aqueous	Ethanolic
1. Alkaloid	+	+
2. Glycoside	+	+
3. Tannin	-	-
4. Saponins	+	+
5. Proteins	+	+
6. Phenolic compounds	-	-
7. Resins	+	+
8. Reducing sugars	+	+

TABLE 2
Zones of inhibition against different micro-organisms by disc diffusion method

Extract	*E.C*	*S. A*	*S. S*	*P. S.*
Aqueous	00	00	00	00
Ethanolic	00	00	00	00
Ciprofloxacin	20mm	22mm	15mm	12mm

E.S. - Escherichia coli; S.A. - Staphylococcus aureus; S.S. - Salmonella spp., *P.S. - Pseudomonas* spp.

TABLE 3
Zones of inhibition against different micro-organisms by Well diffusion method

Microorganism	Con.of extract (µg)		Zone of inhibition
	Aqueous	Ethanolic	
Escherichia coli	100	100	00
	200	200	00
	500	500	00
Staph. aureus	100	100	00
	200	200	00
	500	500	00
Salmonella spp.	100	200	00
	200	200	00
	500	500	00
Pseudomonas spp.	100	100	00
	200	200	00
	500	500	00
Distilled water	100	100	00
	200	200	00
	500	500	00

different bacteria as compared to ciprofloxacin (reference drug).

Conclusion

Based on the results of phytochemical tests, it is concluded that both the extracts of *A. pinnata* shows positive results for alkaloids, glycosides, proteins, resins, reducing sugars and saponins. Also, both the extracts did not show any antibacterial activity against four micro-organisms mentioned above.

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EFFECT OF PALĀŚAKṢĀRASŪTRA IN THE MANAGEMENT OF BHAGANDARA (FISTULA-IN-ANO)

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Abstract: Bhagandara (fistula-in-ano) is the second commonest disease of the anorectal region. A comparative study was carried out to evaluate the efficacy of Palāśakṣārasūtra in the management of bhagandara. It consists of palāśa (*Butea monosperma*), snuhi (*Euphorbia ligularia*) and haridra (*Curcuma longa*). The subjects were treated with Palāśakṣārasūtra in the study group and Apamārgakṣārasūtra in the control group. The results were encouraging.

Introduction

The word fistula is derived from a Latin word, which means a reed, pipe or flute. It implies a chronic granulating track connecting two epithelial-lined surfaces. As the wound is located in the anal region which is prone to infection, it takes a long time to heal and the condition remains troublesome. Operative procedures often lead to complications like recurrences and incontinence.

Āyurvedic classics describe the disease as bhagandara, which has similar signs and symptoms with fistula-in-ano. The kṣārasūtra therapy has been used for a long time. Ācārya Suśruta mentions palāśa as one of the kṣāra (Sūtrasthānam, Kṣārapākavidhi) and has recommended the same in the preparation of kṣārasūtra, as it possesses krimighna (antimicrobial), vraṇahara (wound healing) and gudarogajit (healing anorectal diseases) properties.

Materials and method

Source of data: - 40 diagnosed cases of fistula-in-ano were selected from the OP and IP Departments of P.G. Studies in Salyatantra, SDM College of Ayurveda and Hospital, Hassan, Karnataka. The patients were divided equally into two groups: i) Control (Group A) - Apamārgakṣārasūtra and ii) Treated (Group B) - Palāśakṣārasūtra.

Inclusion criteria: - Patients above 12 years of age; both sexes; cases of operative recurrences and long duration of bhagandara (fistula-in-ano).

Exclusion criteria: - Post operative incontinence of stool; and secondary fistula due to Crohn's disease, Tuberculosis, Carcinoma of rectum and Ulcerative colitis.

Preparation: - The pH of different drugs in Apamārgakṣārasūtra and Palāśakṣārasūtra is shown in Table 1.

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TABLE 1
pH of different drugs in both the Sutras

Drugs	pH
1. Apamārgakṣārasūtra	9.72
- Apamārgakṣāra	9.7
- Snuhīkṣīra	5.6
- Haridra	6.2
2. Palāśakṣārasūtra	10
- Palaśakṣāra	10.5
- Snuhīkṣīra	5.6
- Haridra	6.2

Assessment criteria:- i) Unit Cutting Time (UCT), ii) pain, iii) granulation tissue, iv). Discharge and v) size of the wound. (UCT $= \frac{TTC}{ILC}$ = days/cm; where TTC is Total No. of days taken for cut through and ILC is Initial length of track in cm.)

Application of Palāśakṣārasūtra: - The patient was kept in proper lithotomy position and perianal region was cleaned with antiseptic lotions and draped. Gloved finger was gently introduced into the rectum. Then a suitable selected probe was passed through the external opening of fistula. The tip of the probe was forwarded along the path of least resistance and was guided by the finger in rectum to reach into the lumen of anal canal through the internal opening and its tip was finally directed to come out of anal orifice. Then a suitable length of Palāśakṣārasūtra was taken and threaded into the eye of probe. Thereafter the probe was pulled out through the anal orifice, to leave the thread behind in the fistulous track. The two ends of the thread were then tied together with a moderate tightness outside the anal canal.

Change of Palāśakṣārasūtra: - All the patients were instructed to take hot sitz bath before changing the thread. The Palāśakṣārasūtra was changed at weekly interval. The thread was tied to the previously applied Palāśakśārasūtra in position towards outer end of the knot. Then an artery forceps was applied inner end to the same knot. Then the old thread was cut between the artery forceps and the knot. Pulling of the artery forceps along with the thread ultimately replaced the old thread by Palāśakṣārasūtra. Then the two ends were ligated and bandaging was done. This procedure was done by Railroad technique. The same procedure was followed for successive changes of Palāśakśārasūtra at weekly interval.

Follow-up:- All the patients were instructed to visit ano-rectal clinic once in a week till the complete cut through of the fistulous tract.

Observations and result

The demographic data like age, sex, occupation, habitat, nature of diet, doṣaprakṛti were recorded and the type of bhagandara/fistula-in-ano, position of external openings, length of fistulous track and recurrent cases were analysed.

The length of the Palāśakśārasūtra was measured after each change and was noted in every case. After few days of therapy, this sūtra came out with the knot intact. This stage is known as Cut Through. The average Unit Cutting Time (UCT) of treated group (Palāśakṣārasūtra) was calculated and compared with control group (Apamārgakṣārasūtra). The analysis of average unit cutting time was noted in relation to age, length of track, previous history of operation and position in each group.

The process of healing started with the cutting of the track during the course of treatment. However, a small area did not heal completely at the end of total cut through, which took 1-2 weeks for complete healing in treated groups and 2-3 weeks in control group.

The average unit cutting time and the effect on

UCT in both the group is shown in Table 2 & 3 respectively.

Discussion

Pain felt by the patients at the time of changing thread and subsequent changes of Palāśakṣārasūtra was less compared to Apamārgakṣārasūtra. 20.50% patients complained less degree of pain in Group A compared to 29.26% patients in Group B. Assessment of discharge in comparison with Group A and B, there was no mean difference in both the groups (both are having significant on discharge). Status of wound healing in both groups after 7 days of cut through was 12% in Group A and 48% in Group B. The total average U.C.T. was more or less equal in both the Control and Treated groups.

Conclusion

Based on the data, it may be concluded as follows:

- There was a marked reduction of symptoms like burning pain, irritation, inflammation, and local reactions in treated group as compared to control group.

TABLE 2
Average Unit Cutting Time (UCT)

Group	UCT (in days/cm)
Control (Group A)	8.67
Treated (Group B)	8.48

TABLE 3
Effect on U.C.T in both the groups

Group	Mean	SD	SE	t	Diff.
Gr. A	8.67	1.085	0.243	35.60	19
Gr. B	8.48	0.88	0.200	42.95	19

p = <0.001; Highly significant

- Availability and collection problems were trespassed in the present method.
- It is economical as well as minimizes the problems of preparation and application of kṣārasūtra therapy.
- Wound healing after cut through was faster in control group (1-2 weeks) as compared to (2-3 weeks) in treated group.
- No recurrences of cases were reported during the six months of follow up study.
- So, Palāśakṣārasūtra can be considered as a better alternative in place of Apamārgakṣārasūtra because it has more acceptability, easily available, reduction in UCT and better wound healing.

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Āryavaidyan Vol. XXV., No.4, May - July, 2012, Pages 227 - 232

EFFECT OF MĀMSYĀDI KVĀTHA & YOGA THERAPY ON MĀNASIKABHĀVAS IN ANXIETY DISORDERS

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Abstract: Anxiety becomes morbid if it persists for a long duration. The techniques of yoga and āyurveda provide solution for anxiety disorders. Mānasikabhāvas mentioned in Carakasamhita in the context of anumāna (inference) are the ideal parameters to evaluate the status of manas systematically. In this context, the effect of an āyurvedic formulation Māmsyādi kvātha and yogic practices viz. sūryanamaskāra, śavāsana, kapālabhāti and nāḍīśodhana prāṇāyāma on mānasabhāvas were evaluated in 30 patients suffering from anxiety disorders. The therapy showed statistically highly significant improvement (P<0.001) in the affliction of mānasikabhāvas.

Introduction

Anxiety is a universal experience which has an important protective function in the face of danger. It becomes morbid when symptoms are out of proportion to external circumstances or if they persist long. Altered life style, dissociated family status and changed food habits are contributory factors. Anxiolytic drug is a pharmacologically active agent which counteracts the anxiety disorder. These drugs have adverse effects like drug abuse and dependence, and withdrawal of the drug will be difficult. The techniques of yoga and āyurveda provide solution for anxiety disorders.

Māmsyādi kvātha, referred to in Siddhayoga-samgraha (Yadavji Trikamji) and Bheṣajasamhita, is said to be effective in psychiatric conditions. The components of Māmsyādi kvātha are: jaṭamāmsi (*Nardostachys grandiflora*), aśvagandha (*Withania somnifera*) and pārasika yavāni (*Hyoscyamus niger*) in 8:4:1 ratio respectively.

In Yogasūtras of Patañjali, it is mentioned that by dedicated practice of yogāṅgas, impurities of human being are destroyed and the crown of wisdom radiates in glory. Hence yogic practices viz. sūryanamaskāra, śavāsana, kapālabhāti and nāḍiśodhana prāṇāyāma were selected.

Objectives: - 1) To assess and compare the effect of Māmsyādi kvātha and yoga therapy in the management of anxiety disorders; and 2) to assess the effect of therapies on mānsikabhāvas.

Materials and methods

Patients attending the O.P. and I.P. Departments of I.P.G.T. & R.A. Hospital were screened for mental disorders. Those who fulfill the criteria of diagnosis of anxiety disorders DSM-IV were selected randomly, irrespective of age or place. A detailed history was obtained according to the proforma specially prepared for assessment of anxiety disorders; and the diagnosis was made on the basis of the following criteria:

Diagnosis criteria: - A) Psychological symptoms (apprehension, fear of impending disaster,

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irritability and depersonalisation) and B) Somatic symptoms (tremor, sweating, palpitations, chestpain, breathlessness, headache, dizziness, diarrhoea, frequency of micturition, initial insomnia and poor concentration).

