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Effect of herbal shampoo from long pepper fruit extract to control human head louse of the Ladkrabang Childrens, Bangkok, Thailand.

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Study on 2 formulation of herbal shampoo from long pepper fruit (*Piper retrofractum*) extracts, formulation 1 (10 %concentrations of long pepper fruit extracts) and formulation 2 (3% concentrations of long pepper fruit extracts) were tested against human head louse (*Pediculus capitis*) of sixty heavity lice-infested female childrens at Ladkrabang, Bangkok, Thailand. Twenty milliliter of the herbal shampoo was thoroughly mixed with completely wet hair basically combed with fine comb. Both herbal shampoo showed insecticidal effect on the lice of 99 – 100 % mortality occurred at 5 min and 90 – 100 % of human head lice free childrens occurred at 28 days. The both herbal shampoo proved to be highly effective against all stage of human head lice were considereds safe to children, no side effect after application.

Key words: *Pediculus capitis*, herbal shampoo

Introduction

Human head louse (*Pediculus capitis* De Geer : Pediculidae : Phthiraptera) is the major insect as ectoparasite of human and feed on human blood only, very small, wingless and the size of 2.0 – 4.0 mm with sucking mouth part. (Fig. 1) The life cycle requires 18.0 – 27.0 days, with the adults living up to 35.0 – 40.0 days (Soonweera, 2005; Soonwera and Wangspha, 2007; Wikipedia, 2009) Lice are cosmopolitan parasite found in all areas of the world and a socio-economic problem. Each year in USA and danada there are 6 – 20 million case of human head louse, as many as 6 – 12 million people worldwide are newly infested with human head lice each year. Human head lice are not known to transmit diseases from person-to-person, but they are

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annoying insects due to their obligatory feeding habits on human blood several times a day, and many cause itching, irritation, loss of blood and loss of sleep (Abdel-Ghaffar and Semmler, 2007; Soonweera and Wangspha, 2007)

a b c

Fig. 1. Human head louse (*Pediculus capitis*); Egg (a), Nymph (b) and Adult (c).

Lice infestation are very common, preschool and elementary age children, 8 to 10 years of age infested most often and female childrens are infested more than male childrens. Lice are spread by direct contact, walking from one hair or head to another or by infested articles, that has recently been contacted with an infested articles, such as hats, wings, combs, hair bushes, hair ribbons, pillow, that has recently been contacted with an infested person (Soonwera, 2005)

Chemical treatments with pesticides for lice control are very dangerous for childrens, they have less under developed detoxification mechanisms, they are more susceptible and sensitive to the toxic effect of pesticides such as skin irritation, headaches, burning sensations, and hyperactivity. Malathion has also been found to disrupt the immune system, caboryl is a potential human carcinogen (any substance that produce cancer) and synthetic pyrethroids (e.g. permathrin, phenothrin) are the potential human leukaemia and lymphoid cancer. Pollack *et al* (1999); Baily and Prociv (2000) and Burkhart (2004) also reported that some head lice become resistant to pyrethroid insecticides and some pesticides.

In rural and urban areas of Thailand, childrens are treated pediculosis with organophosphate and synthetic pyrethroid insecticides. The awareness of the toxic effects of pesticides on human health is increasing rapidly. The search for safe and effective product, which do not rely on the application of dangerous insecticides to the childrens, is demanded urgently. The natural product from herbs is safe and effective alternative to control lice of childrens.
Abde-Ghaffar and Semmler (2007), Soonwera and Wangsapha (2007), Rassami and Soonwera (2009) reported that neem seed extract shampoo, herbal shampoo from *Zingiber officinale* (Zingiberaceae) and herbal shampoo from

Angelica siamensis (Umbelliferae) proved to be highly effective against all stage of human head lice and no side effect of children, after treated.

This study was investigated herbal shampoo from long pepper fruit extracts to control human head lice of Ladkrabang childrens, Bangkok, Thailand.

Materials and methods

Preparation of herbal shampoo

The herbal shampoo formulation 1 was prepared from 10 %*Piper retrofractum* fruit extracts, 10% sodium laureth sulfate and 80 %distilled water, the herbal shampoo formulation 2 was prepared from 3% Piper retrofratum fruit extracts, 10 %sodium laureth sulfate and 87 %distilled water and base shampoo (Control) was prepared from 10% sodium laureth sulfate and 90% distilled water

Preparation of human head lice and laboratory experiment

Female childrens of Ladkrabang area, Bangkok were screened for pediculosis. After a preliminary thorough examination of the skin of the scalp, the neck and behind the ears, a total number of 90 naturally infected female childrens, a fine comb was used to thoroughly comb the hair of female childrens and collected adult of human head lice for testing the insecticidal effect of both herbal shampoo by topical application method in laboratory condition, into 3 treatment groups as follows:-

Treatment 1 : Herbal shampoo formulation 1
Treatment 2 : Herbal shampoo formulation 2
Treatment 3 : Base shampoo (Control)

There were 10 lice per experimental unit and 10 experimental unit per 1 treatment in a completely Randomized Design (CRD). The mortality of lice per experimental unit was calculated and recorded after treated 5, 10, 20 and 30 sec. Statistical analysis of experimental data was performed using probit analysis to find out the LT_{50} (Lethal Time). The data was analysed by completely randomized design and the means were separated using Duncan's Multiple Range Test (DMRT), test at $P = 0.05$. This experiment was done on two reexperiment.

