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Experimental study of *Karaviradya taila* for its *Loma Shatana* action

Research Article

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Abstract

Introduction: Beauty enhances the self-confidence of an individual. Un-wanted hair which are present on the body causes cosmetic problems, especially in women. Objectives: is to carryout experimental study of *karaviradya taila on wistar albino* rats and evaluation of histopathological changes. Materials and Methods: Experimental study was carried out on *Wistar albino* rats and prepared *karaviradya taila* was applied on the dorsum of individual rats of test drug group. Observations and Results: The observation showed there is reduction in the growth of hair on albino rats, histopathology section of experimental study showed loss of hair shaft in majority of the hair follicle, decrease in hair follicle noted in test drug group when compared to control group. Discussion and Conclusion: Reduction in the density of hair seen it may be due to the drug *karavira* having the properties like *laghu ruksha and tikshna guna, ushna veerya, pitta vardhaka*. *Danti* also possess *ushna veerya* and *pitta vardhaka* property. *Drugs* having *pitta vardhaka* property, when used may affect the *loma kupa* to cause *lomashatana.*

Key Words: *Lomashatana, Karaviradya taila,* Experimental study, Depilation, Histopathology, Hair Removal.

Introduction

Sneha kalpana (oleaginous preparations) is preparation of various kinds of medicated oils and ghee. *Sneha Kalpana* is efficacious preparations having comparatively longer shelf life, it is one of the commonly prescribed *Ayurvedic* dosage form used in day to day practice, and these have very wide range of therapeutic utility in all age groups and in almost all diseases. *Sneha kalpana* are considered superior to other dosage forms due to its advantages such as increased absorption and extraction of fat soluble as well as a water soluble active principle at a time in a single formulation(1). Sneha kalpana consists of *Taila kalpana* (medicated oils) and *Ghrita kalpana* (medicated ghee). *Ayurveda* gives significant importance to both *antahparimarjana chikitsa* (internal purification) and *bahirparimarjana chikitsa* (external purification). *Bahirparimarjana chikitsa* like, *lepa* (paste), *upanaha* (poultice), *udvartana* (dry powder massage), *abhyanga* (massage) etc. *Ayurveda* not only deals with therapeutic aspects but also concern about preventive, curative, health promotive as well as the cosmetic needs (2).

Beauty improves the self-confidence of an individual. Un-wanted hair which are present on the body causes cosmetic problems and rejection in the society which leads to psychological distress, especially in women. Around 5 to 10% are more prone to such social difficulty, it is one of the most prevalent health problems with the prevalence of about 10% and it impact their quality of life(3). Unwanted hair growth over the body is termed as hypertrichosis, which can be due to hormonal, drug induced, genetic, unhealthy lifestyle or idiopathic. For hair removal two main therapies are in practice viz. Depilation and Epilation (4). Hair removal is practiced for the reasons like cultural, sexual, religion and cosmetic purpose. To eliminate unwanted hair there are numerous ways like topical depilatory creams, plucking, threading, shaving, waxing, electrolysis, laser therapy etc. These formulations or methods containing chemicals, are expensive and causes irritation, minor burns, inflammation, scarring, pain and minimal side effects (5), so there is a need of formulation for hair removal.

Ayurvedic classical texts mentioned few depilatory formulations for hair removal and they are termed *lomashatana yoga* (6), these formulations chiefly comprise of topical applications in the form of *churna* (powder), *lepa* (ointment) or *taila* (oil). *Taila kalpana* (medicated oils) is secondary preparation used both in internally as well as externally. Local applications is beneficial because they are quickly

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absorbable, protect the skin and promotes percutaneous absorption of incorporated drug (7). *Karaviradya taila* (medicated oil) contains herbal drugs such as *kadali ksharodaka, koshataki, karavira,* and *danti*, which can be prepared by general method of *taila kalpana* and used externally in the form of *abhyanga*.