Sampling and management

A group 30 patients selected were randomly divided into 4 groups viz. i) Control (n=7) ii) Yuktivyapāśrayacikitsa (n=7), iii) Satvāvajayacikitsa (n=7) and iv) Combined group (n=9). The period of study was one and half months.

Control group: - In this group, Gelatin coated capsule (1 cap. twice daily) with milk as anupāna was administered.

Yuktivyapāśrayacikitsa group: - 40 ml of freshly prepared Māmsyādi kvātha twice daily i.e. morning and evening was given in this group. (The OP patients were instructed to boil 20 gm of coarse powder of freshly prepared Māmsyādi kvātha added with 320 ml of water and reduce to 1/8th part i.e. 40 ml. For IP patients freshly prepared decoction was administered)

Satvāvajayacikitsa group: - In this group, patients were taught sūryanamaskāra and śavāsana, kapālabhāti and prāṇāyāma. They were advised to do it preferably early in the morning. (Sūryanamaskāra - 4 cycles per day either at a time or in divided schedule; Śavāsana - 10 minutes; Prāṇāyāma - kapālabhāti - 8 minutes - 50 times followed by 5 cycles of normal breathing; and Nāḍīśodhana - 8 minutes)

Combined group: - Both the treatment schedules i.e. Yuktivyapāśraya and Satvāvajaya cikitsas were adopted in this group.

In addition, all the patients were administered Harītakī cūrṇa (5g) with warm water in apāna kāla for koṣṭhaśodhana for a period of 3 days.

Diet: - No particular dietary restrictions were made in the groups. Routine hospital diet was given to the IPD patients. OPD patients were advised to continue their routine diet.

Assessment criteria

Mānasabhāvas: - Suitable interrogation techniques according to the mental status of the patients were implemented and mānasabhāvas were graded based on the following parameters:

Parameters	Gradation
1. Mano-artha vyabhicareṇa (Interpretation of the perception)	
- No deviation. Proper process of perception/interpretation	0
- Getting deviated in objects very rarely	1
- Deviation oftenly and knowledge perception impairs	2
- Deviation and perception frequently disturbed	3
2. Vijñānam-vyavasāyena	
- Normal functioning in routines	0
- Gradual hampered performance	1
- Impaired motivation towards functioning often	2
- Loss of pace & motivation in functioning	3
3. Raja-saṅgena (Involvement in environment)	
- Proper interest and involvement	0
- Gradual decrease in interest	1
- Loss of interest occasionally	2
- Frequently & totally loss of interest	3
4. Moham-avijñānena (Blanketing of proper reasoning capacity)	
- Normal functioning capacity	0
- Gradual affliction towards objects	1
- Affliction towards objects oftenly	2
- Totally involment and affliction	3
5 Krodham-abhidroheṇa	
- No violent tendencies	0
- Violent thoughts very oftenly	1
- Violent sadistic responses oftenly	2
- Frequently violent thoughts & functions	3
6. Śokam-dainyena (Grief/depression)	
- No feeling of sorrowness	0
- Feels sorrow & inferiority occasionally	1
- Feels sorrow & inferiority oftenly	2
- Weeps & feels inferior very frequently	3

Cont...

7. Harṣam-āmodena
   - Totally cheerful on all occasions 0
   - Cheerful and initiative with good occasion 1
   - Rarely cheerful and active in exceptional occasions 2
   - No feelings of cheerfulness 3
8. Prītim-toṣeṇa (Pleased appearance/contentfullness)
   - Always happy and satisfied 0
   - Happy and satisfied occasionally 1
   - Expressing happy mood oftenly 2
   - No feeling of happiness at all 3
9. Bhayam-viṣadena (Fear complex)
   - No depressed mood 0
   - Depressed mood only in reasonable cause 1
   - Depressed without any reasonable cause 2
   - Always in depressed mood and fearful emotions 3
10. Dhairyam-aviṣādena
   - No fear or sorrow at any time 0
   - Fearful only at reasonable cause 1
   - Fearful often in nominal instances 2
   - Always fearful and depressed without apparent reasons 3
11. Vīryam-utthānena
   - Starts and works very quickly 0
   - Works with less interest 1
   - Delayed and decreased interest in working capacity 2
   - Not able to start any work 3
12. Avasthāna-avibhrameṇa
   - Always cofident and stable in perception 0
   - Slight reduction in confidence and stableness in perception 1
   - Occasionally reduced concentration 2
   - No stability/confidence in perception 3
13. Śraddha-abhiprāyeṇa
   - No disdurbance at all 0
   - Loss of or repeated or persistent disturbance in likings 1
   - Moderate or frequent disturbance 2
   - Occasional disturbance in likings 3
14. Medham-grahaṇena
   - Always grasps the events at an instance and retains it 0
   - Grasps and retains the events often 1
   - Delayed in grasping and retaining the events occasionally 2
   - Unable to grasp/understand 3
15. Samjñā-nāmagrahaṇena
   - Completely alert in all occasions 0
   - Alertness slightly impaired 1
   - Alertness only at occasions 2
   - Absolutely no alertness 3
16. Smṛtim-smaraṇena
   - Very good in recalling & remembering 0
   - Recalls and remembers oftenly 1
   - Delayed recall and rememberance 2
   - Unable to recall and remember 3
17. Hrīyam-apatrapaṇena
   - Shyness intact always completely 0
   - Feeling of shyness in front of some known persons and situations 1
   - Shyness in unknown atmosphere 2
   - No shyness at all 3
18. Śīlam-anuśīlena
   - Very good conduct at all occasions 0
   - Impaired conduct at certain situations 1
   - Impaired conduct recurrently 2
   - Totally abnormal conduct 3
19. Dveṣam-pratiṣedhena
   - No revenging tendency at all 0
   - Thoughts of revenge only a few events 1
   - Thoughts and acts of revenge often 2
   - Thoughts and acts of revenge always 3
20. Upādhim-anubandhena
   - All the expressions of effect are clear, direct response to any events 0
   - Delay and deflection in expressing 1
   - Representing the difference in expression and reality often 2
   - Always difference in expression & reality 3
21. Dhṛtim-alaulyena
   - Not greedy for anything 0
   - Greedy and willingness for few essential objects 1
   - Greedy & willingness for comforts of life 2
   - Greedy for all objects without need 3
22. Vaśyatam-vidheyataya
   - Always accepts, obeys and under control 0
   - Obeys and accepts often 1
   - Obeys and under control only on strong commands 2
   - Does not obey at all 3

Observations and results

Percentage-wise slight improvement in all mānasikabhāvas was observed in the control group; but these improvements were not statistically significant whereas, statistically, highly significant/marked improvement was observed in the other three groups. The effect of the therapies on each mānasikabhāvas in different groups is shown in Tables 1-3.

Discussion

Ācārya Caraka has explained the method of examination of various mānasikabhāvas by means of inference (anumāna pramāṇa). In the present study, 22 mānasikabhāva were assessed and scored before and after the treatment.

The number of patients in whom the mānasika bhāvas were afflicted was also less. But the percentage-wise relief was more in both satvāvajayacikitsa group and combined therapy group than Yuktivyapāśrayacikitsa group. This result highlights the aim of satvāvajayacikitsa, 'the self control' as there was improvement in the affliction of mānasikabhāvas like mano-artha, vijñāna, medha, etc.

Conclusion

- Māmsyādi kvātha is effective in improving affliction of mano-artha, raja, śoka, avasthāna, śraddha, medha, samjña, smṛti, and dveṣa.
- Yoga therapy is effective in improving the affliction of all the above-said 9 mānasika

TABLE 1
Effect of the therapy on mānasabhāvas in Control group

Mānasabhāvas	n	Mean		SD	SE	't'	P	%
		BT	AT					
01 Mano-artha	6	1.333	0.166	0.408	0.166	7.024	<0.001	87.47
02 Vijñāna	6	1.5	0.5	0	0	-	<0.001	66.66
03 Raja	9	2.111	0.333	0.833	0.277	6.415	<0.001	84.17
04 Moha	9	1.555	0.222	0.5	0.166	8.012	<0.001	85.72
05 Krodha	7	1.428	0.142	0.487	0.184	6.983	<0.001	89.98
06 Śoka	7	1.857	0.285	0.534	0.202	7.777	<0.001	84.59
07 Harṣa	6	2.166	0.5	0.547	0.223	6.726	<0.01	69.25
08 Prīti	8	1.75	0.25	0.755	0.267	5.617	<0.001	85.71
09 Bhaya	8	1.5	0.25	0.353	0.125	9	<0.001	75
10 Dhairya	7	1.571	0.285	0.487	0.184	6.983	<0.001	81.79
11 Vīrya	8	1.375	0.125	0.462	0.163	7.668	<0.001	90.90
12 Avasthāna	9	2.333	0.44	0.781	0.260	7.23	<0.001	80.58
13 Śraddha	6	1.33	0.33	0	0	-	<0.001	75.18
14 Medha	9	1.55	0.22	0.44	0.146	8.356	<0.001	78.58
15 Samjña	9	1.33	0.22	0.33	0.111	10	<0.001	83.45
16 Smṛti	8	1.875	0.25	0.744	0.263	6.178	<0.001	86.66
17 Hṛīya	4	1.25	0.25	0	0	-	<0.001	80
18 Śīla	4	1.25	0.25	0	0	-	0.001	80
19 Dveṣa	6	1.66	0.33	0.516	0.21	6.347	<0.001	80.01
20 Upādhi	6	1.33	0.166	0.408	0.166	7.02	<0.001	87.47
21 Dhṛti	9	1.33	0.22	0.33	0.111	10	<0.001	83.34
22 Vaśyata	7	1.285	0.285	0	0	-	<0.001	77.82

TABLE 2: Effect of the therapy on mānasabhāvas in the Satvāvajayacikitsa & Combined groups

