Research Article

Available online through
www.ijrap.net

IJRAP
ISSN 2229-3566

PRELIMINARY PHYSICOCHEMICAL EVALUATION OF SARJA RASA (RESIN OF *VATERIA INDICA* LINN.) AND IT'S TRADITIONAL MEDICINAL FORMULATION

Venkateshwarlu G[1]*, Shantha T R[1], Shiddamallayya N[1], Kishore K R[1] and Sridhar B N[2]
[1]National Ayurveda Dietetics Research Institute [NADRI (CCRAS)], Bangalore 560 011, India
[2]Assistant Director Incharge NADRI, Bangalore, India

Received on: 08/01/2011 Revised on: 22/02/2011 Accepted on: 10/03/2011

ABSTRACT
The resin from a tree *Vateria indica* Linn. is therapeutically known in Indian traditional systems of medicine (Ayurveda and Siddha). It is known as Sarja rasa in Ayurveda and Vellai Kungiliyam in Siddha. Studies have shown that the resin possesses resveratrols having anti-tumour properties. Kungiliya parpam (KP) is a Siddha preparation made from this resin that is effective in the management of urinary tract disorders. There have been no physicochemical studies evaluating traditional methods of preparation. Hence a study was undertaken to do a preliminary physico-chemical evaluation of samples Sarja rasa and Kungiliya parpam and compare the changes with a working hypothesis that, Traditional methods of preparation might reconstitute and fortify the phyto-compounds present in the resin to bestow various healing properties. Physicochemical constituents of the two samples (Sarja rasa and Kungiliya parpam) were evaluated using solvent extraction method using soxhlet apparatus. Benzene, petroleum ether, chloroform and ethyl alcohol extracts of both samples were estimated and compared. Solvent extraction of both samples revealed that there was decrease in %w/w of benzene extract whereas an increase in percentage weight/weight (%w/w) values of all other solvents extracts in KP. This provides preliminary hints towards phytochemical mechanism involved in traditional method of preparation. The study demonstrates reconstitution of phytocompounds with traditional methods of preparation of Kungiliya parpam using Sarja rasa which, might contribute to the unique medicinal property of KP. Advanced pharmacological and HPLC studies might help in eliciting modern scientific basis for traditional methods of medicinal preparations.
KEY WORDS: Sarja rasa, Kungiliya parpam, *V. indica* Linn. , Ayurveda, Siddha

***Corresponding Author:**
Assistant Director (Ay.) National Ayurveda Dietetics Research Institute (CCRAS), Govt. Central Pharmacy annexe, Jayanagar, Bangalore 560 011 Email: nadribengaluru@gmail.com

INTRODUCTION
Vateria indica Linn. [(*V. indica* Linn.); Fig 2] is a evergreen medicinal tree that grows up to 30m height indigenous to evergreen forests of western ghats from North Karnataka to Kerala. The resin exuded by the tree is known as Piney resin, white Dammar or Dhupa[1]. Resin is obtained by tapping the tree by making semicircular incisions on the stem through the cork cambium up to the surface of the sapwood. The resin starts oozing from the incisions in 3-4 days and continues till 60-90 days. The resin commercially finds its use in the timber industry in manufacture of varnishes[2]. The use of plants and their exudates in therapy has been among the oldest and widely studied topics. There are ample proofs[3] of the applications of plant exudates in the treatment of various diseases in classical text books of Ayurveda and Siddha. The resin is known as Sarja rasa (SR) in Ayurveda and Vellai Kungiliyam (VK) in Siddha. It is obtained by incising and tapping the tree *V. indica* Linn. **(Fig 1 & 2).** The resin finds its use in traditional Indian systems of medicine like Ayurveda and Siddha for health and healing diseases[4]. It is credited with tonic, carminative and expectorant properties and is used for the treatment of respiratory disorders like chronic bronchitis, throat troubles, tubercular gland, boils, piles, diarrhea and rheumatism and so on[5]. Recent studies on the medicinal tree have also shown anti-cancerous properties[4]. Till now there have been no attempts to decipher *V. indica* Linn. physico-chemically. A popular Siddha medicinal preparation called Kungiliya parpam[3] (KP) [Fig 3] is prepared out of this resin with tender coconut water. It is useful in leucorrhoea, burning micturition, urethritis,

ulcers in stomach or duodenum and dysentery[3]. Both are generally prescribed in the dose of 200 -500 mg with ghee, butter or tender coconut water[3].

