

Computation and Comparison of The Drug Efficacy Indices [$Q_{(VPK)}$] of certain Ayurvedic Hair Care Formulations

Research Article

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Abstract

The *Ayurveda* being one of the oldest systems of alternative medicines have its roots in *Rgveda* the oldest monument of human civilization. Indian Rishis kept this system as their eyeball and developed many useful formulations to the entire human society. The present study aims to predict the efficacies of certain Hair Care *Ayurvedic* formulations including the modern patented and proprietary medicines by computing their respective Drug Efficacy Indices. The Drug Efficacy Index is a new concept that could be considered as the direct measure of efficacy of various *Ayurvedic* formulations.

Keywords: Alternative medicines, *Ayurvedic* Hair Care Formulations, Drug Efficacy Index [$Q_{(VPK)}$], Efficacy

Introduction

People are becoming more and more conscious to their beauty as evident from the increased number of various cosmetic products and related advertisements. The classical *Ayurvedic* formulations are getting converted to the various modern forms like creams and ointments. The alternative system of medicines like *Ayurveda* has a variety of classical hair care products ranging from various oils to ointments and creams. The increase in number of modern products based on *Ayurveda* can be noted and the number is also becoming very large day by day. These products also claim high therapeutic values with certain clinical trials (1,2). The new products range from creams to certain tablets that could be safely administered simultaneously with the external use of respective oils. In addition to these products various other oils of different combinations that claim high therapeutic values are also available in the pharmacies. Most of these recent oils belong to the proprietary medicines and some claim even their textual authority by citing the text *Sahasrayoga* which have various editions and authors of which many are unpublished handwritten manuscripts as evident from their claims. This present study concentrates

on certain classical oil formulations for hair care and certain new generation *Ayurvedic* formulations ranging from oils to creams in addition to the oral tablets. These formulations can be effectively used for treating different hair problems like Involutional alopecia, different allergies, premature graying, malnutrition of hairs etc. Some of them can also act as hair nutrients and cure the hair problems due to indigestion.

Materials and Methods

The alternative systems of medicines have their own proven hair care products for various ailments. This present study concentrates not only on the classical formulations but also on certain non textual new generation products. For the study the classical formulations of oils like *Pundareeka Tailam* (PT), *Prapundareekadi Tailam*(PPT)(*AshtangaHridaya*, *Vaidyaratnam* Make) and *Neelibhrungadi Keratailam* of two different textual formulations (*Sahasrayoga*, *Vaidyaratnam* (NBK-1) and *Oushadhi* (NBK-2) makes), new generation proprietary oils like Parachute *Ayurvedic* Hair Oil (PAHO), *Indulekha Bringha* Oil (IBO), *Dhathri* Hair Care Herbal Oil (DHCHO) and *Dhathri* Dandruff Oil (DDO), and creams like Himalaya Protein Hair Cream (HPHC), Himalaya Anti Hair Fall Cream(HAHFC) and *Dhathri* Hair Care Cream (DHCC) were selected. Among the oral tablets the *Dhathri* Hair Care Capsule (DHCCap) was also selected and compared. The contents and their parts were taken as disclosed by the manufactures.

Pundareeka Tailam (PT) was an oil formulation manufactured by *Vaidyaratnam* with a reference of

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Ashtangahrudayam. The *Pundareeka Tailam* (PT) consisted of *Amalaki*, *Iksu*, *YashtiMadhu*, *Pippali*, *Candanam*, *Indivara*, *Ksheeram*, *Karpura* and *Tila tailam*. The ratios of combination of these ingredients were taken as per the manufacturer's disclosure (Vaidyaratnam) and as per the classical texts. The computed values were compared.

Prapundareekadi Tailam (PPT) is a classical formulation as explained in the text *Ashtangahrudayam*. It is very interesting to know that the Vaidyaratnam recently changed the name of *Pundareeka Tailam* (PT) to *Prapundareekadi Tailam* the classical name of the formulation with content changes. The classical *Prapundareekadi Tailam* consists of *Amalaki*, *Iksu*, *YashtiMadhu*, *Pippali*, *Candanam*, *Indivara* and *Tila tailam*. The ratios of combination of these ingredients were taken as per the manufacturer's disclosure (PPT-V, Vaidyaratnam) and as per the original reference from classical texts (PPT-T). The computed values were compared.

Neelibhrungadi Keratailam (NBK-1 and NBK-2) is a classical formulation recommended for ailments like Involutional alopecia. The NBK-1 contains *Neelidalam*, *Bhrungaraja*, *Indravalli*, *Amalaki*, *Yashtimadhu*, *Gunjabeejam*, *Anjanam*, *Keratailam*, *Keraksheeram*, *Ksheeram*, *Mahisha Ksheeram* and *Ajaksheeram*. The NBK-2 doesn't contain *Ajaksheeram* as per the disclosure of the manufacturer. Both NBK-1 and NBK-2 are prepared based on *Sahasrayoga* as evident from the label. These two *Sahasrayoga* might be different as there are thousands of *Sahasrayogas*. The computed values were compared.