Mānasa bhavas	n	Mean		SD	SE	't'	P	%
		BT	AT					
A. Satvāvajayacikitsa								
01 Mano-artha	3	1.333	0.333	0	0	-	<0.001	75.18
02 Vijñāna	4	1.25	0.25	0	0	-	<0.001	80
03 Raja	6	1.833	0.166	0.516	0.21	7.93	<0.001	90.56
04 Moha	5	1.4	0.2	0.447	0.2	6	<0.01	85.71
05 Krodha	4	1.5	0.25	0.5	0.25	5	<0.01	83.33
06 Śoka	5	2	0.2	0.447	0.2	9	<0.001	90
07 Harṣa	7	1.571	0.142	0.534	0.202	7.069	<0.001	90.89
08 Prīti	7	1.285	0.142	0.337	0.142	8.04	<0.001	88.87
09 Bhaya	3	1.33	0.33	0	0	-	<0.001	75.18
10 Dhairya	4	1.5	0.25	0.5	0.25	5	<0.05	83.33
11 Vīrya	7	1.285	0.142	0.377	0.142	7.997	<0.001	88.87
12 Avasthāna	7	1.285	0.285	0.577	0.218	4.587	<0.01	77.82
13 Śraddha	4	1.25	0.25	0	0	-	<0.001	80
14 Medha	7	1.285	0.142	0.377	0.142	8.042	<0.001	88.87
15 Samjña	6	1.333	0.16	0.408	0.166	7.024	<0.001	88.47
16 Smṛti	4	1.25	0.25	0	0	-	<0.001	80
17 Hṛīya	0	0	0	0	0	-	-	0
18 Śīla	0	0	0	0	0	-	-	0
19 Dveṣa	5	1.2	0.2	0	0	-	<0.001	83.33
20 Upādhi	4	1.5	0.25	0.5	0.25	5	<0.05	83.33
21 Dhṛti	3	1	0	0	0	-	<0.001	100
22 Vaśyata	3	1	0	0	0	-	<0.001	100
B. Combined therapy								
01 Mano-artha	6	1.333	0.166	0.408	0.166	7.024	<0.001	87.47
02 Vijñāna	6	1.5	0.5	0	0	-	<0.001	66.66
03 Raja	9	2.111	0.333	0.833	0.277	6.415	<0.001	84.17
04 Moha	9	1.555	0.222	0.5	0.166	8.012	<0.001	85.72
05 Krodha	7	1.428	0.142	0.487	0.184	6.983	<0.001	89.98
06 Śoka	7	1.857	0.285	0.534	0.202	7.777	<0.001	84.59
07 Harṣa	6	2.166	0.5	0.547	0.223	6.726	<0.01	69.25
08 Prīti	8	1.75	0.25	0.755	0.267	5.617	<0.001	85.71
09 Bhaya	8	1.5	0.25	0.353	0.125	9	<0.001	75
10 Dhairya	7	1.571	0.285	0.487	0.184	6.983	<0.001	81.79
11 Vīrya	8	1.375	0.125	0.462	0.163	7.668	<0.001	90.90
12 Avasthāna	9	2.333	0.44	0.781	0.260	7.23	<0.001	80.58
13 Śraddha	6	1.33	0.33	0	0	-	<0.001	75.18
14 Medha	9	1.55	0.22	0.44	0.146	8.356	<0.001	78.58
15 Samjña	9	1.33	0.22	0.33	0.111	10	<0.001	83.45
16 Smṛti	8	1.875	0.25	0.744	0.263	6.178	<0.001	86.66
17 Hṛīya	4	1.25	0.25	0	0	-	<0.001	80
18 Śīla	4	1.25	0.25	0	0	-	0.001	80
19 Dveṣa	6	1.66	0.33	0.516	0.21	6.347	<0.001	80.01
20 Upādhi	6	1.33	0.166	0.408	0.166	7.02	<0.001	87.47
21 Dhṛti	9	1.33	0.22	0.33	0.111	10	<0.001	83.34
22 Vaśyata	7	1.285	0.285	0	0	-	<0.001	77.82

TABLE 3
Effect of the therapy on mānasabhāvas in Yuktivyapāśraya group

Manasa bhavas	n	Mean		SD	SE	't'	P	%
		BT	AT					
01 Mano-artha	5	1.8	0.8	0	0	-	<0.001	55.55
02 Vijñāna	5	1.8	1	0.447	0.2	4	<0.05	44.44
03 Raja	7	2.142	0.714	0.534	0.202	7.069	<0.001	66.66
04 Moha	7	2	0.571	0.786	0.297	4.8	<0.05	71.4
05 Krodha	6	2	0.666	0.816	0.333	4.003	<0.05	66.65
06 Śoka	7	1.571	0.428	0.377	0.142	8.042	<0.001	72.69
07 Harṣa	6	2.166	0.833	0.516	0.21	6.347	<0.01	61.54
08 Prīti	7	1.714	0.571	0.69	0.268	4.261	<0.01	66.62
09 Bhaya	6	2.166	0.83	0.516	0.21	6.333	<0.01	61.54
10 Dhairya	6	1.166	0.66	0.632	0.258	3.875	<0.05	60.02
11 Vīrya	7	1.857	0.571	0.755	0.285	4.508	<0.01	69.19
12 Avasthāna	7	1.851	0.714	0.377	0.142	8.042	<0.001	61.49
13 Śraddha	4	1.75	0.75	0	0	-	<0.001	57.14
14 Medha	6	2	0.833	0.408	0.166	7.02	<0.001	58.3
15 Samjña	6	1.833	0.666	0.408	0.166	7.02	<0.001	63.61
16 Smṛti	6	2	0.83	0.408	0.166	7.02	<0.001	58.3
17 Hṛīya	4	1.75	0.75	0.816	0.408	2.45	<0.1	57.14
18 Śīla	4	1.5	0.25	0.5	0.25	5	<0.05	83.33
19 Dveṣa	4	1.25	0.25	0	0	-	<0.001	80
20 Upādhi	4	1.25	0.5	0.5	0.25	3	<0.1	60
21 Dhṛti	7	1.714	0.714	0.57	0.218	4.587	<0.01	58.34
22 Vaśyata	4	1.5	0.75	0.5	0.25	3	<0.1	50

bhāvas; in addition, harṣa, prīti, bhaya, vīrya, dhṛti and vaśyata.

- Combined therapy is effective in relieving the affliction of all the 22 manāsika bhavas except harṣa.

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DRUGS USED IN VAMANA KARMA WITH THEIR MODE OF ACTION

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Abstract: Vamana (emesis) is one of śodhanacikitsa (purificatory therapy) in which the doṣa, especially kapha, is expelled through the mouth. Generally, vamana dravyas have uṣṇa (hot), tīkṣṇa (sharp), sūkṣma (subtle), vyavāyi (early absorbable), vikāsi (to dissolve) and urdhvabhāgaharaprabhāva (disease alleviating action on and above the neck) properties. Many vamakadravyas like madanaphala (*Catunaregam spinosa* (Thunb.) Tirveng.), dhamārgava (*Luffa acutangula* (L.) Roxb.), ikṣvāku (*Lagenaria siceraria* (Molina) Standley (Bitter var.), jīmūtaka (*Luffa echinata* Roxb.), etc. have described in the āyurvedic texts. These dravyas act due to their guṇa, rasa, vipāka, vīrya and prabhāva properties. According to modern science it performs emetic action due to active chemical constituent such as saponin and others. It acts in two ways as local or reflex emetic and systemic emetic.

Introduction

Samśodhana (purificatory process) is meant to remove the doṣas from the urdhvabhāga (upper part) i.e. by oral route and adhobhāga (lower part) i.e. by anal route. Removing the doṣas by upper route is called as urdhvavirecana and by lower route is called adhovirecana. Urdhva-śodhana is also called as vamana. Hence vamana can be defined as the process of eliminating the doṣas from the body through oral route by inducing vomiting. It is the śodhana process mainly for kaphadoṣa but according to Śārṅgadhara, vamana is for the elimination of apakva pitta and kapha doṣa. Here doṣa means not only the tridoṣa but also all malas.[1]

Properties of the vamaka dravyas

The dravyas which are used to induce emesis are called as vamakadravyas. They must have some properties which are responsible for inducing vomiting. They are uṣṇa (hot), tīkṣṇa (sharp), sūkṣma (subtle), vyavāyi (early absorbable), vikāsi (to dissolve) and urdhvabhāga-haraprabhāva (disease alleviating action on and above the neck). The significance of all these properties are as follows:

Uṣṇaguṇa help in the viṣyandana (to dissolve) of the doṣas in the body. Tīkṣṇaguṇa helps in the pacana (digestion), chedana (cutting) and śravaṇa (to exudate) of the doṣas from their places. Sūksmaguṇa helps the drug to enter in the sthūla (large) and aṇu (small) strotas (channels) in the body i.e. aṇutva and moves the doṣas towards the koṣṭha i.e. prāṇavatva. Vyavāyi means the drug absorbs in the body

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before digestion and shows its effect hence, due to vyavāyiguṇa, vāmakadravyas act speedily and help to promote the action of other guṇas also. Vikāsiguṇa helps to separate the doṣas dissolved in the dhātus. Urdhvabhāgahara prabhāva is the most important guṇa of the vāmakadravyas; due to this prabhāva, vāmaka dravyas produce the emesis. Some ācāryas say that this prabhāva is due to the pañcabhautik composition of agni and vāyu in the dravyas but practically it is observed that all the drugs having agni-vāyavātmaka composition cannot induce emesis, hence it is clear that urdhva-bhāgaharaprabhāva is different and it is not due to agni vayavātmaka composition of the drug.[2]

Vamaka dravyas in the texts

Bṛhattrayi mentions some vamakadravyas like madanaphala (*Catunaregam spinosa*),

TABLE 1
Properties and action of some individual drugs

Drug	Guṇa	Rasa	Vipāka	Vīrya	Prabhāva	Act as
Madanaphala	Laghu, rūkṣa	Kaṣāya, madhura, tikta and kaṭu	Kaṭu	Uṣṇa	Vamana	Local or reflex emetic
Dhamārgava	Laghu, rūkṣa and tīkṣṇa	Tikta	Kaṭu	Uṣṇa	Ubhayato-bhagahara	-
Ikṣvāku	Laghu, rūkṣa	Tikta	Kaṭu	Sīta	-	-
Jīmūtaka	Laghu, rūkṣa and tīkṣṇa	Kaṭu and tikta	Kaṭu	Uṣṇa	-	-
Kṛtvedhana	Laghu, rūkṣa and tīkṣṇa	Tikta	Kaṭu	Uṣṇa	Ubhayato-bhagahara	-
Viduḷa	Laghu, rūkṣa and tīkṣṇa	Tikta and kaṭu	Kaṭu	Uṣṇa	Vamana	Central emetic
Śanapuṣpi	Laghu, rūkṣa and tīkṣṇa	Tikta, kaṭu and kaṣāya	Kaṭu	Uṣṇa	Vamana	-
Arka	Laghu, rūkṣa and tīkṣṇa	Kaṭu and tikta	Kaṭu	Uṣṇa	-	Central emetic
Apāmārga	Laghu, rūkṣa and tīkṣṇa	Kaṭu and tikta	Kaṭu	Uṣṇa	-	-
Ariṣṭaka	Laghu, tīkṣṇa	Tikta and kaṭu	Kaṭu	Uṣṇa	Vamana	Central emetic
Tāmraparṇa	Laghu, tīkṣṇa, vyavāyi and vikāsi	Tikta and kaṭu	Kaṭu	Uṣṇa	Madaka	Central emetic
Vaca	Laghu, tīkṣṇa	Kaṭu and tikta	Kaṭu	Uṣṇa	Medhya	Central emetic
Sarṣapa	Tīkṣṇa, rūkṣa	Kaṭu and tikta	Kaṭu	Uṣṇa	-	Local emetic

dhamārgava (*Luffa acutangula*), ikṣvāku (*Lagenaria siceraria*), jīmūtaka (*Luffa echinata*), kṛtavedhana (*Luffa acutangula*), kuṭaja (*Holarrhena pubescens*), viduḷa (*Barringtonia acutangula*), bimbi (*Coccinia grandis*), śaṇapuṣpī (*Crotalaria retusa*), sadāpuṣpī(*Calotropis procera*), pratyakpuṣpī (*Achyranthes aspera*), etc.

