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Statistical Analysis of *Doshala Varga* of *Siddhamaantra Nighantu*

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ABSTRACT

Introduction

Siddhamaantra Nighantu is a peculiar lexicon which has distinctive contribution in the form of a chapter named as *Doshala Varga*. *Doshala Varga* (the group of substances which vitiates *Doshas*) gives a clear indication as to which substances should be avoided in diet as well as medicine regime either individually or in combination.

Materials and methods

All the relevant information about the drugs like their botanical identity, family, *Rasa*, *Guna*, *Virya* and *Vipaka* of *Doshala Varga* was collected with the help of previous and successive texts of *Siddhamaantra Nighantu*. The collected information was subjected to multiple correspondence analysis.

Result

Exploration of the text revealed that *Doshala Varga* consisted of 15 subgroups which have been presented in the paper. MCA analysis revealed that *Amla Vipaka* was found to be the most significant factor for *Doshala* action.

Discussion & Conclusion

The factors like *Amla Vipaka*, *Teekshna Guna*, *Rooksha guna* etc for a drug, seek the proper utilisation technique as per different parameters of a diseased or healthy individual. The skilful utilisation of these properties may prove beneficial and specific combination of these properties may also lead to *Doshala* action as discussed in the paper.

Key Words *Doshala Varga*, *Siddhamaantra Nighantu*, MCA, *Vatala Varga*, *Pittala Varga*.

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INTRODUCTION

Siddhamaantra Nighantu is the only unique lexicon amongst the Ayurveda classical texts which has a unique style of describing the drugs. The present text seems to have been influenced by minimum of the contemporary texts as it has followed the approach of mentioning the drugs with respect to its *karma* (therapeutic action).

The lexicons of Ayurveda have discussed the drugs with respect to their pacifying action, both in *Dosha* specific terms as well as disease specific terms. *Doshala Varga* is the most unique group of drugs as per its therapeutic activity given by *Siddhamaantra Nighantu*. *Doshala Varga* is a collection of substances by the author *Keshava* of *Siddhamaantra Nighantu* that result in

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vitiating of *Doshas*. The vitiations with respect to only one, two or all the three *Doshas* as per the action of the substances have been enlisted.

Multiple Correspondence analysis¹ is a mathematical tool to visualise the inter-relationship of larger data within different individuals and variables. Present study was aimed at finding out the correlation of the *Rasa*, *Guna*, *Virya* and *Vipaka* of this group of drugs in relation to their actions on *Doshas*. The rationale of the drugs having *Doshala* action hence found, was compared with the available therapeutic information about the drugs and was presented and discussed.

MATERIALS AND METHODS

1. All the relevant information about the drugs like their botanical identity, family, *Rasa*, *Guna*, *Virya* and *Vipaka* of *Doshala Varga* was collected with the help of previous and successive texts of *Sidhhamantra Nighantu*.
2. The drugs which were of controversial botanical identity and lacked the textual references of *Rasa*, *Guna*, *Virya*, *Vipaka* were excluded from the computational analysis i.e. multiple correspondence analysis (MCA).
3. All the English terminologies for Ayurveda terms were taken from NAMASTE² portal of Ministry of AYUSH.
4. Various graphical representations were obtained through different projections taken on the data through RStudio³ Software programme. Two samples were taken for MCA analysis. In

Sample 1 (sample size 31), the combination attributes for *Rasa* and *Guna* were kept as single entity under the corresponding columns. In Sample 2 (sample size 109) the combination attributes under *Rasa* and *Guna* were kept separately under the respective rows and columns. The graphical representations of MCA on the data were interpreted and presented in organised manner under result.

RESULTS

Result of the Literature exploration:

The chapter of *Doshala varga* consists of 15 subheadings in total. The chapter has been headed by the name *Doshala Varga*, although there are 15 subheadings under this chapter which have been reviewed individually.

The first subheading named as *Vatala Varga* consists of the substances like *Tila Shaka* (*Tilapushpa Shaka*-flower and the vegetative parts of *Tila* (*Sesamum indicum* L.)), *Mochaka* (*Wil Banana*-*Musa balbisiana* Colla.), *Kashtapatala* (*Patala* (*Stereospermum suaveolens* DC without flowers)), *Kulmasha* (A preparation which involves cereals like *Yava* (*Barley*- *Hordeum vulgare* Linn.)-*Sour gruel*), *Mandaja Takra* (Buttermilk prepared from thick curds), *Ruksha Dadhi* (the curd which is devoid of *Sneha* or fat), and *Arasa Phala* (the fruit from which the juices have been extracted). This group mentions those substances which are exhibiting the effect of vitiating the *Vata Dosha*. The group

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consists of seven substances out of which three are herbs.

