



Research Article

J. Ayu. Herb. Med.
2015; 1(3): 74-76
November- December
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Computation and comparison of the drug efficacy indices [Q(VPK)] of certain ayurvedic foot care formulations

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ABSTRACT

Aim: The medical science *Ayurveda* being one of the oldest system of alternative medicines have its own well studied philosophy rooted to Vedic age and in a unique way the great Indian *Rshis* the very founders of *Ayurveda* observed the nature and developed many simple but fruitful formulations to cure various ailments for the sake of the entire human society. The present study aims to predict theoretically the efficacies of certain Foot Care *Ayurvedic* formulations including the modern patented and proprietary medicines by computing their respective Drug Efficacy Indices. **Method:** The efficacies of certain classical as well as proprietary *Ayurvedic* Foot care Formulations were theoretically calculated using a simple mathematical formula computed based on traditional and fundamental principles of Vedic *Ayurveda*. **Results:** The Drug Efficacy Indices of the selected formulations were numerically computed using an equation based on the *dravyaguna vingnaneeya* and categorized to corresponding pharmacological groups. Apart from these certain foot care formulations were theoretically designed using the developed computational methods and their corresponding Drug Efficacy Indices were computed and compared. **Conclusion:** The present study categorized the commonly used Foot care formulations according to their pharmacological activities. The present study also showed the practical application of Computer Aided Drug Designing (CADD) of two foot care formulations based on the classical principles of *Ayurveda* by effective incorporation of modern concepts like Artificial Intelligence to the most fruitful and simple manner.

Keywords: Alternative medicines, *Ayurvedic* Foot Care Formulations, Drug Efficacy Index [Q_(VPK)], Computer Aided Drug Designing (CADD).

INTRODUCTION

The system of *Ayurveda* provides various formulations for treating almost all kind of diseases that have high therapeutic values and also found rich with many cosmetics. Suitable incorporation of the recent developments of modern technology gave birth to various modified forms of many classical *Ayurvedic* formulations like ointments and creams. It is wonderful to believe that many recent market surveys showed the increased need of such products due to the modern look as well as their claimed therapeutic values. Most of these recent formulations belong to the proprietary medicines and some claim even their textual authority by citing the text *Sahasrayoga* which have various unpublished editions that have to be seriously observed. This present study concentrates on computing and predicting the efficacy indices of certain classical foot care formulations and new generation *Ayurvedic* formulations that can be effectively used for treating different foot problems like different allergies, cracking, rough feet etc. The Alternative system of *Ayurveda* classifies such ailments to many kinds of *Kustha* the skin disorders.

The skin disorders *Kushtha*: According to *Ayurveda* the diseases are due to the vitiation of *doshas* the somatic humors. Similarly the skin diseases termed *Kusthas* were classified scientifically according to the nature of the vitiation of all the three *doshas* with a predominantly vitiated one, two or the all thus arising seven types. In *Madhava Nidana* the different causes of various skin disorders are well explained and classified ^[1,2,3,4]. From the *samhitas* the texts it is further evident that there is no skin disorder that is caused by vitiation of only one *dosha* among the three and theses skin disorders of various types having similar etiological source show difference in pain, color, symptoms, effects, name and treatment according to proportional variation, association and location of *doshas* that are vitiated.

The *Ayurvedic* Etiology and Diagnosis of *Kushtha*: According to *Ayurvedic samhitas* the following are the etiological factors for skin disorders viz. incompatible food habit, habitually having unctuous and heavy substances, suppression of the natural urges (particularly of vomiting), exposure to physical exercise and/or intense heat after gormandizing, having cold, hot, lightening measures and diet against the prescribed order, application of cold water immediately after intense exposure to the sun, exertion or fear, gormandizing during indigestion and especially when the previous meal is not properly digested,