Caraka has mentioned many other vamaka drugs in the first and second chapters of Sūtrasthāna; and in the eighth chapter of Vimānasthāna, he has classified the drugs according to useful part.

Mode of action

Āyurvedic view: - According to āyurveda, the drug acts due to their dravyaprabhāva, guṇa prabhāva and dravyaguṇaprabhāva. Some drugs perform their action due to one of their particular property (guṇa, rasa, vipāka, vīrya or prabhāva). Properties and action of some drug is shown in Table 1. In some cases, when rasādi padārtha have the equal strength, vipāka and vīrya suppress rasa and vipāka and prabhāva suppress all these. Prabhāva is the most dominating in saptapadārtha.[3]

Modern view:- According to modern science emetic drugs acts in two ways as local or reflex emetic and central emetic. Local emetic, after reaching the stomach, causes gastric irritation which causes stimulation of the vagus nerve, which carries massage towards the vomiting center in the brain which in turn induces vomiting (e.g. madanaphala, sarṣapa, sphaṭika, lavaṇa, vanapalāṇḍu, vaśa and hot water in more quantity). These actions are only for some time and the vomiting stops after stomach becomes empty hence can be given safely according to need. Central emetics after absorption, directly act on vomiting center situated in hypothalamus and causes vomiting (e.g. ariṣṭaka, svarṇakṣīri, vaca, etc.). The action is prolonged in this case, which causes exhaustion, hypotension, etc. hence should be used with caution.

Most of the vamaka dravyas like madanaphala, dhamārgava, jīmūtaka, ariṣṭaka, hijjala have saponin as one of the chemical constituent which act as emetic substance.

Conclusion

Vamanakarma of a drug is mainly due to its vamanaprabhāva, uṣṇa, tīkṣṇa, sūkṣma, vyavāyi and vikāsi guṇa and kaṭurasa as it have pañcabhautika composition with the predominance of agni, vāyu and ākāśa mahābhūtas.

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PERSPECTIVES OF KṢĀRA IN CARAKASAMHITA

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Abstract: Kṣāra, the alkaline group of medicinal substances, has emphasized throughout the classical literature for various therapeutic purposes. They are obtained from water soluble ash of the drugs of plant origin. These preparations possess corroding and dehydrating action and are mainly used for reduction of mass or lump, drying excess fluidity or vitiated kapha and in conditions such as arśa (haemorroid), gulma (abdominal lump), arbuda (tumour), grahaṇi (malabsorption syndrome) and śotha (oedema). A number of formulations and prescriptions containing kṣāra have referred to in Carakasamhita in different contexts. This review is expected to provide an insight about the introduction and evolution of kṣāra in āyurvedic therapeutics.

Introduction

Kṣāra (alkali) is a unique and potent dosage form described in the ayurvedic literature and is found advocated in various ailments as an independent medicine or contributory ingredient in several formulations. Kṣāra are the alkaline substances obtained from the water soluble ash of the drugs of plant origin.[1] However certain substances from mineral origin like taṅkaṇa (borax)[2] and animal origin like śaṅkha (conch shell)[3] are also used for the preparation of different kṣāra. The basic techniques involved in the preparation include burning of the raw drug into ash, dissolving the ash in specific quantity of water (6 parts of ash), discarding the water insoluble ash and concentrating the water soluble ash to obtain kṣāra.[1] As the name itself suggests, kṣāra is highly corrosive and is prescribed both internally as well as externally in right indications. The major indications of kṣāra include gulma, śotha, grahaṇi, arśa, arbuda and granthi.[4]

In spite a number of kṣāra preparations and their uses are described in āyurvedic texts, their use at present is limited to few areas like in kṣāra-sūtras (medicated threads coated with alkalis) and lepas (applications) indicated for anorectal disorders. Kṣāra being one of the aṇuśāstras (para-surgical instruments), the father of surgery, Suśruta has given special emphasis on this dosage form and has dedicated a separate chapter for kṣāra.[5] Descriptions about kṣāra found scattered across the classic, wherein its pharmaceutical procedure is not well explained. Caraka who known for the best medical treatment (carakastu cikitsite)[6] has advocated variety of kṣāra and their application in various disease conditions. An attempt is made in the current exercise to have an extensive compilation on ksara mentioned in Carakasamhita.

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Definition and grouping

The substance with corrosive (kṣāraṇa) properties is defined as kṣāra. It is produced by combination of many rasas, dominated by kaṭu and lavaṇa rasas and is prepared by some raw materials like yava, apamārga, etc. It is not a rasa (taste), instead a dravya (substance).[7] This clarification is given by Ātreya Punarvasu in reply to the argument that kṣāra is a kind of taste.[8] In another context while explaining the treatment of gulma, Caraka defines kṣāra as a substance that cuts and throws-out the morbid doṣas.[9] He has classified substances into three broad categories based on their origin viz. i) mineral (pārthiva), ii) animal (jaṅgama) and iii) vegetative (audbidha) and has placed kṣāra under audbidha category.[10] Based on taste, kṣāra is included under pungent group (kaṭuskandha).[11] Among the three broad categories of treatments viz. antarparimarjana (internal treatments), bahirparimarjana (external treatments) and śastrapranidhana (surgical treatments), kṣāra is considered as one of the śastrapranidhana treatment.[12]

Kṣāra in Carakasamhita

There are about 26 types of kṣāra mentioned in Carakasamhita. However, descriptions of individual kṣāra are not found except yavakṣāra. Yavakṣāara is useful in treatment of hṛdroga (cardiac diseases), pāṇdu (anaemia), grahaṇi, plīha (spleenomegaly), anāha (constipation), galagraha (difficulty in swallowing), kāsa (cough), and kaphaja arsa (piles of kapha origin). Kṣāra are tīkṣṇa (sharp), uṣṇa (hot), laghu (light), rukṣa (dry), kledi (moistening), pakta (digestive), vidaraṇa (breaking), dahana (burning), chedana (cutting the morbid doṣas), dīpana (carminative) and are just like fire (agnisannibha).[13] Different types of kṣāra mentioned in Carakasamhita are shown in the Table 1.

Apart from these, Caraka has described certain substances that possessing kṣāra property viz. mahiṣamūtra (buffalo's urine),[14] pakva kūśmāṇḍa (ripened *Benincasa hispida*)[15] and audbidha

TABLE 1
Kṣāra referred to in Carakasamhita

Name of kṣāra/Botanical name	Ref. (Ci.)*
Yavakṣāra (*Hordeum vulgare*)	5/147
Sarjakṣāra (*Alhagi camelorum*)	2/23**
Tilakṣāra (*Sesamum orientale)*	3/14**
Jyotiṣmati kṣāra (*Celastrus paniculatus*)	1(3)/15-23
Iṅgudi kṣāra (*Balanites roxburghii*)	1(3)/15-23
Palāśakṣāra (*Butea monosperma*)	1(3)/32-35
Kamalakesarakṣāra (*Nelumbo nucifera*)	2/92-93
Kamalanāḷakṣāra (*Nelumbo nucifera*)	2/92-93
Priyaṅgukṣāra (*Callicarpa macrophylla*)	2/92-93
Madhūkakṣāra (*Madhuca longifolia* var. *latifolia*)	2/92-93
Asanakṣāra (*Pterocarpus marsupium*)	2/92-93
Nīlotpalakṣāra (*Monochoria vaginalis*)	5/177
Kadaḷīkṣāra (*Musa paradisiaca*)	7/88-89
Pāṭalakṣāra (*Stereospermum suaveolens*)	7/88-89
Nicūlakṣāra (*Barringtonia acutangula*)	7/88-89
Mālatīmukuḷa kṣāra (*Jasminum grandiflorum*)	7/168
Mūlakakṣāra (*Raphanus sativus*)	12/43-46
Ajapurīṣakṣāra (Goat's excreta)	13/162-165
Bilvakṣāra (*Aegle marmelos*)	13/169-170
Agnimantha kṣāra (*Premna integrifolia*)	13/170-171
Śyonākakṣāra (*Oroxylum indicum*)	13/170-171
Balakṣāra (*Sida corifolia*)	13/170-171
Apamārgakṣāra (*Achyranthus aspera*)	13/170-171
Aśvagandhakṣāra (*Withania somnifera*)	17/117
Eraṇḍapatrakṣāra (*Ricinus communis*)	18/171
Muṣkakakṣāra (*Scbrebera swietenioides*)	26/192-193

* Cikitsāsthānam; ** Sūtrasthānam

lavana.[16] Based on the similarity in the appearance, smell, taste and touch of urine, a subcategory of pittaja prameha has named as kṣārameha.[17]

Kṣāra formulations

A number of kṣāra formulations are described in the āyurvedic classics in different contexts (Tables 2-3).

Apart from above, Caraka describes different kind of compound kṣāra preparations [prepared by antardhūma (incineration in closed chambers) method] in the treatment of grahaṇi (disorders of small intestine). They include Pippalyamūlādi kṣāra,[18] Bhallātakadi kṣāra[19], Durālabhādi kṣāra,[20] Bhūnimbādi kṣāra,[21] Haridrādi kṣāra,[22] Kṣāra guṭika[23] and Pañcama kṣāra (Triphalādi kṣāra).[24] Caturthakṣāra (Vatsakādi kṣāra)[25] referred in this context is a preparation where palāśakṣārajala is used as a basic liquid media.

Kṣāra is suggested to be one of the pathyas in some of the ailments like sthaulya (obesity),[26] gulma,[27] grahaṇi[28] and śotha.[29] In the same line, several ill health conditions are treated by diet processed with kṣāra (Table 4).