The second subgroup is named as **Vatala Alpapittalakapha Varga** which contains the substance which are considered to produce the action of vitiating *Vata* along with slight vitiation of *Pitta* and *Kapha*. It contains fruits of *Runeyaka* (fruits of *Karanta*-*Cryptolepis bochanani* Roemer & Schultes).

The third subgroup is **Pittala Varga** which contains the substances that are *Pittala* in action. It consists of fruits of *Shami* (*Prosopis spicigera* Linn.). meat which is roasted or fried by using oil. It also consists of *Vrihi dhanya* (monocots or cereals or food grains) which are not considered under the group of *Mahadhanya*.

The fourth group named as **Pittala Kaphodasina Varga** consists of *chaundyambha* (the water obtained from the cracks present in stones).

The fifth group consists of **Shleshmala Varga**, consists of the drugs mentions the drugs like *Shalmaliveshta* (Mocharasa- Gum extract of *Shalmali*, *Bombax malabaricum* DC.), *Bandhuka* (*Pentapetes phoenicea* L.), Wet or fresh *Kana* (*Pippali*- *Piper longum* L.), Wet or fresh *Ushana* (*Maricha*- *Piper nigrum* L.), *Kulevara* (a variety of *Chatraka*), *Kshaudra Sheersha* (*Madhu Mastaka*- *Citrus medica* Linn.), *Twaka* (*Cinnamomum zeylanicum* Breyn.), *Khanda* (sugarcandy), *Peya* (a rice gruel with small quantity of cooked rice), *Samyava* (A preparation with water, milk, ghee, sugarcandy, pepper and wet ginger as ingredients), and *Payasa* (a sweet milky dish).

The **Shleshmala Alpapittala Varga**, sixth group consists of the food preparations which are cooked with different milk products like *Kuchika*. The seventh subgroup named as **Vatapittala Varga** contains *Amra* (*Mangifera indica* Linn.) and preparations of *Virudha* (sprouting seeds or sprouts).

The eighth subgroup named as **VataPittala Shleshmodasina Varga** consists of raw fruits of *Kapitha* (*Limonia acidissima* Linn.) shoots or sprouts *Vamsha* (*Bambusa arundinaceae* (Retz) Roxb.).

The ninth subgroup named **VataPittalaalpashleshmala Varga** consists of *Yavasura* (an acid fermented preparation with flour of *Yava* i.e *Hordeum vulgare* Linn.) which is spirituous liquor which is prepared by acid fermentation instead of Alcohol preparation as commented by *Vopadeva*.

The tenth subgroup named as **Vatashleshmala** consists of the vegetative parts *Yashtimadhu* (*Glycyrrhiza glabra* L.), *Guggulu* (*Commiphora makul* Engler.), *Supyaja* (group of *simbi dhanya* or pulses), *Nalaka* (*Nelumbo nucifera* Gaertner.), *Shalikalyani* (the variety of rice (*Oryza sativa* Line) which is *Anchika* (worshipped, revered, admired, distinguished)-*Binni Rice*), *Chanchuparni* (*Corchorus fascicularis* Lam.), *Kuberaka* (*Cedrela Toona* Roxb. ex Rottler Willd.), *Yavashaka* (leaves of *Yava* (*Hordeum vulgare* Linn.)), the tubular stalk of *Kushmanda* (*Benincasa cerifera* Savi.) and *Gavedhuka* (*Coix lacryma jobi* Linn.). The fruits of *Tindisha* (*Abelmoschus esculentus* (L. Moench), *Chinaka*
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(*Panicum aceum* Linn.), *Putrajiva* (*Putranjiva roxburghii* Wall.) and *Kukunda* (Babul tree or Sant Tree-*Vachellia nilotica* (L.) P.J.H.Hurter & Mabb.) are also included in this group.

The eleventh subgroup named as ***Vatashleshmala Alpapittala Varga*** consists of *Yatuka* (*Keshaparni-Achyranthes bidentata* Blume) and *Suvarchala* (*Aditya bhakta*- The substance that show the activity of vitiating *Vata* and *Kapha Dosh*a considerably *Cleome viscosa* Linn.).