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having contraindicated items while undergoing *pancakarma* therapy, having contraindicated food items together like new cereals, curd, fish, salt and sour substances etc., intercourse during indigestion, sleep regularly during the day, indulging in sinful activities like insulting the *Brahmanas*, teachers (and other respectable persons) etc. The *Ayurvedic* diagnosis considers that all types of *Kustha* are caused by the three *doshas* together, so the predominance or minimal role of each *dosha* must be determined from the respective symptoms very carefully. The diagnosis uses the unique ways to determine the consequent primary *dosha* involved in the disorder. The primary *dosha*/type can be determined both ways either the *dosha* inferred from the type of skin disease present (Retro diagnosis) and the skin disease type may be inferred by the *doshas* involved (diagnosis). It is also possible from the etiological factors collected from the oral narration of the patient (oral history) under treatment. The effective combination of these three methods viz. diagnosis, retro diagnosis and oral history will enhance the processes for prescribing effectively. The *Vata* predominant skin disorders have characteristic roughness, wasting, pain (piercing or other types), contracture, extension, hardness, coarseness, colour (blackish and reddish) etc., the *Pitta* predominant have characteristic heat, redness, various discharge, suppuration, characteristic smell (fleshy), moisture, falling down of organs etc. and the *Kapha* predominant skin disorders have characteristic whiteness and coldness, itching, stability, raising, heaviness, unctuousness etc. The prognosis suggests that if all symptoms are present, plus debility, thirst, burning sensation, loss of appetite etc. the skin disorder might be incurable and reject without treating. The skin disorders or *Kusthas* that are predominant in *Vata-Kapha* nature or any single *dosha* can be easily curable ones and those predominant in *Kapha-Pitta* or *Vata-Pitta* are found difficult. Any curable skin disorder may change to incurable due to neglect or not properly treating. The skin disorders can be effectively cured by selectively treating the most aggravated *dosha* first, followed by the secondary *doshas*.

Materials And Methods

Here in this paper a common skin disorder namely *Vipadika* a *Vata-Kapha* type minor skin disorder that causes tearing of especially the feet with excessive pain is taken and the efficacies of various foot care creams including marketed *Jivantyadi Yamaka* and the classical formulation called *Jivantyadi Yamaka* were computed and compared.

The *Jivantyadi yamaka* (JY): This is a classical formulation explained in various *Samhitas* for treating the minor skin disorder called *Vipadika* (*Vata-Kapha*) that also recommended remedy for other non leprosy minor skin disorders like *Carmakhya* (*Vata-Kapha*), *Ekakustha* (*Vata-Kapha*), *Kitibha* (*Vata-Kapha*) and *Alasaka* (*Vata-Kapha*). It contains the ingredients *Jivanti*, *Manjistha*, *Daruharidra*, *Kampilaka* (dust), *Arkaksheera*, *Ghrtam*, *Tailam*, *Sarjarasa*, *Madhucchistha* (Bee's Wax) and *Tuttha*. This is one among the best formulations with high therapeutic values since the age of *Caraka Samhita* the oldest *Ayurveda* text available^[5]. The parts percentages are very clearly and specifically given authentic texts with great importance. The formulation is marketing by many pharmaceuticals with different combination quoting the classical texts as their references. For computing the Drug Efficacy Indices the parts percentages of the components of the marketed formulations as stated by the manufacturers were taken. The computed values were compared with that of the classical formulation (*Jivantyadi Yamaka*) as per the part percentages mentioned in authentic texts.

Amrut Malam (AM): This is a modern *Ayurvedic* proprietary medicine manufactured by Amrut Pharmaceuticals, Belgaum. The manufacturer claims that it is useful for the cracks on heels, foot toes, hand, lips and skin due to cold. It is also recommended for the disorders like chapped lips, burning sensation in palms and soles, itches, dryness of the skin,

weeping or dry skin diseases, cuts, wounds, burns of acid or fire, athlete's foot etc. This proprietary medicine contains *Garcinia indica*, *Ricinus communis*, *Cinnamomum camphora*, Talc, *Gandhaka*, *Mentha spicata*, Zinc oxide and oil base colour.

Krack Heel Repair (KHR): This is a modern *Ayurvedic* proprietary medicine manufactured by Paras Pharmaceuticals Ltd., Ahmedabad. The manufacturer claims that it is a specialist heel care cream which uses healing power of seven herbs that moistures, heals and soothes the affected area when applied. It is recommended for the treatment of dry skin disorders such as cracked heels, chapped hands, fissures and chilblains. It is also helpful for treating minor burns, cuts and wounds. It contains the *kwath* processed oil derived from *Pitadaru*, *Kampilaka*, *Pashanabheda*, *Manjistha*, *Payasvini*, *Sarjarasa*, *Grta* and *Sasyaka*. In addition it also contains *Vrikshamla* and base to make with other approved excipients.

Himalaya Foot Care Cream (HFCC): It is an *Ayurvedic* proprietary medicine manufactured by Himalaya Drug Company, Bangalore. This is claimed that the formulation is an effective relief from dry, cracked heels and rough feet. It can give deep moisture for soft and smooth feet. Manufacturer refers the *API Bhava Prakasha* a classical text. The formulation contains Honey, *Curcuma longa*, *Shorea robusta*, *Zingiber officinale* and *Trigonella foenum-graeceum*. The added inactive constituents are Methylparaben IP, Propylparaben IP and Bronopol IP.