Methodology

Pharmaceutical study

Preparation of *karaviradya taila* (8) was done as per the general method of preparation of *taila* i.e 1/4 part of *kalka* (paste of *karavira*, *koshataki* and *danti* powder): 1 parts of *tila taila* and 4 parts of *kadali ksharodaka* as *drava dravya* (alkaline liquid).

Table 1: Ingredients and proportions of *karaviradya taila*

No	Drugs	Drugs	Quantity
1	*Karavira moola churna*	*Nerium indicum* Mill.	250g(1/4part) [83.33g each]
3	*Koshataki panchanga churna*	*Luffa acutangula* (Linn.) Roxb.	
4	*Danti churna*	*Baliospermum montanum* Muell-Arg.	
5	*Tila taila*	*Sesamum indicum* L	1000ml (1part)
6	*Kadali ksharodaka*	*Musa paradisiaca* Linn.	4000ml (4parts)

Experimental study

Study was conducted in Sri Adichunchangiri College of pharmacy, B.G Nagar, Nagamangala, Mandya, Karnataka, India, Animal house reg no – 377 / PO/ ReBi / S/ 01/ CPCSEA, IAEC no – SACCP- IAEC/ 2021-01/35. 18 healthy Wister albino rats were selected and grouped into 3 different category. Selected animal was divided by randomization method. 6 animals in each group. The individual rat was weighed and rats >150g only taken for the study and marked 3x3 cm rectangular mark on dorsal area with picric acid. No drug application to control group. Commercially available hair removal cream veet as standard drug (0.5g) was applied for the standard group and wiped it off after 5 minutes with cotton. The *karaviradya taila* (1.5ml) was applied to marked region on test drug group, after 60 min of application the drug was removed by wiping the area with the cotton. Application of test drug twice daily for 15days to see the *loma shatana* (depilatory) action.

Inclusive criteria

- Healthy albino female rats of 4-5 week age will be considered
- Weighing about 150-250g

Exclusive criteria

- Pregnant and diseased rats
- Rats which are under trial of other experiments

Table 2: Grouping of animals

Group	Name	Drug	No .of Rats
1	Control Group	No Drug Application	6
2	Reference Standard	Commercially Available Hair Removal Cream (Standard drug)	6
3	Test Drug	*Karaviradya Taila*	6

Intervention

Histopathological changes of skin layers and hair follicle.

Assessment criteria

- Hair fall, decrease in the density and re-growth of hair in marked region.
- By observing any change in the color of hair or skin.

Fig-1 Experimental study methodology

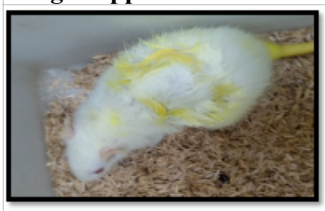
Caging and labeling of the groups

Drug for standard group

Marking With picric acid

Karaviradya taila for test group

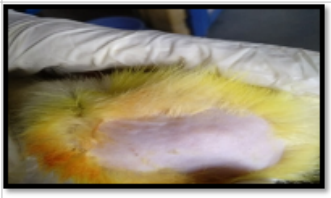
Fig-2 Application of standard drug to standard group



Application of standard drug

Wiping of standard drug with cotton

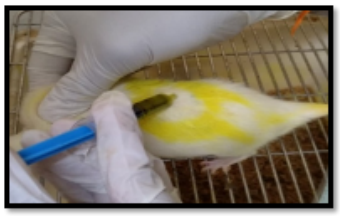
Reaction after application of standard drug-for 2 rats



Hair removal was seen after application of standard drug

Note- The yellow discoloration is due to picric acid, which was used for marking

Fig-3 application of *karaviradya taila* to test drug group

			
During application of *karaviradya taila*	After application of *karaviradya taila*	Observation of any reaction after application of *karaviradya taila*	Observation of color change