The twelfth subgroup named as ***KaphaPittala Varga*** consists of *Amrabadhasthi* (*Madhyavastha* neither raw nor completely ripen state of *Amra* (*Mangifera indica* Linn.)), *Nalinijala* (water of any pool or pond or a lotus pool), *Kalamlasutashandaki* (*Shandaki* or Fryums), *Shashkuli* (a large round cake), *Raga* (condiments prepared from sweet substances), *Khadava* (condiments prepared from sour substances). *Pradigdhamamsa* (the meat preparation where it is boiled with excessive ghee, *Jeeraka* till it becomes soft), *Pishtotha Bhaksya* (condiments prepared from flours of various cereals), *Yavaka* (*Koshihikari*- a short grained rice (*Oryza sativa* Linn.)), *Hayana* ((a variety of Rice *Oryza sativa* Linn.) which is hard for cooking), *Pamshuvapya* (The variety of Rice (*Oryza sativa* Linn.)) which is grown in sandy soil.

The thirteenth subgroup named as ***KaphaPittala Vatodasina Varga*** is *Kusumbha Taila* (the oil of *Kusumbha* (*Carthamus tinctorius* Linn.)).

The fourteenth subgroup named as ***KaphaPittala Alpapattala Varga*** consists of *Urvichara* (Penny Bun-*Boletus edulis* Bull).

The fifteenth subgroup named as ***Doshala Varga*** consists of the vegetative parts of *Sarshapa* (Field Mustard- *Brassica campestris* Linn.), vegetative parts of *Jyothishmati* (Black oil tree- *Celastrus paniculatus* Willd.), *Kuthinjara* (Goosefoot-*Chenopodium quinoa* Willd.), *Chatraka* (Field Mushroom-*Agaricus campestris* Linn.), *Chanchu* (Jute or Mallow leaves- *Corchorus aestuans* Linn.), *Lonika* (Common Purslane-*Portulaca oleraceae* Linn.), mature green and uncooked *Mulaka* (*Raphanus sativus* Linn.), the various preparations from the oil-cakes of *Tila* (*Sesame-Sesamum indicum* Linn.), *Shushka Shaka* (dried vegetables), *Virudhaka* (Sprouted cereals).

Shandaki (A fried condiment or an alcoholic preparation), *Vataka* (A round shaped cake made of pulse fried in oil), *Ama madhu* (Improperly formed or immature honey), *Manda Avika Dadhi* (An improperly formed thick curds prepared from sheep milk), *Phanita* (Inspissated juice of Sugarcane), Ripen *Bilva* (*Aegle marmelos* (L.) Correa.), Ripen *Lakucha* (Monkey Jack-*Artocarpus lakoocha* Roxb), *Kanakapotha* (Lemon Dove-*Columba larvata* Temminck).

Bhedasi (Orange-bellied Leafbird-*Chloropsis hardwickii* Jardine & Selby). animals which are old, dried, emaciated animals. Even the substances namely *Pinyaka Chilichima* (Indian Prawn-*Fenneropenaeus indicus* H.Milne Edwards 1837) and meat of (Oil cakes), *Patalavrihi*
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(Buckwheat-Fagopyrum esculentum Moench), the Meda (Fat), Vasa (Marrow of the flesh) and Majja (Bone marrow) of the animals and birds.

Result of MCA analysis

MCA result of Sample 1

The MCA of sample 1 having 31 individuals revealed that Vipaka Amla was the highest contributing factor amongst all other variables as being shown in figure 1. The combination of Madhura Amla and Kashaya Rasa was found the next consecutive highest significant factor for the mentioned action as shown in Figure 1 and 2.