Experiment of herbal shampoo against human head lice of naturally infected female childrens

90 female childrens (heavy infestation with lice) from Ladkrabang area, Bangkok, age 8 – 10 years were selected to participate in the experiment. 90 : female childrens were randomly separated into 3 treatment groups as follows:-

Treatment 1 : treatment with herbal shampoo formulation 1 (30 female childrens)
Treatment 2 : treatment with herbal shampoo formulation 2 (30 female childrens)
Treatment 3 : base shampoo (Control) (30 female childrens)

For application completely wet hair was thoroughly mixed, according to the length of the hair, with 20 ml of herbal shampoo and base shampoo (Control). The shampoo remained mixed with the hair for 5 min. and the shampoo was washed out with tap water (Fig. 2). The mortality of 7, 14 and 21 days after the initial treatment. The data was analysed by completely randomized and the means were separated using Duncan's Multiple Range Test (DMRT), at P = 0.05.

Fig. 2. Female childrens during application of the herbal shampoo.

Results

The effect of herbal shampoo on mortality of human head lice in Laboratory condition

The effect of herbal shampoo formulation 1, herbal shampoo formulation 2 and base shampoo (Control) on mortality of human head lice in laboratory, the mortality and LT_{50} value revealed that herbal shampoo formulation 1 and formulation 2 proved the most effective against human head lice of 100% mortality occurred at 30 sec. and LT_{50} value of 11.37 and 16.70 sec.,

respectively and base shampoo (Control) showed of 80% mortality occurred at 30 sec. and LT_{50} value of 25.34 sec. as shown in Table 1 and Fig 3.

Experiment of herbal shampoo against human head lice of naturally infected female childrens.

The effect of herbal shampoo formulation 1, formulation 2 and base shampoo (control) on mortality of lice of a heavy infestation with lice in 30 female childrens per treatment. After application herbal shampoo formulation 1 and formulation 2 shampoo for 5 min. 100 and 99 %of the collected different stage of lice were dead, less than 1 %was still alive and slight movement and base shampoo (Control) showed of 47.22% mortality.

In the second, third and fourth experiment, after application herbal shampoo formulation 1 and formulation 2 for 5 min. 100 %of the collected lice was dead and base shampoo (Control) showed of 43.43, 36.37 and 34.23% mortality, respectively as shown in Table 2 and Fig.4

The percentage of human head lice – free childrens after application herbal shampoo formulation 1 at 1^{st} , 2^{nd} , 3^{rd} and 4^{th} experiment showed of 40, 50, 80 and 90% human head lice – free childrens, respectively. Effect of base shampoo (Control) on human head lice –free childrens showed of 20, 25, 55 and 60.0 % after treated at 1^{st} , 2^{nd} , 3^{rd} and 4^{th} experiment, respectively, as shown in Table 3 and Fig.5

Table 1. Effects of herbal shampoo on mortality of human head lice occurred at 5, 10, 20 and 30 sec. by Topical application method in the laboratory condition.

Treatments	% mortality/Time(sec.)				LT_{50} (sec.)
	5	10	20	30	
Herbal shampoo formulation 1	$20.0^{a\,1}$	45.0^{a}	85.0^{a}	100^{a}	11.37
Herbal shampoo formulation 2	16.0^{a}	32.0^{b}	70.0^{b}	100^{a}	16.70
Base shampoo (Control)	0^{b}	0^{c}	40.0^{c}	80.0^{b}	25.34
CV(%)	154.21	45.63	18.29	5.54	

[1] means that data within the some column followed by the same letter are not significantly different by DMRT (P=0.05).

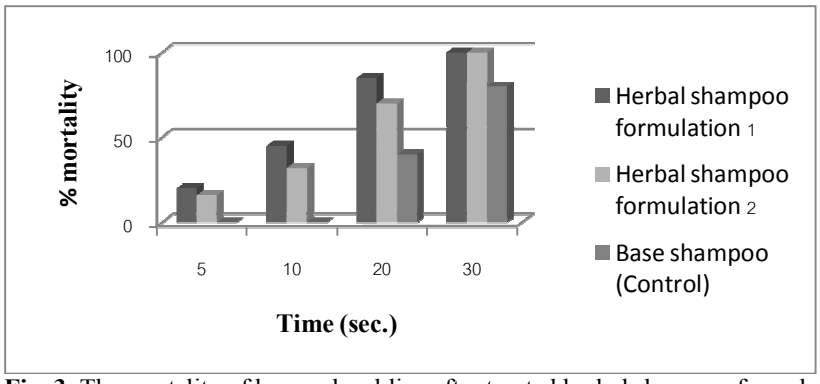

Fig. 3. The mortality of human head lice after treated herbal shampoo formulation 1, herbal shampoo formulation 2 and base shampoo (Control).