Herbal Heel Healer (HHH): This is a prescription given in the text published by Divya Sansthan, Haridwar. This contains *Sarshapa Tailam*, *Madhucchista* and *Karpura* that can be used for the dry and rough heel^[6].

Herbal Foot Heal-1 (HFH-1): This is a designed herbal formulation for external application suggested based on the traditional knowledge in view of the modern computational methods for the treatment of the minor skin disorder called *Vipadika* (*Vata-Kapha*) and other non leprosy minor skin disorders like *Carmakhya* (*Vata-Kapha*), *Ekakustha* (*Vata-Kapha*), *Kitibha* (*Vata-Kapha*) and *Alasaka* (*Vata-Kapha*). It contains the ingredients *Sarshapatilam*, *Madhucchishta*, *Karpura*, *Darvi* and *Grta* as the base with specific and fixed compositions.

Herbal Foot Heal-2 (HFH-2): This is another designed herbal formulation for external application suggested based on the traditional knowledge in view of the modern computational methods for the treatment of the minor skin disorder called *Vipadika* (*Vata-Kapha*) and other non leprosy minor skin disorders like *Carmakhya* (*Vata-Kapha*), *Ekakustha* (*Vata-Kapha*), *Kitibha* (*Vata-Kapha*) and *Alasaka* (*Vata-Kapha*). It might be useful for other minor skin disorders like *Dadru* (*Kapha-Pitta*), *Carmadala* (*Kapha-Pitta*), *Pama* (*Kapha-Pitta*), *Visphota* (*Kapha-Pitta*) and *Sataru* (*Kapha-Pitta*). It contains the ingredients *Sarshapatilam*, *Madhucchishta*, *Karpura*, *Darvi*, *Grta*, *Jivanti*, *Sarjarasa* and *Vrkshamla* with specific and fixed compositions.

Experimental

The respective drug efficacy indices the measures of the pharmacological activities of all the above formulations were computed using the formula (Figure 1).

$$Q_{(VPK)} = \frac{\sum_{(V,P,K)} q_{(i)}}{100} + \Pi \leq 1$$

Figure 1: Equation for computing drug efficacy index $Q_{(VPK)}$

Where $Q_{(VPK)}$ is the Drug Efficacy Index, VPK represents *Vata*, *Pitta* and *Kapha* respectively and $q_{(i)}$ is the individual components for the *Vata*,

Pitta and *Kapha* respectively. The Π represents the *Prabhava* the corrective entity that can effectively affect the therapeutic value of the formulation that observed in the real practical world [7]. The drugs understudies were also classified according to their respective classes based on the computed efficacies and were compared scientifically.

RESULTS AND DISCUSSIONS

The computational studies categorized the formulations understudy according to their pharmacological activities. The computed drug efficacy indices as well as their respective classes of various formulations and products were tabulated (Table 1).

Table 1: The computed Drug Efficacy Indices Q(VPK) and Classes of various Foot Care formulations.

Formulation	Q(V)	Q(P)	Q(K)	Q(VPK)	Pharmacological Category/ Class
<i>Jivantyadi Yamaka</i> (Classical)	-18.84	-58.73	-22.43	1.00	<i>Vata-Kapha-Pittaghni</i> (<i>Tridoshaghni</i>)
<i>Jivantyadi Yamaka</i> (Oushadhi Make)	-31.43	-38.19	30.38	0.39	<i>Vata-Pittaghni</i>
<i>Amrut Malam</i>	-35.12	37.18	-27.70	0.26	<i>Kapha-Vataghni</i>
Krack Heel Repair	-7.46	-91.86	0.68	0.99	(<i>Kapha</i>)- <i>Vata-Pittaghni</i> (~ <i>Tridoshaghni</i>)
HFC-Cream	19.66	-30.97	-49.37	0.61	<i>Pitta-Kaphaghni</i>
Herbal Heel Healer	16.01	3.02	-80.79	0.62	<i>Kaphaghni</i>
Herbal Foot Heal-1	-10.02	-58.78	-31.20	1.00	<i>Vata-Kapha-Pittaghni</i> (<i>Tridoshaghni</i>)
Herbal Foot Heal-2	-6.04	-85.31	-8.65	1.00	<i>Vata-Kapha-Pittaghni</i> (<i>Tridoshaghni</i>)