There has been no study so far to understand how a traditional method of medicinal preparation brings in physicochemical change in raw resin of *V. indica* Linn. Hence a preliminary physicochemical study of the resin of *V. indica* Linn. before and after the preparation of Kungiliya parpam was conducted.

AIM AND OBJECTIVE

To conduct a physicochemical evaluation of the samples Sarja rasa and Kungiliya parpam and to compare the changes in the physicochemical parameters of above samples.

MATERIALS AND METHODS

Materials: The yellow resin was procured from the local market and authenticated by the experts of survey of medicinal plants unit of NADRI, Bangalore which is a Government of India authorized centre for plant sample authentication (Author: Shiddamallayya). It was powdered and subjected to physico chemical analysis.

Kungiliya parpam

Ingredients

Resin of *V. indica* Linn: 300 gms.

Tender coconuts: 07 nos.

Method of Preparation of Kungiliya parpam: 300 gms of Sarja rasa (*V. indica* Linn. resin) was brought from the local market and powdered. The powdered resin was mixed with one tender coconut water (500 ml) and boiled until the resin started to appear (12 min) on the surface of the boiling liquid in a molten state. The resin was separated by filtration and cooled. The procedure of melting and recovery was repeated for an additional six times. The final product was dried, ground and then sieved. The fine powder was creamy white in colour[3].

Methodology of Physicochemical Analysis

Samples: Sample 1: Sarja rasa (Resin of *V. indica* Linn.
Sample 2: Kungiliya parpam

Apparatus: Soxhlet apparatus

Solvents: Petroleum ether, benzene, chloroform and alcohol.

Experiment: The resin powder of sample 1 was filled in the thimble of soxhlet apparatus. The material was exhaustively extracted with petroleum ether (40°C) for about 48 hours. The solvent was distilled off at low temperature and under vacuum and concentrated on water bath to get semisolid liquid. After extracting with petroleum ether, the material was refluxed with other solvents like benzene, chloroform and alcohol[6]. The same procedure was repeated for sample 2.

RESULTS AND DISCUSSION

The results of the preliminary analysis are given in the **table 1**. When the preliminary physicochemical parameters were compared between Sarja rasa (SR) [resin of *V. indica* Linn.] and *Kungiliya parpam* (medicinal preparation of *V. indica* Linn. resin), there was negligible ash value in both samples (SR: 0.14%; KP: 0.68%). Increase in volatile oils (SR: 32.84%; KP: 36.57%) in-spite of boiling is a notable finding and increased moisture content (SR: 0.81%; KP: 2.91%) in obvious in a process of boiling with tender coconut water.

Solvent extraction of *V. indica* Linn. resin with the petroleum ether (83.05%), benzene (9.40%), chloroform (0.19%) and ethyl alcohol (1.014%) revealed extractives as indicated in brackets under each fraction. *KP* on the other hand yielded enhanced extractives [petroleum ether (91.03%), chloroform (1.62%) and ethyl alcohol (1.90%) except benzene (4.35%)]. This might be due to the presence of major phytocompounds, like ketones, resins, saponins, steroids, terpenes, tannins, phenols and saponins. Increase in petroleum ether extracts is indicative restructuring of steroids[7]. Increased ethyl alcohol extracts is suggestive of increased glycosides, flavonoids and tannins. Increased chloroform extracts points towards increase in steroids, triterpenes and alkaloids. Reduction in the benzene extracts of *KP* might indicate of reduction in some fatty acid compounds.