Parachute Ayurvedic Hair Oil (PAHO) is an *Ayurvedic* proprietary medicine processed through *Taila Paka Vidhi* that nourishes the hair roots and the scalp and effectively controls hair fall. Usage also promotes hair growth, pre mature graying and reduces dandruff. It consists of *Amalaki*, *Ghratakumari*, *Madayantika*, *Mustaka*, *Methika* and *Nalikera Tailam* as per their container. The contents and proportions were taken as per the disclosure of the manufacturer for computational works.

Indulekha Bringha Oil (IBO) is a poly herbal patented and proprietary formulation manufactured by Mosons Extractions Pvt. Ltd., Thalassery, Kannur Kerala. The IBO contains *Aloe barbadensis*, *Vitis vinifera*, *Wrightia tinctoria*, *Eclipta alba*, *Phyllanthus emblica*, *Tinospora cordifolia*, *Prunus amygdalus*, *Murraya koenigii*, *Glycyrrhiza glabra*, *Azadirachta indica*, *Bacopa monnieri*, *Cocos nucifera- Oil*, *Cinnamomum camphora*, *Cocos nucifera- Milk Oil* and *Kshiram Milk* as disclosed by the manufacturer. The manufacturer claims that the active ingredients along

with the base oil create an excellent combination that is extremely beneficial for hair.

Dhathri Hair Care Herbal Oil (DHCHO) is a polyherbal *Ayurvedic* new generation medicine assures unbreakable hair in six weeks. The oil contains *Neeli*, *Kumari*, *Bhrungaraja*, *Brahmi*, *Indravalli*, *Gunja*, *Jadamanchi*, *Yashti madhu*, *Amalaki*, *Vibhitaki*, *Haritaki*, *Puranakittam*, *Ksheeram* and Coconut oil. The contents and proportions were taken as per the disclosure of the manufacturer.

Dhathri Dandruff Oil (DDO) is a polyherbal *Ayurvedic* new generation medicine for the treatment of dandruff, itching, alopecia, hair loss and psoriasis as claimed by the manufacturer. This formulation contains *Berberies aristata*, *Embelia ribes*, *Saussuria lappa*, *Nardostachys jadamansi*, *Citrus limonum*, Coconut oil (*Cocos nucifera*) and *Writia tinctoria* as ingredients. The contents and proportions were taken according to the disclosure of the manufacturer for computational works.

Himalaya Protein Hair Cream (HPHC) is a unique herbal formulation with extra nourishment of natural proteins derived from Chickpea and Wheatgerm. The cream is also enriched with *Eclipta* and *Amla* that promote hair growth. It consists of *Emblica officinalis*, *Cicer orientinum*, *Triticum sativum* and *Eclipta prostrata*. The reference is sited as API and *Bhavaprakasha*. The ingredients and their proportions were taken as per the disclosure of the manufacturer for computational works.

Himalaya Anti Hair Fall Cream (HAHFC) is specially formulated with botanical extracts that reduces hair fall due to thinning and breakage and also provides nourishment to hair. It consists of *Cicer orientinum*, *Eclipta prostrate*, *Glycyrrhiza glabra*, *Emblica officinalis*, *Terminalia bellirica*, *Terninalia chebula*, *Vitis vinifera* and Coconut oil. The reference is sited as API and *Bhavaprakasha*. The ingredients and their proportions were taken as per the disclosure of the manufacturer for computational works.

Dhathri Hair Care Cream (DHCC) is an *Ayurvedic* hair oil formulation in the form of the cream that protects the hair and improves hair growth. It energizes the scalp and nourishes the hair shaft to help produce stronger, thicker hair. The natural herbs present in the cream promotes hair growth, hair restoration, avoid hair fall, dandruff and thinning of hair. It stops itching and scaling instantly and provide whole day protection of hair as per the claims of the manufacturer. It is concentrated hair oil consisting of *Trichosanthes cucumerina*, *Indigofera tinctoria*, *Eclipta alba*, *Ficus glomerata*, *Ficus retusa*, *Ficus religiosa*, *Ficus*

bengalensis, Ocimum sanctum, Emblica officinalis, Cassia fistula, Azadirachta indica, Aloe vera, Almond oil and Neem oil. The ingredients and their proportions of this proprietary medicine were taken as per the disclosure of the manufacturer for computational works.

Dhathri Hair Care Capsule (DHCCap) is an internal medicine of herb-mineral nature that gives protection to the hair from internally by nourishing the hair follicles as per the claims. According to the manufacture it also helps the digestive process and enhances the immune system of the body with no reported adverse effects. This *Ayurvedic* proprietary medicine is prepared out of *Terminalia chebula, Terminalia bellerica, Emblica officinalis, Eclipta alba, Tinospora cordifolia, Ipomoea paniculata, Asparagus racemosus* and *Asphaltum panjabinum*.

The drug efficacy indices of all the above formulations both classical and new generation medicines were computed as per the disclosure of the manufacturers printed on the containers.

Experimental

The drug efficacy indices the measures of the pharmacological activities of all the above were computed using the formula (Figure 1). 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 (3).