The classical fundamental terms and concepts were numerically measured and corresponding efficacies were calculated scientifically for the entire formulations understudy and the respective values were compared. The classical formulation *Jivantyadi Yamaka*, and designed formulae Herbal Foot Healer-1 and Herbal Foot Healer-2 belong to *Tridoshaghni* category with highest possible computed Drug Efficacy Index values. The *Jivantyadi Yamaka* of Oushadhi make became *Vata-Pittaghni* with a less Drug Efficacy Value 0.39 and much below than the classical one of desired *Tridoshaghni* nature. The Krack Heel Repair has a less positive $q_{(K)}$ value and hence belong *Vata-Pittaghni* category that can be considered to an approximate *Tridoshaghni* category with a Drug Efficacy Value 0.99. The computational studies classified *Amrut Malam* to *Kapha-Vataghni* with a computed Drug Efficacy Index value 0.26, Himalaya Foot Care Cream to *Pitta-Kaphaghni* with a computed Drug Efficacy Index value 0.61 and the prescription Herbal Heel Healer to *Kaphaghni* with a computed Drug Efficacy Index value 0.62. According to traditional texts the minor skin disorders belong to vitiation of all the three *doshas* with a predominantly vitiated one, two or the all three *doshas* together where one, two or all may predominant. Hence the formulations must be *Tridoshaghni* category with slight acceptable variations. This is further evident from the computational studies as it classified the classical formulation *Jivantyadi Yamaka* to *Tridoshaghni* category. Among the proprietary medicines understudy Krack Heel Repair showed highest value for Drug Efficacy Index value and might be better than the others in its therapeutic effects. The therapeutic values observed clinically also supported the studies for treating the minor skin disorders *Vipadika* and *Vicarcika*. The designing of the drugs with *Tridoshaghni* category is very difficult and the ancient scholars knew it very well and hence the incurability and practical difficulties to cure certain types of skin disorders are explained very well in the respective *Samhitas*.

CONCLUSION

The study showed that the formulations can be successfully classified to the respective classes/categories based on the computed Drug Efficacy Index values. The combinations must be taken very carefully according to the classical texts. They are very specific and small alterations in their respective ratios could deviate from their *Samhita* stated therapeutic effects. The computed values can be considered as the direct measure of the efficacies theoretically. The manufactures have to strictly adhere to the formulations as explained in the *Sahitas* in the best possible manner. The present study also showed that the Computer Aided Drug Designing (CADD) of the *Ayurvedic* formulations

including proprietary formulations based on the classical principles also has high practical importance by showing the incorporation of modern scientific concept like Artificial Intelligence to the field of *Ayurveda* for Drug Designing processes in a fruitful manner with suitably designed formulations. The success of any prescription is highly based on correct diagnosis and selection of the formulations or drugs. This method also helps the practitioners to classify the modern *Ayurvedic* proprietary medicines and prescribe them for the *Cikitsapurusha* based on the *Tridosha* theory for better clinical results.

CONFLICTS OF INTEREST

No conflicts of interest.

SOURCE OF FUNDING

Nil.

REFERENCES

- Maharishi University of Management Vedic Literature Collection, Madhavanidana of Madhavakara. www.mum.com
- Sastri, B.S. Comments Sudhalahari of Sarma U on Madhava Nidana of Madhavakara, Kusthanidana, Chapter 49, Chowkhamba Sanskrit Series Office, Benares City, India. 1943. pp. 164-168.
- Dattaram, M. Madhavabhavartha deepika Commentary of Madhava Nidana or Rugviniscaya of Madhavakara, Kusthanidana, Chapter 49, Nirayasaragar Press, Mumbai, India. 1867. pp. 252-261.
- Lal Chandra. Sarvangasundari Hindi Commentary on Madhava Nidana of Madhavakara, Kusthanidana, Chapter 49, Chowkhamba Sanskrit Series Office, Benares City, India. 1950. pp. 284-294.
- Acharya J.T. Commentary Ayurvedadeepika of Chakrapanidatta on Carakasamhita of Agnivesa revised by Caraka and Drdhabala, Nidana Sthana; Kusthanidanam, Chapter 5, Verse 1-16, Chowkhamba Krishnadas Academy, Varanasi, India. 2010. pp. 216-219.
- Balakrishna A. Aushadha darsana. 1st ed. Divya Prakashan, Haridvar, India. 2010. p. 63.
- Abhilash Mullasseril. The Drug Efficacy Index [Q(VPK)] A novel parameter to calculate theoretically the efficacy and efficiency of ayurvedic formulations. JBCE. 2015; 3(1): 1-5.

HOW TO CITE THIS ARTICLE

Abhilash Mullasseril. Computation and comparison of the drug efficacy indices [Q(VPK)] of certain ayurvedic foot care formulations. J Ayu Herb Med 2015;1(3):74-76.