Note- The yellow discoloration is due to picric acid, which was used for marking

Observationd and Results of experimental Study

The observation and results of experimental study is divided into 2

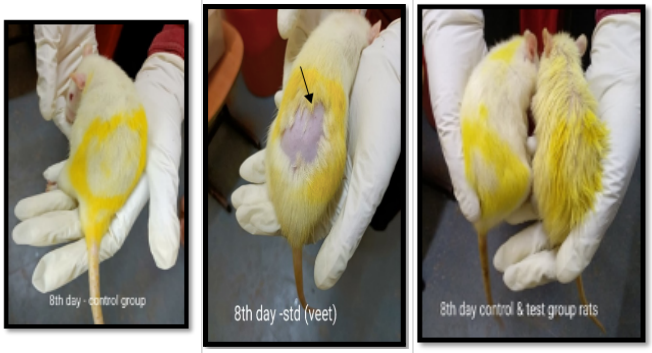
- Observations and results of animal experimental study
- Observations and results of histopathology study

Table 3: Observations and results of animal experimental study

11/11/21 Day-0	All 3 groups	• Marked 3x3 cm with the picric acid over dorsal aspect of individual rats of all the 3 groups • No drug application to any group on day -0
12/11/21 Day-1	Control group	• No drug application to control group • Given normal feed and water
	Standard group	Application of hair removal cream, 0.5mg over the dorsum for 3-5 min and wiped it off with the cotton (one time application) • Hair removal was seen immediately after wiping with cotton • Rats became hyperactive and irritated after application • Reddish discoloration was seen over the skin of 3 rats • Rats were licking the cream, may be because burning sensation/ irritation caused by the cream.
	Test drug group	*Karaviradya taila* is applied twice 1.5ml over the dorsum of rats at 9 am & 3pm • No hypersensitivity reactions seen after application of oil • Rats were licking the taila after application may be because of irritation/abnormal sensation by oil • No hair fall seen on day one
13/11/21 Day-2	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Rats were licking the standard drug applied area on 2nd day also. • Reddish discoloration of skin with small abrasions <1mm were noted over standard drug applied area of 3 rats. • All other rats were healthy with normal food and water intake
	Test drug group	• No hair fall or discoloration seen on day-2 • *Karaviradya taila* is applied twice 1.5ml over the dorsum of rats at 9:16 am & 3pm • Immediately after application of oil rats started licking the oil
14/11/21 Day-3	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Rats were licking standard drug applied area on 3rd day also • Reddish discoloration of skin with small abrasions started heeling on its own. • All other rats were healthy and fine with normal food and water intake
	Test drug group	• No hair fall or discoloration or any allergy noted on day-3 • *Karaviradya taila* is applied 1.5ml twice over the dorsum of rats at 9:16 am & 3:30 pm • Immediately after application of oil rats started licking the oil may be because of irritation or discomfort • Normal water and food intake
18/11/21 Day-7	Control group	• No drug application to control group • Given normal food and water
	Standard group	• No hair re-growth seen in standard drug applied area
	Test drug group	• Not able to differentiate the hair fall because of dense hair
19/11/21 Day-8	Control group	• No drug application to control group • Given normal food and water
	Standard group	• Hair re-growth< 0.5mm seen in standard drug applied area when seen through magnifying lens
	Test drug group	• Not able to differentiate the hair fall because of dense hair • Rats were little irritated from 8th day onwards