Table 2. Effects of herbal shampoo on mortality of human head lice of naturally infected female childrens, 5 min. after treated on 1st , 2nd , 3rd and 4th experiment.

Treatments	% mortality/experiment			
	1st	2nd	3rd	4th
Herbal shampoo formulation 1	100[a 1]	100[a]	100[a]	100[a]
Herbal shampoo formulation 2	99.0[a]	100[b]	100[b]	100[a]
Base shampoo (Control)	47.22[b]	43.63[c]	37.37[c]	34.23[b]
CV(%)	20.23	11.56	12.37	12.67

[1] means that data within the some column followed by the same letter are not significantly different by DMRT (P=0.05)

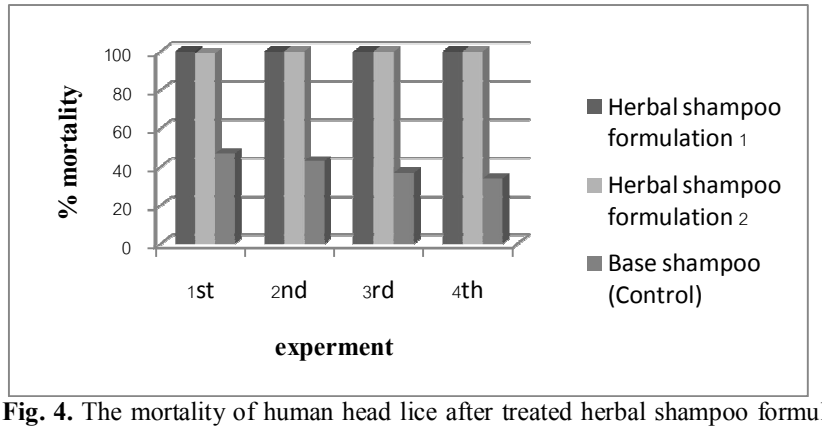

Fig. 4. The mortality of human head lice after treated herbal shampoo formulation 1, herbal shampoo formulation 2 and base shampoo (Control) of naturally infected female childrens.

Table 3. Effects of herbal shampoo on human head lice – free childrens, 5 min. after application of herbal shampoo, on 1st , 2nd , 3rd and 4th experiment.

Treatments	% human head lice – free childrens/experiment			
	1st	2nd	3rd	4th
Herbal shampoo formulation 1	45.0[a 1]	80.0[a]	90.0[a]	100[a]
Herbal shampoo formulation 2	40.0[a]	50.0[b]	80.0[b]	90.0[a]
Base shampoo (Control)	20.0[b]	25.0[c]	55.0[c]	60.0[b]
CV(%)	30.22	20.16	10.52	9.23

[1] means that data within the some column followed by the same letter are not significantly different by DMRT (P=0.05)

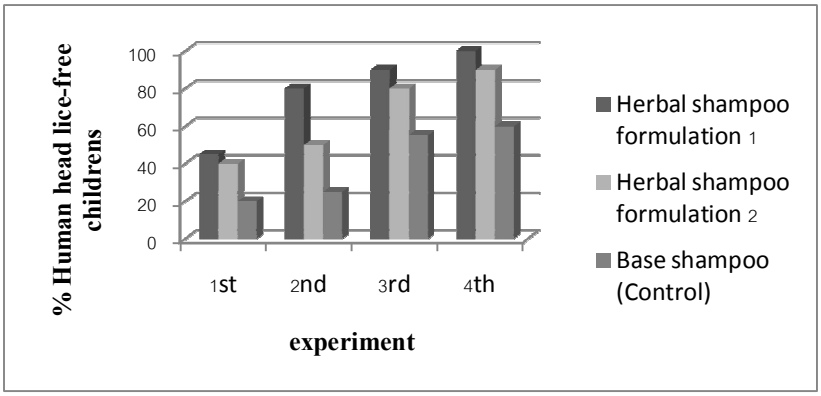

Fig. 5. Human head lice – free chidrens after treated herbal shampooformulation 1, herbal shampoo formulation 2 and base shampoo (Control).

Discussion

In this research, the herbal shampoo formulation 1 and formulation 2 proved to be highly effective against nymph and adult of human head lice more than base shampoo (control). As a result, Suppasan (2005) reported that herbal shampoo from piperaceae plants extract showed that 98.0% of human head lice – free childrens after treated of herbal shampoo. Both herbal shampoo are highly effective against nymph and adult of human head lice in naturally infected childrens, and safe to childrens. After application of both herbal shampoo did not show any negative side effect such as erythema, skin irritation and burring sensation, for a safe and effective treatment of pediculosis, the herbal shampoo should be applied for 5 min. once a week.

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