The following findings are indicative of immense potential of *V. indica* Linn. as a safe drug useful in oncology and geriatrics. Further, through traditional methods this resin can be impregnated with other medicinal uses. Studies have shown that the resin of *V. indica* Linn. is a complex mixture of several triterpenes hydrocarbons, ketones, alcohols and acids along with small amounts of sesquiterpenes[2]. On distillation oleoresin yields essential oils (76%) with stray balsamic odour. Dipterocarpaceous plants [*V. indica* Linn. belongs to the family Dipterocarpaceae[2]] are known to contain various resveratrols oligomers that exhibit a variety of biological activities such as antibacterial and antitumor effects. High-performance liquid chromatography analysis of *V. indica* Linn. showed that the extract contains bergenin, hopeaphenol, vaticanol B, vaticanol C, and epsilon-viniferin[2]. The extract is also safe and does not show significant toxicity to mice even at a dosage of 1000 mg/kg body weight by daily oral administration for 28 days[4]. Further, two new resveratrol (=5-[(*E*)-2-(4-hydroxyphenyl) ethenyl]benzene-1,3-diol) derivatives, vateriaphenols D (**1**) and E (**2**), were isolated from the leaves of *V. indica* (Dipterocarpaceae), together with six known resveratrol oligomers (**3-8**), a

isocoumarin (bergenin, **9**), and a benzophenone (**10**). The structures of the isolates were established on the basis of spectroscopic analyses, including a detailed NMR spectroscopic investigation[8].

CONCLUSION

Although Sarja rasa used in Ayurveda and Siddha system of medicine, it is little known in phyto-pharmacology. Of late, phyto-pharmaceutical scientists have been working on *V. indica* Linn. and have demonstrated anti-tumor and antioxidant properties. The Siddha formulation KP involves a traditional method viz., thermal processing of the SR (resin of V.indica) with tender coconut water. KP thus prepared, is endowed with newer therapeutic properties when compared to SR. There have been no efforts so far to decipher the phytochemical changes that occur in SR when it subjected to traditional processing during the preparation of KP. Hence a study was undertaken to compare the preliminary physicochemical parameters of SR and KP. Interestingly, analysis shows that this process brings in physicochemical reorganization and enhancement in the levels of principal phyto-compounds. These changes may be involved in bringing about unique medicinal property of the preparation that is not so conspicuous in the resin. This was a preliminary study and significantly provides impetus to undertake future endeavors. Column chromatography, advanced HPLC, Pharmacological and clinical studies might help in identification of individual compounds, exact mechanism of phytochemical change and clinically utility of *V. indica* Linn. resin and formulations based this resin especially, in the area of geriatrics and anti-tumor activities, can bring in newer horizons in the medicinal utility of this preparation and establish a firm phytochemical basis for its therapeutic properties.

ACKNOWLEDGEMENTS

The authors are thankful to the Director General, CCRAS, New Delhi for the encouragement and financial support. Thanks to Dr.Sudha, Ex. R.A (Siddha) and Smt.Saraswathy Pasupathy Ex. R.A (Chem.) for the technical support.