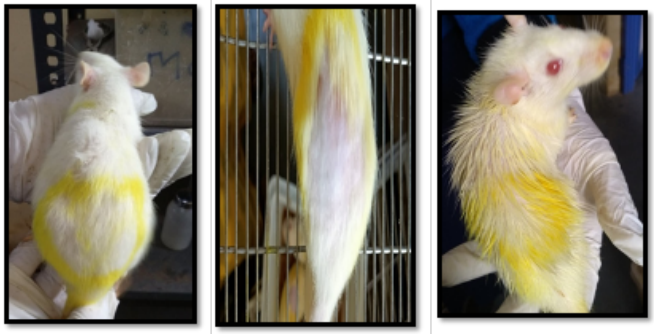
20/11/21 Day-9	Control group	• No drug application to control group • Given normal feed and water
	Standard group	Normal food and water intake • Hair re-growth< 0.5mm seen in standard drug applied area for 1 rat and <1 mm for one rat, when seen through magnifying lens
	Test drug group	• Not able to differentiate the hair fall because of dense hair • Rats became hyperactive after application of oil
21/11/21 Day-10	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Hair re-growth seen in in 3 rats <1mm
	Test drug group	• Not able to differentiate the hair fall because of dense hair • All the rats were little irritated
22/11/21 Day-11	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Hair re-growth seen in in 6 rats about 0.5 to 1mm length
	Test drug group	• Not able to differentiate the hair fall because of dense hair but hair were easily coming out when plucked • All the rats were little irritated and not allowing to apply oil
23/11/21 Day-12	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Hair re-growth seen in all the 6 rats, of about 1mm
	Test drug group	• No allergic reactions seen over the skin • No discoloration
24/11/21 Day-13	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Hair re-growth seen in all the 6 rats, of about 1 -2mm
	Test drug group	• No discoloration of skin and hair seen • Little decreased in the density was seen in all the rats when compared with the control group
25/11/21 Day-14	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Hair re-growth seen in all the 6 rats, of about 2mm
	Test drug group	• Little decreased in the density was seen in all the rats when compared with the control group
26/11/21 Day-15	Control group	• No drug application to control group • Given normal feed and water
	Standard group	• Normal hair re-growth seen , 2 mm length
	Test drug group	• No discoloration of skin and hair seen • Little decreased in the density was seen in all the rats when compared with the control group
27/11/21 Day-16	All 3 groups	• The skin flap of 2x2 cm is taken out from 2 rats from each group under general anesthesia for histopathology • Dressing of the wound was done.

Fig-4 Comparison on 8th day



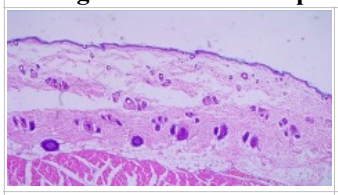
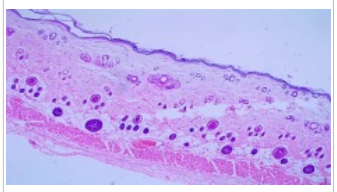
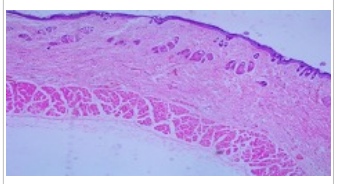
8th day control group	8th day- standard group	8th day control & test group

Fig-5 Comparison on 15th day



15th day control group	15th day- standard group, re-growth of hair seen	15th day test drug group, Decreased density of hair seen

Fig-6 Photo-microscopic section of histopathology

	**Control group**- Features are of Normal skin morphology
	**Standard group**- Superficial dermis show loss of hair shaft but hair root intact and mild degree of keratinolysis in follicular epithelium. Epidermis show no significant histo morphological changes.
	**Test drug group**- Sections studied show loss of hair shaft in majority of the hair follicle, decrease in hair follicle noted compared to control group. Epidermis show no significant histo morphological changes.

Discussion

Sneha kalpana (oleaginous preparations) is a unique dosage form in *Ayurveda,* it is widely acceptable in all the age group, both internally as well as externally. Externally it is used for *abhyanga* (massage) most commonly. Local applications is beneficial because they are quickly absorbable, protect the skin and promotes percutaneous absorption of incorporated drug (9). Drug and media to some extent is taken and heated along with the oil at a desired temperature and for a certain period of time. Here, the principle is to transfer the active constituent of the drug according to its solubility. Transfer of aqueous and lipid-soluble principles of all herbal drugs takes place in oleaginous preparations. *Sneha paka* and liposome for conventional medicine, are very similar in origin and character as both are naturally lipoidal in nature. In this dosage form, the active compound can be present either in the aqueous spaces, if it is water-soluble, or in lipid membrane, if it is lipid soluble (10).