The drugs were also classified according to their respective classes as per the computed pharmacological activities. The drug efficacy indices were compared and explained scientifically.

Figure 1: Equation for computing Drug Efficacy Index $Q_{(VPK)}$

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

The drug efficacy indices were computed, compared and explained scientifically.

Results and discussion

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 computed and tabulated (Table 1).

Table 1: The computed Drug Efficacy Indices $Q_{(VPK)}$ and Classes of various Hair Care formulations.

Formulation	$q_{(V)}$	$q_{(P)}$	$q_{(K)}$	$Q_{(VPK)}$	Pharmacological Category/ Class
PT	0.99	-57.92	41.09	0.16	<i>Pittaghni</i>
PPT-T	-3.70	-60.61	35.69	0.29	<i>Vata- Pittaghni</i>
PPT-V	11.78	-56.89	31.32	0.14	<i>Pittaghni</i>
NBK-1	-2.04	-73.09	24.86	0.50	<i>Vata- Pittaghni</i>
NBK-2	-2.78	-71.97	25.25	0.50	<i>Vata- Pittaghni</i>
PAHO	-9.27	-48.58	42.15	0.16	<i>Vata-Pittaghni</i>
IBO	-9.99	-56.82	33.19	0.34	<i>Vata-Pittaghni</i>
DHCHO	16.62	-77.33	-6.05	0.67	<i>Kapha-Pittaghni</i>
DDO	4.77	-92.39	-2.84	0.90	<i>Kapha-Pittaghni</i>
HPHC	22.59	-63.86	13.55	0.28	<i>Pittaghni</i>
HAHFC	11.67	-62.66	25.67	0.25	<i>Pittaghni</i>
DHCC	29.21	-47.04	-23.74	0.42	<i>Kapha-Pittaghni</i>
DHCCap.	20	-60	-20	0.60	<i>Kapha-Pittaghni</i>

The classical fundamental terms and concepts were numerically measured and corresponding efficacies were calculated scientifically for the entire formulations under study and the respective values were compared. The PPT-T (0.29), NBK-1(0.50), NBK-2(0.50), PAHO (0.16) and IBO (0.34) belong to the *Vata-Pittagni* category with various Drug Efficacy Indices given in brackets. The studies suggest that the predicted efficacies is in the order NBK-1 & 2 > IBO > PPT-Traditional > PAHO. These formulations are meant for the treatment of ailments due to the vitiation of *Vata-Pitta* nature. The classical example is *Indraluptam* due to *Pitta* vitiation along with *Vata* as per the texts (4). The dandruff due to pathogens pervaded through air could be effectively controlled and thus the hair loss problems like alopecia in an effective manner. The PT of Vaidyaratnam was *Pittaghni* with a Drug Efficacy value 0.16. The pharmacological activity of the formulation PPT-V changed to *Pittaghni* with a further less Drug Efficacy Index 0.14 where the traditional one belongs to *Vata-Pittaghni* nature with a Drug Efficacy Index 0.29. The computed efficacy values of PT (0.16) became less when changed to PPT-V (0.14) and are even less than many creams of the *Pittaghni* category HPHC (0.28) and HAHFC (0.25). These formulations belong to *Pittaghni* category can be effectively used for the treatment of *Palitam* due to vitiated *Pitta* caused by excessive heat as evident from the texts (5). The formulations like DHCHO (0.67), DDO (0.90), DHCC (0.42) and DHCCap (0.60) belong to the *Kapha-Pittaghni* category. All these products are from the same manufacturer and their predicted efficacy is in the order of DDO > DHCHO > DHCCap > DHCC based on the computed Drug Efficacy Indices. These are suitable for treating ailments due to *Kapha-Pitta* vitiation. The DDO may be beneficial for the treatment of ailments like itching due to psoriasis, and dandruff (due to psoriasis) belongs to *Kapha-Pitta* nature. The classical example is the severe case of *Indraluptam* or *Khalitya* with itching and secretions including blood (6). The hair loss due to such psoriasis type dandruff might be effectively controlled by the same in a best possible manner.

Conclusion

It is well known that alternative medicines act according to the classical principles and must be used for treating respective ailments which is also found applicable to the various cosmetics formulations. The study supported the classical principles and provided

scientific proof for the differences showed by the formulations with difference in therapeutic natures. The classical formulations must be prepared according to the ratio as explained in the traditional texts without any dilution for cost reduction. Otherwise the chances are high for altering the pharmacological activities as claimed in the classical texts and that violates the rights of practitioners and patients.

According to alternative systems of medicines the formulations must be administered according to the *prakrti* of the person under treatment. The practice of traditional *Ayurveda* is very much founded on the *Tridosha* Theory and we cannot imagine any dilutions of the same at any cause and the manufacturers should take further steps (7). The study also provided the scientific proof for not only the efficacies but also the observed efficiencies of various hair care products based on classical terms. In addition the study also showed that the classical terms could be measurable with a consistency and expressed numerically. The future researches are going on to develop suitable software with complete features for the use of *Ayurveda* community.

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