Caution in administration

Kṣāra is one of the three drugs advocated not to be consumed in excess [other two are pippali (*Piper longum*) and lavaṇa (salt)]. On excess, it transforms properties like uṣṇa, tīkṣṇa and laghu into the body resulting in dryness, blindness, impotency, hair fall, yellowish discolouration of hair, cardiac diseases[30] and causes tridoṣa

TABLE 4
Kṣāra prescribed as independent medicine

Name of kṣāra	Indications	Vehicle	Reference**
1. All kṣāra	Sthaulya (obesity)	-	Su. 21/23
2. Kamalanāḷakṣāra	Kaphanubandha raktapitta	-	Ci.2/92-93
3. Kamalakesarakṣāra	-do-	-	Ci.2/92
4. Palāśakṣāra	-do-	-	-do-
5. Priyaṅgu kṣāra	-do-	-	-do-
6. Asanakṣāra	-do-	-	-do
7. Madhūkakṣāra	-do-	-	-do-
8. Palāśakṣāra	Raktagulma	Sesame oil, ghee	Ci.5/173
9. Nīlotpalakṣāra	Kaphaja-raktapitta	Honey, ghee	Ci.5/177
10. Palāśakṣāra	Śvitra	Phaṇita (sugar candy)	Ci.7/164
11. Yavakṣāra	Jalodara	Gomūtra (cow's urine)	Ci.13/93
12. Yavakṣāra	Arśa, vibandha (constipation)	Jaggery	Ci.14/98
13. Aśvagandhakṣāra	Hikka śvāsa (Hiccup and asthma)	Honey, ghee	Ci. 17/117
14. Eraṇḍapatrakṣāra	Kāsa	Trikaṭu*, sesamum oil, Jaggery/holy basil juice	Ci. 18/171
15. Yavakṣāra	Vātaja pīnasa (rhinitis of vāta-origin), kāsa and vaisvarya (loss of voice)	Ghṛta	Ci.26/134
16. Yavakṣāra	Ādhmāna (abdominal distention)	-	Si. 7/24

* Combination of black pepper, long pepper and ginger
**Carakasamhita: Si - Siddisthānam; Ci. Cikitsāsthānam

TABLE 2
Different types of kṣāra formulations described in Carakasamhita

Name/type of formulation	Name of ksara used	Indications/Use	Reference*
A. Prefix 'kṣāra' formulations:			
- Kṣāraguṭika	Yavakṣāra, sarjakṣāra and mūlakakṣāra	Śotha, udara (ascities), śvetakuṣṭha (leucoderma) and aśmari (calculi)	Ci.12/43-46
- Kṣāravaṭika	Ajapurīṣakṣāra	Udara and śotha	Ci.13/162-165
- Kṣāraghṛta	Yavakṣāra and sarjakṣāra	Grahaṇi	Ci. 15/171-182
- Kṣāragada guṭika	Palāśakṣāra	Viṣa (poisonous conditions)	Ci.23/101-104
- Kṣāraguṭika	Palāśakṣāra, muskakaksara and yavakṣāra	Kaṇṭharoga (diseases of throat)	Ci.26/192-193
- Kṣārataila	Mulakaksara, yavakṣāra and sarjakṣāra	Bādhirya (deafness), karṇanāda (tinnitus) and karṇaśūla (ear ache) for karṇapūraṇa (ear filling)	Ci.26/227-229
B. Topical applications:			
- Haridrādi lepa	Tilakṣāra	Kuṣṭha (skin diseases)	Su.3/14
- Udaraśūlaśamaka lepa	Yavakṣāra	Udaraśūla (abdominal pain)	Su.3/20
- Citrakādi lepa	Palāśakṣāra	Kuṣṭha	Ci.7/85-86
- Māmsyādi lepa	Palāśakṣāra	Kuṣṭha	Ci.7/87
- Prakṣāḷaṇa yoga	Kadaḷi, palāśa, pāṭala and nicūḷakṣāra	Kuṣṭha	Ci.7/88-89
- Lepa yoga	Kadaḷīkṣāra and mālatīmukuḷakṣāra	Śvitra	Ci.7/168
- Pratisāraṇa yoga	Yavakṣāra	Kaphaja viṣa	Ci.23/189
C. Cūrṇa formulations:			
- Śaṭhyādi cūrṇa	Yavakṣāra	Gulma and bastiśūla (pain in bladder)	Ci.5/86-90
- Nārāyaṇa cūrṇa	Yavakṣāra and sarjakṣāra	Udara, arśa, bhagandara (fistula-in-ano), śvāsa and kāsa	Ci.13/124-132
- Nīlinyādya cūrṇa	Yavakṣāra and sarjakṣāra	Udara and gulma	Ci.13/137-138
- Pippalyādi cūrṇa	Yavakṣāra	Grahaṇi and agnimāndya (low digestive power)	Ci. 15/106-107
- Maricādya cūrṇa	Yavakṣāra	Grahaṇi and aruci (loss of taste)	Ci. 15/108-110
- Pippalīmulādi cūrṇa	Yavakṣāra and sarjakṣāra	Kaphaja grahaṇi	Ci. 15/168-169
- Viḍaṅgādi cūrṇa	Yavakṣāra	Kapha vāta kāsa, hikka and agnimāndya	Ci. 18/47-48

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Table 2 continued

Name/type of formulation	Name of ksara used	Indications/Use	Reference*
- Vātaja kāsahara yoga	Yavakṣāra and sarjakṣāra	Vāta-kāsa	Ci. 18/48-49
- Sauvarcalādi cūrṇa	Yavakṣāra	Vāta-kapha kāsa	Ci. 18/122
- Cavyādi cūrṇa	Yavakṣāra	Kaphaja svarabheda	Ci.26/287
- Dhātakīpuṣpādi yoga	Yavakṣāra	Parikartika (fissure)	Si. 6/64-65
D. Vaṭi formulations			
- Hiṅgvādi guṭika	Yavakṣāra and sarjakṣāra	Vāta kaphaja gulma and mūtrakṛcchra (disurea)	Ci.5/79-84
- Citrakādya guṭika	Yavakṣāra and sarjakṣāra	Grahaṇi	Ci.15/96-97
E. Rasāyana/lehya formulations			
- Loharasāyana	Jyotiṣmatīkṣāra, iṅguḍīkṣāra and palāsakṣāra	Rasāyana (rejuvenator), smṛtikara (memory enhancer), buddhi medha kara (increases intellect and intelligence)	Ci.1(3)/15-23
- Pippalīrasāyana	Palasakṣāra	Kāsa, kṣaya, śoṣa, svāsa, hikka, grahaṇi, pāṇḍu, pīnasa, śopha and gulma.	Ci.1(3)/32-35
- Indrokta rasāyana	Palasakṣāra	Vṛṣya (aphrodisiac), rasāyana	Ci.1(4)/13 -26
- Kamsaharītakīlehya	Yavakṣāra	Śvāsa, arocaka, jvara, prameha, gulma, udara, raktapitta, amḷapitta, vivarṇata, mūtravikāra, vātavikāra and śukradoṣa	Ci.12/50-52
- Jīvantyādi lehya	Yavakṣāra	Sarva kāsa	Ci. 18/176-179
F. Sneha formulations			
- Sadyosnehana ghṛta	Yavakṣāra	Sadyo snehana (instant oleation)	Su. 13/94
- Hiṅgusauvarcalādya ghṛta	Yavakṣāra	Śūla, anāha and vāta-gulma	Ci.5/69-70
- Nīlinīghṛta	Yavakṣāra	Vāta-gulma	Ci. 5/105
- Tailapancakam	Yavakṣāra	Gulma and anāha	Ci.5/96
- Daśamūlī ghṛta	Yavakṣāra	Kaphagulma	Ci. 5/142
- Bhallātakādya ghṛta	Yavakṣāra	Kaphagulma, pāṇḍu and śvāsa	Ci. 5/143-146
- Kṣīraṣaṭpalaghṛta	Yavakṣāra	Kaphagulma, grahaṇi and pāṇdu	Ci. 5/147-148
- Citrakādi ghṛta	Yavakṣāra	Śotha	Ci.12/57
- Pancakolaghṛta	Yavakṣāra	Udara, śotha, gulma and arśa	Ci.13/112-114
- Citrakaghṛta	Yavakṣāra	Udara	Ci.13/116-117
- Pippalyādi ghṛta	Yavakṣāra	Arśa	Ci.14/103-104
- Cavyādi ghṛta	Yavakṣāra	Arśa	Ci. 14/105

Cont..... -/-

Table 2 continued

Name/type of formulation	Name of kṣāra used	Indications/Use	Reference*
- Pippalīmūlādi ghṛta	Yavakṣāra	Arśa	Ci. 14/105
- Cavyādi ghṛta	Yavakṣāra	Arśa	Ci. 14/107-109
- Daśamūlādya ghṛta	Yavakṣāra and sarjakṣāra	Arśa	Ci. 15/82-85
- Pañcamūlādi ghṛta	Yavakṣāra and sarjakṣāra	Vāta-śleṣmāvṛta and sama arśa	Ci. 15/88-93
- Mṛdbhakṣyajanya pāṇḍuroga ghṛta yoga	Yavakṣāra	Mṛdbhakṣyajanya pāṇḍuroga	Ci. 16/121
- Daśamūlādi ghṛta	Yavakṣāra	Hikkaśvāsa	Ci. 17/140-141
- Pippalyādi ghṛta	Yavakṣāra	Kāsa, śvāsa, hṛtśūla, grahaṇi-doṣa and gulma	Ci. 18/36-38
- Kaṇṭakāri ghṛta	Yavakṣāra	Hikkaśvāsa, sarvakāsa and kaphavyādhi	Ci. 18/125-128
- Dvipañcamūladi ghṛta	Yavakṣāra and sarjakṣāra	Kṣaya and kāsa	Ci. 18/1580-160
- Ḍāḍimādi ghṛta	Yavakṣāra	Kṣayakāsa	Ci. 18/164-167
- Cāṅgeri ghṛta	Yavakṣāra	Atisāra and gudabhramśa ruja	Ci. 19/43
- Cavyādi ghṛta	Yavakṣāra	Gudabhramśa	Ci. 19/44
G. Kṣāra as anupāna (vehicle)			
- Eraṇḍa taila	Yavakṣāra	Vātaja-grahaṇi	Ci.15/79
- Tilvaka ghṛta	Yavakṣāra	Vātaja-grahaṇi	Ci.15/79
- Ativiṣādi kvātha	Yavakṣāra	Grahaṇi	Ci. 15/105
- Puṣkaramūlādi kalka	Yavakṣāra	Hṛdroga (cardiac diseases)	Ci.26/84,85
- Śilājatu	Yavakṣāra	Vātaja-gulma	Ci. 5/97
H. Therapeutic uses of kṣāra through pathya kalpana:			
- Takrasiddhakṛmighnayavāgu	Sarjakṣāra	Krimi	Su. 2/23
- Bhedini yavāgu	Yavakṣāra	Vibandha (constipation)	Su. 2/29
- Jīvantyādi yavāgu	Yavakṣāra	Arśa, atisāra, vātagulma, śopha and hṛdroga	Ci.12/60-61
- Takra	Yavakṣāra	Udara	Ci.13/101-102
- Mūlaka yūṣa	Yavakṣāra	Kaphaja grahaṇi	Ci. 15/144
- Kulattha yūṣa	Yavakṣāra	Kaphaja grahaṇi	Ci. 15/144
- Mātuluṅgādi yūṣa	Apamārgakṣāra	Hikka śvāsa	Ci. 17/97
- Śigrvādi yūṣa	Yavakṣāra	Hikka śvāsa	Ci. 17/98
- Mūlakādi yūṣa	Yavakṣāra	Granthī visarpa	Ci.21/128