No drug application to the control group, hence no hair fall seen in control group rats, all the rats in the control group were healthy throughout the study with normal feed and water intake, histopathology of microscopic section shows skin with epidermis and dermis, epidermis show stratified squamous epithelium with no abnormal histomorphological features. Dermis show adnexal structures composed of hair follicle and sebaceous and eccrine glands in superficial and deep dermis. Features are of Normal skin morphology.

In standard group hair removal was seen after 5 min of application of drug. Rats became hyperactive and irritated after application of standard drug and reddish discoloration was seen over the skin of 3 rats may be because of the chemical used in the cream (thioglycolic acid and potassium hydroxide). Hair re-growth < 0.5mm seen on applied area when seen through magnifying lens on day-8. Normal hair re-growth seen in all 6 rats, >2 mm length on 15th day, histopathology of microscopic section shows hair roots at superficial dermis mild degree of keratinolysis and loss of hair shaft, no change noted in the thickness of skin, no signs of inflammation noted**,** color of hair and skin also not affected, no features of allergic reaction noted, no alteration in number of hair follicle, superficial dermis show loss of hair shaft and mild degree of keratinolysis in follicular epithelium, epidermis show no significant histo morphological changes**.**

Test drug group rats were little irritated from 8th day onwards but no change in the food and water intake, no change in the color of skin or hair, no allergic reactions seen throughout the experimental study, decrease in the density of hair was seen from 13th day onwards in all the rats of test drug group when compaired with the control group, but complete hair fall as was not seen when it was compaired with the standard drug group, histopathology of microscopic section shows loss of hair shaft at both superficial and deep dermis, no change in the thickness of skin, no signs of inflammation noted, color of skin and hair was also not seen microscopically, no features of allergic reaction noted, occasional hair follicle in the superficial dermis show features of regrowth. Sections studied show loss of hair shaft in majority of the hair follicle, decrease in hair follicle noted compared to control group. Epidermis show no significant histo morphological changes.

The entry of drug molecules with the help of oil media at the site of hair follicle by increased lipophilic activity, thereby helping it to cross the layers of the skin stratum cornium which is lipophilic in nature on reaching the site of action i.e hair follicle(11). *Kadali* stem contains phosphorus, sodium and potassium (12). Mild decrease in the density seen when compaired with control group, it may be because potassium having caustic property might help in destroying hair follicle (13).

The drug *karavira* having the properties like *laghu* (light) *ruksha* (dry) and *tikshna guna* (sharp quality)*, ushna veerya* (hot potency)*, pitta vardhaka* (aggravates *pitta*). *Danti* also possess *ushna veerya* and *pitta vardhaka* property. *Drugs* having *pitta vardhaka* property, when used may affect the *loma kupa* to cause *lomashatana.* The excessive use of *kshara* is *kesha upaghatakara* (14), as said in *Ayurveda* classical text. The repeated application may leads to loss of hair, *kshara* (alkalis) are corrosive in nature which on the contact disintegrates or destroys the tissue elements. The *tikshna* (sharp)*, ushna* (hot)*, chedana* (excision)*, lekhana* (scrapping)*, dahana* (burning)*,* qualities of *kshara* (alkali) may assist in depilation.

Conclusion

Sneha kalpana (oleaginous preparations) is having longer shelf life, extraction of fat soluble as well as water soluble active principle at a time in a single formulation and quick in absorption. Ingradients of *karaviradya taila* are easily available, easy to prepare

and cost effective. Mild decrease in density of hair seen in test drug group from 13th day onwards when compaired with the control group. No allergic reactions were observed on test drug group rats throughout the experiment. Histopathology showed loss of hair shaft in majority of the hair follicle, decrease in hair follicle noted in test drug group when it compaired to control group.

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