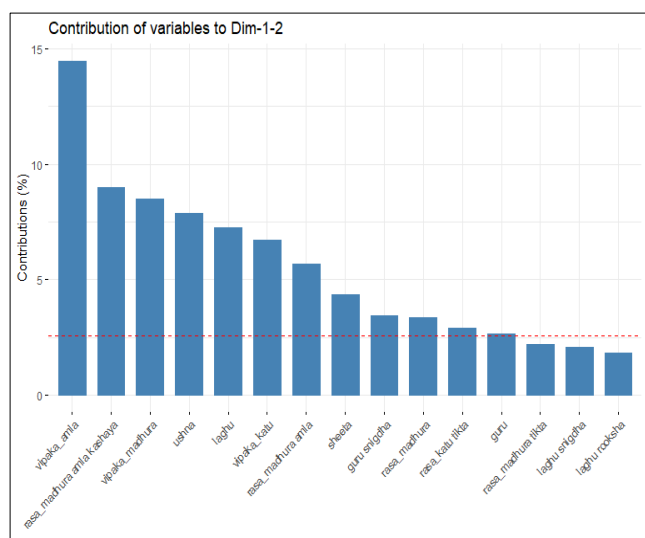


Figure 1 Contribution of variables to Dim 1-2 for sample 1

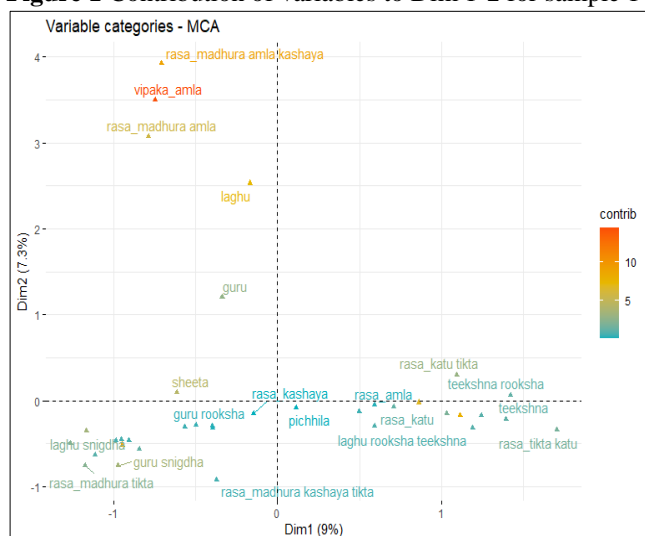


Figure 2 Contribution of variable categories – MCA for sample 1

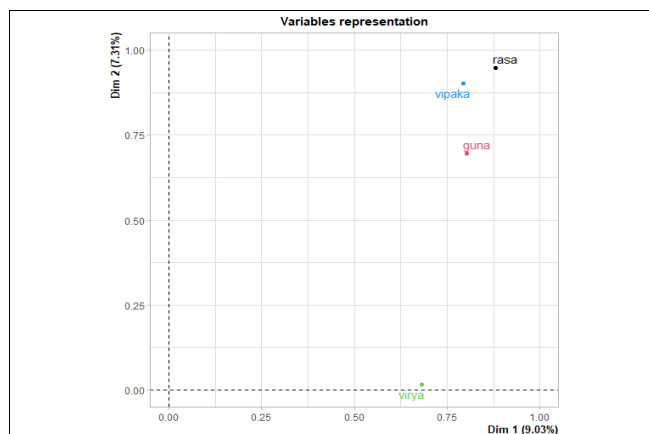


Figure 3 Variable representation for sample 1

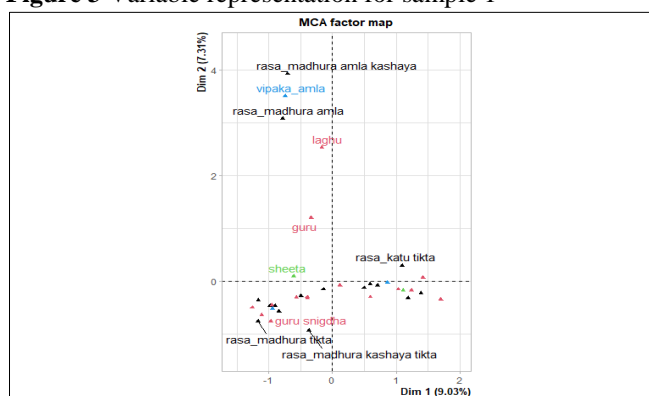