*Carakasamhita - Ci. - Cikitsasthanam; Su. - Sutrasthanam; Si. - Sidhisthanam

TABLE 3
Kṣāra used in different formulations of pañcakarma and other procedures

Name of formulation	Procedure	Ingredient ksara	Indications	Reference
1. Palāśakṣārayukta-tilapiṣṭa	Yonīkṣāḷana (vaginal douch)	Palāśakṣāra	Raktagulma	Ci.5/174
2. Uttarabasti yoga	Uttara basti (medicated enema through vagina)	Yavakṣāra	Raktagulma	Ci.5/178
3. Triphalādi taila	Nasya (nasal instillation)	Yavakṣāra	Udara	Ci.13/149
4. Dvidīya nirūha yoga	Basti (medicated enema through anus)	Yavakṣāra	Udara	Ci. 13/174-175
5. Citrakādi taila	Abhyaṅga (massage)	Yavakṣāra	Arśa	Ci.14/40
6. Pariṣekayoga	Pariṣeka (pouring)	Yavakṣāra	Granthi visarpa	Ci.21/122
7. Parama agada	Nasya, añjana lepa, pariṣeka	Yavakṣāra	Vṛścīkadaṁśa (scorpion bite)	Ci.23/212-214
8. Śatapadi viṣahara yoga	Nasya and añjana	Ajasakritkṣāra Sarjakṣāra	Śatapādi damśa (centipede bite)	Ci.23/215
9. Śigrvādi yoga	Nasya and kavaḷa	Yavakṣāra	Śiroroga (diseases of head)	Ci.26/186
10. Pippalyādi cūrṇa	Kavaḷa (gargling)	Yavakṣāra	Mukharoga (oral diseases)	Ci.26/188-189
11. Kṣāraguṭika	Gaṇḍūṣa (gargling)	Palāśa, muṣkaka and yava kṣāra	Kaṇṭha roga (diseases of throat)	Ci.26/192-193
12. Kāḷaka cūrṇa	Gaṇḍūṣa	Yavakṣāra	Danta, mukha and kaṇṭha rogas	Ci.26/194-195
13. Pītaka cūrṇa	Gaṇḍūṣa	Yavakṣāra	Dantaroga and mukharoga	Ci.26/196-197
14. Pariṣeka yoga	Kṣāra	Pariṣeka	Kaphaja vātarakta (gout-kapha origin)	Ci.29/147
15. Pippalyādi yoga	Virecana (purgation)	Yavakṣāra	kaphaja roga	K. 7/29
16. Triphalādi yoga	Virecana	Yavakṣāra	kaphaja roga	K. 7/37
17. Kośātakādi yoga	Basti	Yavakṣāra	Kaphaja roga	Si.3/57
18. Gomūtrādi yoga	Basti	Yavakṣāra	Vitiated kapha	Si. 7/63
19. Kaphanāśaka basti	Basti	Yavakṣāra	Vitiated kapha	Si. 10/24

*Carakasamhita - K - Kalpasthānam;, Si - Siddisthānam; Ci. Cikitsāsthānam

vitiation.[31] Caraka even warns that kṣāra is the top drug among those which causes infertility.[32] Apart from these, kṣāra is known to be a causative factor for many other diseases on excess consumption (Table 5).

Considering the contraindications in regular use, Caraka suggests that before prescribing kṣāra, certain factors like doṣa predominance, constitution of patient, season, strength of patient and diseases may be taken into account that and kṣāra should be administered with a gap of one day, two days or three days as suitable[33]. Kṣāra is contraindicated during śaratkāla (around August and September)[34] as it is the period of pittaprakopa (aggravation).

Discussion and conclusions

26 types of kṣāra and more than 100 kṣāra-contained formulations are mentioned in Carakasamhita. Though Caraka considers kṣāra under audbhidha category, Ajapurīṣakṣāra of animal origin is an exception. Among various kṣāra, yavakṣāra is found most frequently used, and often the word kṣāra is synonymously mentioned in place of yavakṣāra. Among kṣāra groups, kṣāradvaya (two kṣāra) - yavakṣāra and sarjakṣāra - has described in many places in the text, but other groups like kṣāratrya (three kṣāra) and kṣārapañcaka (five kṣāra) are not found though some of kṣāra under these groups like palāśakṣāra, muskakakṣāra, apamārgakṣāra, etc are described. Taṅkaṇa, one among the kṣāra-traya (three kṣāra) is not found in Carakasamhita.

TABLE 5
Kṣāra as aetiological factor of diseases

	Disease	Reference*
1.	Pittaja śiroroga	Su.17/22
2.	Pittaja hṛdroga	Su.17/32
3.	Pittaja śotha	Su.18/2
4.	Jvara	Ni.1/22
5.	Raktapitta	Ni.2/4
6.	Pittaja prameha	Ni.5/24
7.	Udara	Ci.13/12
8.	Arśa	Ci.14/15
9.	Vātarakta	Ci.29/5
10.	Dvajabhaṅga (erectile disfunction)	Ci.30/163
11.	Pittaja pradara (menorrhagia of pitta origin)	Ci.30/214
12.	Stanyadoṣa (defects of breast milk)	Ci.30/232

*Carakasamhita

As kṣāra is rich with potassium and sodium contents, which are known for diuretic action, it is indicated in śotha. It is useful in treating conditions like gulma, grahaṇi, hikka and śvāsa due to its chedana (cutting) action on kapha and drying properties. However, kṣāra is mentioned as one of the aetiological factors for certain diseases like raktapitta, udara and arśa, it is indicated in such cases also; diseases of kapha origin are treated with specified kṣāra, but not pitta condition as kṣāra is tīkṣṇa and uṣṇa by nature.

Pharmaceutical aspect of kṣāra is not well explained in Carakasamhita; that is why Cakrapāṇidatta refers Suśrutasamhita in certain contexts. For e.g., in the context of treatment of granthi visarpa, he comments on the term 'pakya kṣāra' as that kṣāara prepared according to the procedure of kṣārapāka (kṣāra preparation) explained by Suśruta. While describing kṣāragada in viṣacikitsa, he comments palāśakṣāra to follow, the Suśruta's method of kṣāra preparation. However, Carakasamhita would help in understanding different types of kṣāra and their therapeutic applicability in different contexts.

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4. Ibid., 11/7-8
5. Ibid, Chapter 11, p 44
6. Dr. Bhaskara Govinda ghanekar, *Vaidya-keeya Subhashita Sahitya*, 2nd chapter, 6th Sloka, P 9, Chaukhambha Prakshashana, Varanasi, 2007.
7. Acharya Yadavji Trikamji, *Carakasamhita* (Commented by Chakrapanidatta), Sutrasthanam, 26/9, Krishnadasa Academy, Varanasi, 2000.
8. Ibid, 26/8.
9. Ibid, Cikitsasthana, 5/58.
10. Ibid, Sutrasthana 1/73-74
11. Ibid, Vimanasthana 8/142
12. Ibid, Sutrasthana 11/55
13. Ibid, 27/305-306.
14. Ibid, 1/101
15. Ibid, 27/113
16. Ibid, 27/303
17. Ibid, Nidanasthana, 5/29
18. Ibid, Cikitsasthana, 15/173-176.
19. Ibid, 15/177-178.
20. Ibid, 15/179-180.
21. Ibid, 15/181.
22. Ibid, 15/182.
23. Ibid, 15/183-185.
24. Ibid, 15/188-193.
25. Ibid, 15/186-187.
26. Ibid, Sutrasthana 21/23.
27. Ibid, Cikitsasthana 5/166.
28. Ibid, 15/196.
29. Ibid, 12/62.
30. Ibid, Vimanasthana 1/17.
31. Ibid, Sutrasthana 8/142.
32. Ibid, 25/240.
33. Ibid, Cikitsasthana 5/56- 57.
34. Ibid, Sutrasthana 6/45.

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GARAVIṢA - CONCEPT AND SIGNIFICANCE

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Abstract: Gara constitutes a toxic material, which, when externally or internally comes into contact, leads to many ill effects. In olden days, people used this technique for various illegal purposes. Today also it has a role in our erred lifestyle; only the patterns have changed, but not the concept. Usage of dhāttura seeds (*Datura metel*) for misdeeds like abduction, powders of cantharides (dried spanish fly - a variety of insect) for homicidal purposes, cosmetics and oils for hair growth are a few instances. They cause damage to the body sooner or later. Garaviṣa has a special mention in many texts. But its concept, method of induction, outcome and treatment pave the way for many doubts in a practitioner. An attempt to answer these doubts is made here.

Introduction

Among the eight branches, Agadatantra (toxicology) stands separate in its concept, clinical approach, management and result. It is "Viṣa gara vairodhika praśamana"[1] (one which combats poisons of different types) in concept; "Āgantujavyādhi"[2a] (disease due to exogenic cause) in clinical approach; and its management should be immediate like that of saving a house from fire[2c]; and the result of the effort of a vaidya is immediate because of the nature of the disease.[2d] Apart from these specialties, Agādatantra has contributed much in both diagnosis and treatment in this regard. The concept of virudha (incompatible), garaviṣa (concocted poison), duṣīviṣa (cumulative toxicity), bhinnaviṣa (remnant poison) and their distinguished features from other systemic disorders are a few examples it provides in diagnostic approach. While describing caturvimśati upakrama (twenty four folds of treatment)[1b], Caraka mentions specialized managements like agada auṣadhapāna (detoxifying medicaments), kākapādacikitsa (cutting the scalp and applying medicines over it), phuṭkara cikitsa[3] (ūttu cikitsa in vernacular - forceful blowing out of air into the ears of the patient by the physician after chewing medicines) and hṛdayāvaraṇa (taking large quantity of ghee immediately after affliction of poison to save vital organs from damage).

Among all these, garaviṣa has a special mention in many texts. But the concept of gara, its method of induction, its outcome and treatment paves the way for many doubts in a practitioner. Is it just propaganda so as to mislead the people or does it really exists? If it existed, was it prevalent during the bygone era? Is it practised today also? An attempt to answer these queries is made here.

What is gara?

Garaviṣa is a combination of various toxic or non-toxic materials which affects an individual's health physically and mentally when applied

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externally or administered orally. It may comprise body parts and excreta of various animals or some non poisonous substances that become hazardous when mixed together.[2e, 4, 1c]

Prevalence

There are direct references to its motives and modes of induction in the texts. Ācārya Suśruta mentions its modes as external and internal; and is induced intentionally or accidentally.[4] Vāgbhaṭa explains it as intentional; induced by admixing with food.[2e] Kriyākaumudi, a textbook of Toxicology in Malayāḷam, states that garaviṣa (kaiviṣam in vernacular) is administered with the intention of making a person physically or mentally ill and also to set the individual under one's own command (vaśīkaraṇam in vernacular).[5a]

While screening garaviṣa in today's perspective, an ever ending list of food items that are incompatible and preservative-mixed can be seen; in addition, indulgence with the alcoholic beverages and nicotinic derivatives cause further damage. We are landing into an intentional diet mishap. The usage of the body parts of animals and toxic plants for homicidal purposes and misdeeds is another aspect of garaviṣa. The practice of using cantharide powder and seeds of thorn apple (*Datura metel*) are classical examples. Cantharides (dried Spanish fly) are deadly venomous when it externally comes into contact or enters the body (with food). It induces various drastic features of irritant poison and is fatal. 10 gm of the powder or 10 mg of its active principle Cantharidin is sufficient to kill a person. Thorn apple (dhattūra in Sanskrit) has a peculiar action on the nervous system. It causes loss of reasoning skill and orientation when taken orally. Its seeds powder mixed with food is used for misdeeds like kidnapping, robbery, etc.[6] These examples cited in our classics are still in practice with the same motives and modes.