REFERENCES

1. Chopra RN, Nayar SL & Chopra IC. Glossary of Indian Medicinal Plants. C.S.I.R., New Delhi; 1958.
2. Kirtikar, KR, Basu, B.D., Indian Medicinal Plants. 2nd ed. (Vol. I) Delhi; 1993.
3. Anonymous, Vaidya Yoga Ratnavali-the Formulary of Siddha Medicines, IMPCOPS, Chennai; 1972.
4. Mishima S, Matsumoto K, Futamura Y, Araki Y, Ito T, Tanaka T, et al. Antitumor effect of stilbenoids from *Vateria indica* against allografted sarcoma S-180 in animal model. J Exp Ther Oncol. 2003; 3(suppl 5):283-288.
5. Anonymous, The Wealth of India raw materials (SP-W) volume X. publication and information directorate, C.S.I.R New Delhi; 1976.
6. Anonymous, Quality control methods of medicinal plant materials. W.H.O; 1996.
7. SS Das, Malini Sen, YN Dey, S De and AK Ghosh. Effects of Petroleum Ether Extract of *Amorphophallus paeoniifolius* Tuber on Central Nervous System in Mice. Indian J Pharm Sci. 2009; 71(suppl 6): 651–655.
8. Tetsuro Ito, Naohito Abe, Yuichi Masuda , Minori Nasu, Masayoshi Oyama , Ryuichi Sawa et al. Two Novel Resveratrol Derivatives from the Leaves of *Vateria indica*. Helvetica Chimica Acta, 2009; 92 (1):195 – 208
9. Anonymous, The Ayurvedic Pharmacopoeia of India (Part-I, Vol.IV), Dept. of AYUSH Govt. of India, New Delhi; 2004.
10. P K Varier (ed), Indian medicinal plants a compendium of 500 species (Vol 5). Arya vaidya sala, Kottakkal, Orient Longman Pvt.Ltd, Chennai; 1996.
11. Ashok Seth (ed), The Herbs of Ayurveda (Vol. IV), Alankar publishers Bhavnagar, Gujarat; 2005.

Table 1: Physico-chemical analysis of Sarja rasa (*Vateria indica* resin) & Kungiliya parpam

Sl.No.	Parameter	Unit (w/w) %	Sarja rasa (Vateria indica resin)	Kungiliya parpam
1	Ash content	% (w/w)	0.14	0.68
2	*pH value (1% Alcohol)	-	6.58	6.78
3	Volatile oil	% (w/w)	32.84	36.57
4	Moisture content	% (w/w)	0.81	2.91
5	Petroleum ether extract	% (w/w)	83.05	91.03
6	Benzene extract	% (w/w)	9.40	4.35
7	Chloroform extract	% (w/w)	0.19	1.62
8	Ethyl alcohol extract	% (w/w)	1.014	1.90
9	Resin content	% (w/w)	97.38	87.14

The resin (Vellai kungiliyam) & preparation (Kungiliya parpam) were water insoluble but soluble in alcohol

% (w/w) = weight by weight percentage

Table 2: Ayurvedic properties of Sarja rasa (Resin of *Vateria indica*) [10, 11]

Sl No	Ayurvedic characteristic	Properties
1	Rasa (taste)	Tikta (bitter),Kashaya (astringent), Madhura (sweet)
2	Guna (quality)	Ruksha (arid), Laghu (light),Ushna (Hot)
3	Veerya (potency)	Sheeta (cold)
4	Vipaka (post digestive effect)	Katu (pungent)
5	Doshagnata (effect on doshas)	Pitta Rakta and Kapha shamaka (pacifying)
6	Karma (action)	Vedana sthapana (anodyne`) vrana shodhana (antiseptic), vrana ropana (would healing), jantughna (anti infective), thermogenic, emmanogogue, Styptic, carminative, expectorant and tonic.
7	Vyadhiharatva (indications)	Gout, rheumatism, cancer, chronic bronchitis, tubercular glands, haemorroids, amenorrhoea, dysmenorrhoea, leucorrhoea, diarrhoea, urinary tract infections,, hemicrania , skin diseases and vitiated conditions of Vata.
8	Sarja rasa Yoga (preparations with the resin of V.indica)	Ayurveda: Pinda taila, Kachuradi curna, Manmathabhra rasa[9] Siddha: Kungiliya parpam[3]

Twig **Trunk**

Fig. 1. *Vateria indica* Linn.

Fig. 2. Sarja rasa
(Raw Resin of *Vateria indica* Linn.)

Fig. 3. Kungiliya Parpam
Siddha medicinal formulation prepared from Resin of *Vateria indica* Linn.)

Source of support: Nil, Conflict of interest: None Declared