Figure 4 MCA factor map for sample 1

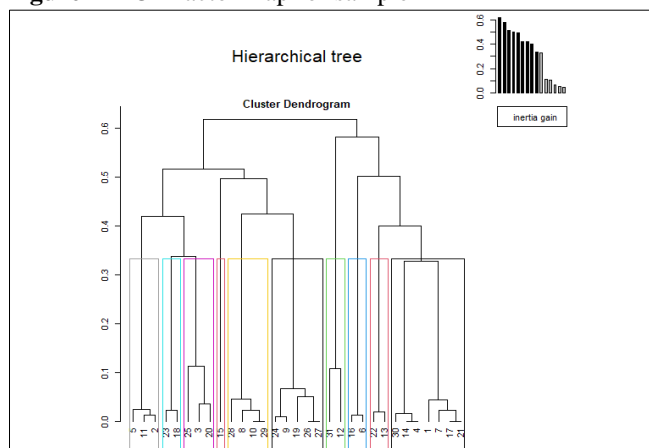


Figure 5 Cluster dendrogram for sample 1

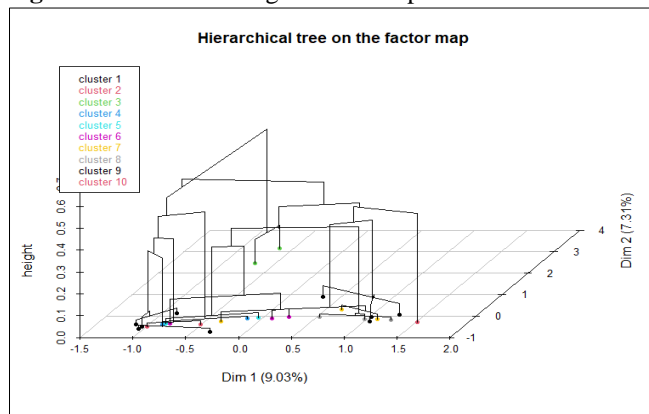


Figure 6 Hierarchical tree on the factor map for sample 1

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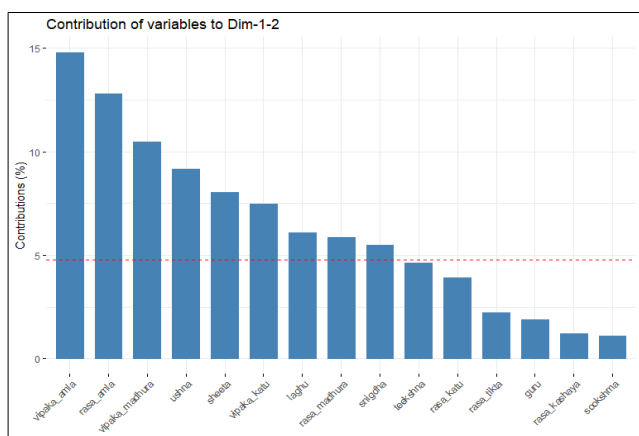