The external effects of gara mentioned in our classics are seen in the use of cosmetics. The ingredients of various cosmetics available in the market today are the powders of Cantharides and many other synthetic poisons.[6] They are used as counter irritants of skin and also in the hair oils. When ill-assorted for skin, they act as irritants and exhibit the signs of irritant poisons.

Adulteration and gara

Today it has become an uphill task to find an un-adulterated food. Majority of eatables available in the market are either adulterated or loaded with pesticides. The shifting to fast food culture adds the injury. According to Caraka, people, in one way or the other, are subjected to garaviṣa.[1c] It kills a person very slowly and hence can be considered as a low potent poison.

Clinical features

Our classics have emphasized the outcome of gara and its involvement in multi-system. Vāgbhaṭa explains the symptoms of effects of toxins on various systems with a clear-cut demarcation of physical and psychological.[2f] The features like pāṇdu (pallor), mahodara (ascitis), yakṛtpḷīha (hepatobiliary disorders) shows the severe effect of toxins leading to cirrhosis or hepatic failure. Other features like kārśya (emaciation), alpāgni (loss of proper digestive fire), jvara (pyrexia) indicate malnourishment and alimentary system involvement. They can be serious or debilitating in nature. Next, a series of features relating to mental instability are enlisted. It signifies the ingestion of stupefying poisons or addiction/dependency to narcotic poisons. A person, who is addicted to narcotic like opium or cannabis derivatives[6], presents with the symptoms mentioned by

Vāgbhaṭa (which may either be accidental or intentional). Also, the psychological features mentioned (by Vāgbhaṭa) tally with the features of chronic cocaine poisoning.[6] So, "Viṣāṇām ca alpavīryāṇām" concept[2e] is found true in the usage of alcohol, adulterated food, various narcotics, and stupefiers and also some adverse drug reactions as in aspirin (renal failure, pulmonary oedema) and antidepressants (dizziness, hypotension, confusion, cyanosis, respiratory failure).[6] Before treatment, it is necessary to confirm whether the features are the effect of gara.

Detection

Caraka advises to interrogate the bystander of the patient about the details of the last food the patient consumed; with these, the physician can get the root cause of poisoning and act accordingly.[1d]

Though it is a tedious work to detect the poison in food or cosmetics, the treatment has to be done very soon. Kriyākaumudi explains a technique to detect the presence of gara in a patient. Prepare a paste of nīlinīpatra (*Indigofera tinctorea* leaves) macerated with milk and apply over the abdomen of the patient. After some time, the paste naturally gets dried, but if garaviṣa is present, that particular part will remain wet even after a long time.[5b]

Treatment

Āyurveda advises śodhana (purificatory procedure) in bahudoṣa avastha (strongly afflicted disorder) provided the patient is strong. Garaviṣa is penetrating in nature and also indigestible. The physician should decide the purificatory procedure, either vamana (emesis)[2g] or virecana (purgation), according to the site of affliction. Once the unabsorbed or undigested toxin is removed from the body, palliative and rejuvenative medicines can be prescribed. Medicines containing gold are preferred as gold is a good rejuvenator when given with honey and ghee. It is justified with a simile that a patient affected with viṣa, if given medicaments of gold, the poison will slip off from the body just like a droplet of water from a lotus leaf.[2b]

The whole procedure is replicated in the emergency management of poisoning. The unabsorbed poison is removed by emesis or gastric lavage and the absorbed poison by purgation. Later the patient is given antidotes (specific or universal) and symptomatically managed.[6] These are the remedial measures to get rid of toxins.

Conclusion

The practice of garaviṣa persists even today; the change is only in the mode of administration and its applicability. A sincere attempt in controlling the spread of slow toxins in our lifestyle is the need of the hour. It is the duty of disciples of āyurveda to understand the codified system, assimilate the scattered references and build a concept and propagate it to the society.

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EXCERPTS FROM CIKITSĀMAÑJARI - LXVII

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Abstract: The chapter 'Mukharogacikitsa' (treatment of face and mouth) continues. Classification of mukhapāka (aphthous ulcer), its various causes and treatments are discussed in this issue.

Treatment of mukhapaka

Based on the dependent doṣas, aphthous ulcers (mukhapākās) are classified into five viz. vātika, paittika, śḷaiṣmika, sannipātika and raktaja; along with them, three diseases viz. ūrdhvaguda, arbuda and pūtyāsyatā (halitosis) are to be considered; thus the total number of diseases of mouth (sarvamukhagatārogas) comes eight.

Deranged vāta causes ulcers within the oral cavity that are coloured red; the lips become dry, copper coloured and the ulcers may change positions in the cavity frequently. The skin around the ulcer can be stretched. The tongue becomes sensitive to cold, swollen, cracked and thorny surface appearance. The patient finds it difficult to open the mouth wide. The ulcers may also contain pus. Piles, flatulence, kapha, etc. block the downward passage of vata resulting in its upward movement, which cause belching with foul smelling. Halitosis is also present. This condition is termed ūrdhvaguda. Deranged pitta causes bitter taste in the mouth, accompanied by local and general burning sensation. Ulcer appears similar to burn caused by strong alkali. Similarly, damaged kapha causes sweet taste in the mouth, in which ulcers are itchy and the secretion dense. Inner portion of the cheek presents dark or white thickening of the mucous membrane and the lesion increases when bitten split open or rubbed. This condition is also caused by kapha, termed arbuda. Aphthous ulcers can also be caused by vitiated blood and all other doṣas. Here, foul smell emits from the mouth and there is an aversion to clean teeth and tongue. All mouth washes used in ulcers shall contain honey.

Mukhapāka caused by vāta is treated by fraying ulcers with fine powders of kṛṣṇā (*Piper longum*) mixed with rock salt and ēla (*Elettaria cardamomum*). Sesame oil medicated with drugs that pacify vāta is used for filling the mouth and gargling. In combined vitiation of pitta and rakta, drugs capable of relieving these doṣas are to be selected. Ulcers that originate due to kapha and ulcers that are painful, hard and static are to be rubbed with the rough leaf of śāka (*Tectona grandis*). Ulcers that are caused by derangement of all doṣas (sannipātika origin) are to be treated symptomatically. Arbuda of recent origin if not increased in size, is to be treated by excision and rubbing the surface with the powders of svarjika (impure Sodium bicarbonate), nāgara (*Zingiber officinale*) and honey

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to promote secretions. A kaṣāya prepared from guḍūci (*Tinospora cordifolia*) and bark of nimba (*Azadirachta indica*) added with sesame oil and honey, is used for filling the mouth. A diet of cooked yava (*Hordeum vulgare*), nasya and abhyaṅga with sesame oil medicated with pungent (tīkṣṇa) drugs are recommended. After inducing emesis (vamana), inhalation of fumes that are pungent is advised to relieve foul smell of the mouth. Nasal medications are also indicated. Mouthwash prepared from the kaṣāya of the following and rubbing the oral cavity with powders prepared from these drugs also relieve ulcer.

Samaṅga	*Mimosa pudica*
Dhātaki	*Woodfordia fruticosa*
Lodhra	*Symplocos cochin-chinensis*
Phalini	*Callicarpa macrophylla*
Padmaka	*Prunus cerasoides*

Treatments indicated for śītada and upakuśa, such as nasya, etc. also are to be done. Foul smell of the mouth is relieved by tooth brushes made from drugs that are bitter and spicy. Filling the mouth with sesame oil medicated with drugs that are bitter also has the same effect.

Add fine powders of the following to a kaṣāya prepared from the following and reduce sufficiently to roll pills. These pills, on placing inside the mouth daily for some time, relieves diseases that are difficult to treat originate from neck, lips, uvula, soft and hard palates, rohiṇika, āsyaśoṣa and gaṇḍa. This preparation is advised by the sage Videhādhipati.

Phalatraya	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Dvīpi	*Plumbago zeylanica/indica*
Kirātatikta	*Andrographis paniculata*
Yaṣṭyāhva	*Glycyrrhiza glabra*
Siddhārtha	*Brassica juncea*
Kaṭutrika	*Zingiber officinale*
	Piper longum
	Piper nigurm
Musta	*Cyperus rotundus*
Haridrādvaya	*Curcuma longa*
	Berberis aristata
Yāvaśūka	*Sodii carbonas impura*
Vṛkṣāmḷa	*Tamarindus indica*
Amḷāgrima	*Citrus lemon*
Vetaśa	*Homonoia riparia*
Aśvatha	*Ficus religiosa*
Jambu	*Syzygium cumini*
Āmra	*Mangifera indica*
Dhanañjayatvak	*Terminalia cuneata* - bark
Āhimāra tvak	*Acacia leucophloea*
Khadira sāra	*Acacia catechu* - cutch

A kaṣāya prepared from the following, mixed with honey, used for gargling relieves diseases of the mouth.

Kṣudra	*Solanum virginianum*
Guḍūci	*Tinospora cordifolia*
Sumanapravāḷa	*Jasminum grandiflorum* - bud
Dārvi	*Berberis aristata*
Paṭola	*Trichosanthes lobata*
Triphala	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica

Powder of the following drugs mixed with honey on placing inside the mouth relives diseases of the face, neck and teeth:

Gṛhadhūma	Soot
Tārkṣya	Copper vitriol
Pāṭha	*Cyclea peltata*
Vyoṣa	*Zingiber officinale*
	Piper nigrum
	Piper longum

Kṣāra	Carbonate of potash
Agni	*Plumbago indica/zeylanica*
Aya	Iron powder
Vara	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Tejohva	*Zanthoxylum rhetsa*

Pītaka cūrṇa

Powder prepared from the following, mixed with honey and ghee on placing inside the moth for some time and spitting out, relieves diseases of the tooth, mouth and neck.

Dārvītvak	*Berberis aristata* - bark
Sindhūtbhava	Rock salt
Manaśśila	Realgar
Yāvaśūka	*Sodii carbonas impura*
Haritāla	Orpiment

Immerse pathya (*Terminalia chebula*) in cow's urine till they lose the shape; then fortify this liquid with yava, misi (*Anethum graveolens*) and kuṣṭha (*Saussurea costus*). A person who consumes this medicine gets insulated against diseases of the mouth like the king who is unaffected by evils.

Ulcers and pus in the oral cavity is relieved by consumption of the kaṣāya prepared from the following added with ghee.

Saptachada	*Alstonia scholaris*
Uśīra	*Vetiveria zizanioides*
Paṭola	*Trichosanthes lobata*
Mustā	*Cyperus rotundus*
Harītakī	*Terminalia chebula*
Tiktaka	*Andrographis paniculata*
Rohiṇi	*Picrorhiza kurrooa*
Yaṣṭyāhva	*Glycyrrhiza glabra*
Rājadruma	*Cassia fistula*
Candana	*Santalum album*

Diseases of the oral cavity are relieved by consumption of a kaṣāya prepared from the following added with honey.

Paṭola	*Trichosanthes lobata*
Śuṇṭhi	*Zingiber officinale*
Triphala	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Viśāla	*Citrullus colocynthis*
Trāyanti	*Gentiana kurroo*
Tikta	*Andrographis paniculata*
Niśa	*Curcuma longa*
Amṛta	*Tinospora cordifolia*

A kaṣāya prepared from the following, mixed with honey, relieves mukhapāka. It can be used for gargling also.

Śṛṅgīvera	*Zingiber officinale*
Haridre dve	*Curcuma longa*
	Berberis aristata
Triphala	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Taṇḍulīyaka	*Amaranthus spinosus*

Reduce the decoction of dārvi in fire to form a thick paste; and add gairika (red ochre) to it. This preparation, kept in the mouth with honey, relieves pus in the mouth and tubular abscesses.

Reduce the kaṣāya prepared from kṣīrīvṛkṣa (the four Fig trees); and add powders of khadira, triphala and yaṣṭyāhva to it. This preparation used as above has similar therapeutic effects.

Gargling with a mixture of sesame oil and ghee is advised; this preparation added with honey, responds quickly to ulcers. Gargling with fine paste of iraṭṭimadhuram (*Glycyrrhiza glabra*) mixed with milk is also effective. Ghee medicated with sesame seed paste as solid component,

and kaṣāya of the same seeds as liquid component, filtered in soft (mṛdu) state of solid component, used for nasya along with ghee, relieves diseases of the mouth. Sesame seed paste, mixed with milk or candana paste in sour buttermilk is used for gargling.

One fourth of sesame oil medicated four times with the expressed juice of the following as liquid component, and powders of kaṭukka (*Terminalia chebula*), tuṭi (*Elettaria cardamomum*) and kuṣṭha (*Saussurea costus*) as solid component, relieves ulcers of the mouth.

Pazhukka	*Areca catechu*
Kovakka	*Coccinia grandis*
Rāvu	*Curcuma longa*
Iñci	*Zingiber officinale*

Depending upon the deranged doṣa of lesion, application of medicated oil on the head is suggested. When kapaha is predominant, Triphalādi or Asanavilvādi oil is applied on the head. Vitiated vāta and pitta is treated with medicated oils such as Ceriya Candanādi or Ārukālādi in which the solid component is replaced with a paste prepared from koṭṭam (*Saussurea costus*), iraṭṭimadhuram, candanam, iruveli (*Plectranthus vettiveroides*), rāmaccam (*Vetiveria zizanioides*) and nannāri (*Hemidesmus indicus*). Tuṅgadrumādi is also good.

Tuṅgadrumādi oil prepared with medicated sesame oil with tender coconut water and cow's milk as liquid components, and paste of sugandha (*Kaempferia galanga*), lāmajja (*Plectranthus vettiveroides*), yaṣṭimadhuka (*Glycyrrhiza glabra*), utpala (*Nymphaea nouchali*) and candana as solid component on application on the head, cools eyes and satiates head.

Intake of ghee medicated with svaducatuska is effective. A kaṣāya prepared with 12 kazhañju (48g) cerupayar (*Vigna radiata*) added with ghee is prescribed to consume in the morning. Kaṣāya prepared with iraṭṭimadhuram in half potency (ardhakaṣāya) is prescribed to consume in the evening. Cut pieces of amukkura (*Withania somnifera*), cooked in milk and dried in sun, is prescribed to intake with sugar in the morning. Buffalo ghee medicated with the expressed juice of cerupūla (*Aerva lanata*) as liquid component, and iraṭṭimadhuram and mezhuku (bee's wax) as solid component, is suggested for gargling. The expressed juice from the husk of tender coconut, mixed with sesame oil can also be used for gargling. All the above medicines relieve mukhapaaka.

Gargling with medicated ghee prepared with kaṣāya of barks of kṣīridruma (the four Fig trees), khadira and arimeda (*Acacia leucophloea*) as liquid component, and paste of śiva (*Terminalia chebula*), padmaka (*Prunus cerasoides*), yaṣṭi and śīta (*Santalum album*) as solid component, added with sita (sugar) and sanātha (honey), relieves mukhapāka. Gargling with Arimedastaila relieves kapolārbuda.

A kaṣāya prepared from the following, on gaṇḍūṣa (filling the mouth), relieves mukhapāka.

Jātipatra	*Myristica fragrans*
Amṛta	*Tinospora cordifolia*
Drākṣa	*Vitis vinifera*
Yāṣa	*Fagonia cretica*
Dārvi	*Berberis aristata*
Phalatrika	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica

A ghee medicated with seeds of muriṅga (*Moringa oleifera*) and iraṭṭimadhuram are prescribed for gargling. Sesame oil medicated

with the expressed juice of nirguṇḍi (*Vitex negundo*) as liquid component and fine paste as solid component prepared from the following, relieves diseases of the mouth and abscesses.

Nalpāl	The four Fig trees
Veppu	*Azadirachta indica*
Lanta	*Ziziphus jujuba*
Paṭavalam	*Trichosanthes lobata*
Amṛtu	*Tinospora cordifolia*
Ñjāval	*Syzygium cumini*
Pachoṫṫi	*Symplocos cochin-chinensis*
Śuṇṭhi	*Zingiber officinale*
Muttaṅga	*Cyperus rotundus*
Tātirippu	*Woodfordia fruticosa*
Varuṇa	*Cretaeva magna*
Vṛṣa	*Justicia beddomei*
Kaṇa	*Piper longum*
Vīra	*Coccinia grandis*
Pāchuṇṭa	*Mimosa pudica*
Koṭṭam	*Saussurea costus*
Jāti	*Myristica fragrans*
Brahmadru	*Cedrus deodara*
Dārvi	*Berberis aristata*
Rajani	*Curcuma longa*
Phalapati	*Vitis vinifera*
Vājīgandha	*Withania somnifera*

A kaṣāya of Iḷanīrkuzhampu (given below) is prescribed for gargling. In this preparation, the liquid component is tender coconut water, and the paste prepared from fine powders of the following is solid component:

Dārvi	*Berberis aristata*
Triphala	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Madhuka	*Glycyrrhiza glabra*

The above kaṣāya is filtered and the filtrate is used for gargling.

Eḷḷu (*Sesamum indicum*) and panaccikkuru (Seeds of *Diospyros malabarica*) ground and mixed with cow's milk is prescribed for gargling. Husk removed seeds of iṭiccirañji (*Mimusops elangi*) fried in sesame oil in a copper vessel is prescribed for gargling to alleviate all diseases of the mouth.

Fine powders of the following mixed with honey, tied in a loose cloth bundle, is suggested to place inside the mouth for reliving diseases of the mouth; this cleans the teeth.

Muttanga	Cyperus rotundus
Cuṇṭa	*Solanum indicum*
Veppu	*Azadirachta indica*
Triphala	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Vyoṣa	*Zingiber officinale*
	Piper nigrum
	Piper longum

Filling the mouth with a paste prepared from the juice of mātuluṅga (*Citrus medica*) and ārdraka (*Zingiber officinale*) - equal parts, with honey and jaggery and vyoṣa, relieves diseases of the face. Oral application of paste prepared from the following, mixed with honey or śaśi (*Cinnamomum camphora*) relieves diseases of the mouth.

Vyoṣa	*Zingiber officinale*
	Piper nigrum
	Piper longum
Kaṇa	*Piper longum*
Vanakaṇa	*Piper longum* (wild var.)
Agni	*Plumbago indica/zeylenica*
Viḷaṅga	*Embelia ribes*
Cavya	*Piper mullesua*
Māyūrika	*Achyranthus aspera*
Paṭu	Rock salt
Yavāgraja	*Hordeum vulgare*

Heat an iron vessel till it becomes red hot and then add cow's milk mixed with puzhuku (civet) and jīrakam (*Cuminum cyminum*). Close the vessel immediately with an earth vessel having a hole on the top. Direct the fumes arising through the hole to the nose and mouth using a tube prepared from pāḷa (the spathe of the areca palm). This relieves diseases of the neck.

Diseases of the teeth, mouth and neck in general are caused by kapha and rakta doṣa. Repeated bloodletting is required to get rid of the contaminated blood. Śirovireka (pungent nasal medications - nasya), repeated purgation, induction of emesis, gargling with fluids medicated with drugs that have spicy (kaṭu) and bitter (tikta) taste, frequent bloodletting and medicines that reduce kapha are necessary for the relief and non-recurrence of these diseases.

Yava rice, pulses kept in alkaline substances for a night, fat free diet, soup and any other edibles that do not increase kapha are suitable here.

Disease of the neck should be treated quickly because neck is situated in the region of prāṇa and the delay may block respiration and the condition can become fatal. Any error in treatment may also cause fatal.

The diseases of mukha i.e. lips (oṣṭha), neck (gaṇḍa), teeth (danta), gums (dantamūla), tongue (jihva), soft and hard palate (tālu), oesopharynx (gaḷa) and diseases that affect the oesopharyngeal region are 75 in total (Table 1).

TABLE 1
Classification of mukharoga

Sl. No	Site of manifestation	No.
1.	Oṣṭha	11
2.	Gaṇḍa	11
3.	Danta	13
4.	Dantamūla	6
5.	Jihvā	8
6.	Tālu	8
7.	Gaḷa	10
8.	Sarva vaktra	8

The following diseases will not respond to the treatment: karāla, māmsoṣṭha, raktoṣṭha, all arbudas (except jalārbuda), kacchapa, tālupiṭaka, gaḷaugha, suṣira, mahān, svaraghna, ūrdhva-guda, śyāva, śataghnī, valaya, ālasa, nāḍi, sānnipātika oṣṭhakopa and raktaja oṣṭhakopa, all rohiṇī, sphuṭadanta, dantabheda, upajihvika - pakva, gaḷagaṇḍa, svarabhramśa and kṛcchrochvāsa (of older than an year). Harṣa and bheda can be managed and the other face and mouth diseases are curable with the help of medicines and surgery.

Printed at Premier Offset Prints, Kozhikode and published by Aryavaidyan P.K.Warrier, Managing Trustee, Arya Vaidya Sala, Kottakkal for and behalf of Arya Vaidya Sala, Kottakkal.
Editor: Dr. M.R. Raghava Varier. Typesetting: Department of Publications, Arya Vaidya Sala, Kottakkal.