Figure 7 Contribution of variables to Dim 1-2 for sample 2

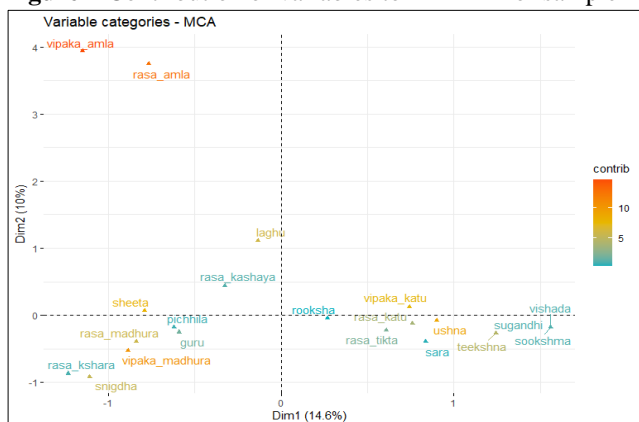


Figure 8 Contribution of variable categories – MCA for sample 2

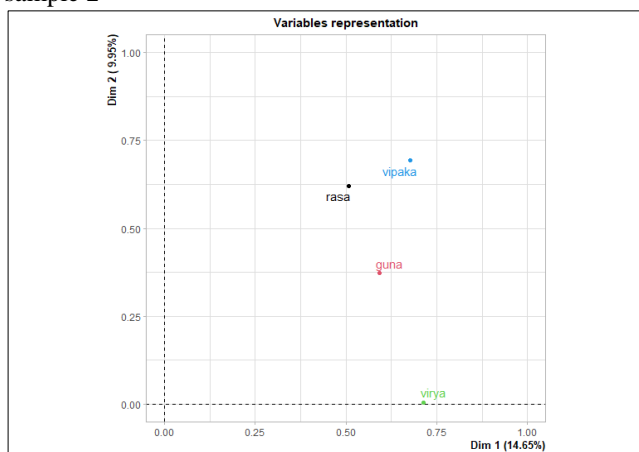


Figure 9 Variable representation for sample 2

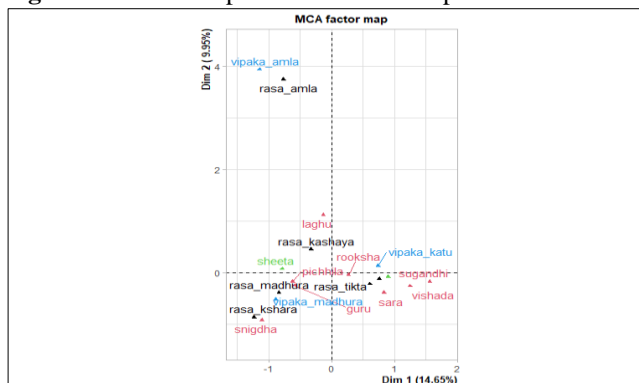


Figure 10 : MCA factor map for sample 2

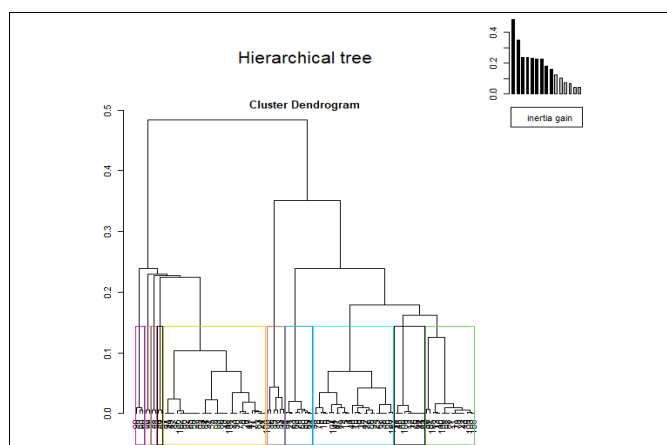


Figure 11 : Cluster dendrogram for sample 2

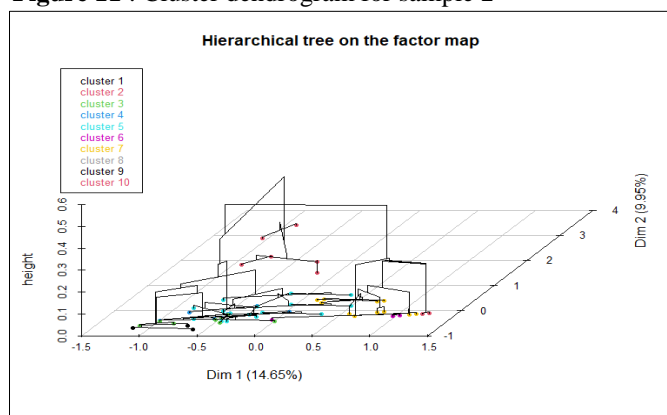


Figure 12 Hierarchical tree on the factor map for sample 2

The combination of *Teekshna* and *Rooksha guna* was found to be a significant contributing factor for *Doshala* action as shown in figure 2. Amongst the four variables taken in the study, *Rasa* was found to be the most contributing factor for the therapeutic action of the drugs as can be inferred from figure no 3. Cluster dendrogram as in figure 5 shows the division of the individuals carrying same attributes/set of properties. HCPC analysis divided the drugs carrying same properties into 10 clusters as shown in figure 5 and figure 6. The drugs named *Mochaka*, *Runeyaka*, *Yashtimadhu shaka*, *Nalaka*, *Yava shaaka* have been shown to be in the same cluster. Another cluster which was found to have similar properties consisted of

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Twaka, Kuberaka, Yatuka, Sarshapa Shaka and *Jyotishmati Shaaka*.

MCA result of Sample 2

The MCA of sample 2 having 109 individuals revealed that *Vipaka Amla* was the highest contributing factor amongst all other variables as being shown in figure 7 and 8. Figure 9 reveals that *Vipaka* was the most significant factor for *Doshala* action amongst the four variables i.e. *Rasa, Guna, Virya* and *Vipaka*. *Amla Rasa* was also a significant factor for *Doshaghna* action as being shown in figure no 10. Cluster dendrogram as in figure 11 shows the division of the individuals carrying same attributes/set of properties. HCPC analysis divided the drugs carrying same properties into 10 clusters as shown in figure 11 and figure 12. The drugs named as *Ardraka, Amra, Kapitha*, and ripen *Lakucha* were lying in the same cluster depicting identical properties.

DISCUSSION

Therapeutic rationale of *Doshala Varga*

Ayurveda texts state that a substance can act as a drug as well as toxin depending upon its judicious use⁴. The poisonous herbs like *Vatsanaabha* (*Aconitum ferox*) can be used as a drug with the help of bio-transformation procedures like *Bhavana, Bharajana, Nirvapana, Dhalana, Shodhana* etc. Hence, the same substance works as an *Aushadha* (medicine) as well as *Visha* (poison) under different doses, combinations, or different preparation processes.

The name *Doshala* indicates the herbs/substances/combinations which may vitiate one, two or all three *Doshas* independently or in combination. The author has given a different set of drugs which aggravates vitiation of *Doshas*. Some of these substances seem to be having *Doshala* effect (*Dosha* vitiating property) because of their typical growing conditions like, *Hayana* ((a variety of Rice *Oryza sativa* Linn.) which is hard for cooking), *Pamshuvapya* (The variety of Rice (*Oryza sativa* Linn.)) which is grown in sandy soil. Substances like *Ama madhu* (Improperly formed or immature honey), *Manda Avika Dadhi* (An improperly formed thick curds prepared from sheep milk), *Phanita* (Inspissated juice of Sugarcane), Ripen *Bilva* (*Aegle marmelos* (L.) *Correa.*), Ripen *Lakucha* (Monkey Jack-*Artocarpus lakoocha* Roxb), *Kanakapotha* (Lemon Dove-*Columba larvata* Temminck), have been mentioned as *Apathya* (not fit as dietary items) at many other Ayurveda texts also. *Madhu* (Honey) when turns *Amla* (sour) becomes uneasy to digest and toxic after its ingestion due to its fermentation. Likewise, *Manda Dadhi* (improperly formed curd) becomes *Abhishyandi*⁵ and *Durvipachya* (highly indigestible) as has been already mention in *Charaka Samhita* also. The *Doshala Varga* includes the vegetative parts of *Sarshapa, Jyotishmati, Lonika, Mulaka, Tila* etc., which have been already told as the most unsuitable *Shaka* (leafy vegetables) in many other lexicons. Substances like *Nalinijala* (water of any pool or pond or a lotus pool), might have been mentioned under this group owing to the

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potential risk of water polluting bodies of those times. *Kusumbha Taila*⁶ (Safflower oil) has been told to have properties of vitiating *Kapha* and *Pitta* and has been previously told as the most unfit oil for consumption and *Tridosha Prakopaka* (vitiating all the three *Doshas*) by *Charaka Samhita*⁷. *Yavasura* (an acid fermented preparation with flour of *Yava* i.e *Hordeum vulgare* Linn.) has been told to have properties of vitiating all the three *Doshas*.

Discussion on MCA result

MCA revealed that *Vipaka Amla* was the most significant factor for *Doshala* action which might be since *Vidaghajeerna*⁸ (acidic undigested metabolites) is the precursor for most complex pathologies. *Teekshna* and *Rooksha guna* were found to be a significant factor for *Doshala* action. The above *Gunas* (pharmacological properties) are subject to their judicial use because the drugs carrying these properties if used in excess can lead to *Aptarpana* (catabolic results) and *Roga sankara* (plenty of other diseases). The results also revealed that *Rasa* and *Vipaka* were the contributing factors in Sample 1 and sample 2, which can be understood by the fact that most toxicities are the result of continuous use of drugs carrying such *Doshala* properties. Ingestion of such drugs leads to vitiation of *Doshas* as a result of their digestion (*Rasa*) as well as metabolic utilization (*Vipaka*).

CONCLUSION

Many references were found by the names of *Apathya* (unfit as diet) and *Visha* (toxic)

substances throughout the classical texts and lexicons of Ayurveda. The information shared at those references somewhat has been compiled here by the author along with some additions on his own. Present study revealed that the typical combination of *Amla Vipaka* along with *Madhura*, *amla* and *Kashaya Rasa* in the *Vidagdha* (acidified) and vitiated stage become the precursors for the vitiation of one, two or all three *Doshas*. Hence such combination of properties if found in *Aahara* (Dietary food items) or *Aushadha* (medicines) must also be looked upon while conducting the clinical research trials for these substances under food items/processed foods and medicinal usage.

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