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Physicochemical Analysis of Some Marketed Hair Oils

• **Alisha Kumari** • **Dipty Yadav** • **Shaily Kumari**
• **Madhu Rani Sinha**

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Corresponding Author : Madhu Rani Sinha

Abstract : *The current study aimed to analyse some marketed hair oils to determine some physiochemical parameters (such as colour, specific gravity and viscosity) and the presence of heavy metals (Pb, Cd) and mineral oils. Based upon the results we concluded that heavy metals, Pb and Cd was present in all the four selected brand of hair oils. Mineral oil was also found to be present in all the brands that was tested .It is often claimed that heavy metals and mineral oil may cause harmful effects on human body .So, extensive use of such products should be avoided.*

Keywords: *Hair oils, Physicochemical parameters, Heavy metals, Mineral oil.*

Alisha Kumari
B.Sc. III year, Chemistry (Hons.), Session: 2016-2019,
Patna Women's College,
Patna University, Patna, Bihar, India

Dipty Yadav
B.Sc. III year, Chemistry (Hons.), Session: 2016-2019,
Patna Women's College,
Patna University, Patna, Bihar, India

Shaily Kumari
B.Sc. III year, Chemistry (Hons.), Session: 2016-2019,
Patna Women's College,
Patna University, Patna, Bihar, India

Madhu Rani Sinha
Head, Department of Chemistry,
Patna Women's College, Bailey Road,
Patna–800 001, Bihar, India
E-mail : sinhamr@rediffmail.com

Introduction :

Hair is one of the vital parts of the body derived from ectoderm of skin, is a filamentous biomaterial that grows from follicles found in the dermis and also a protective appendages on the body. The appearance of hair plays an important role in people's overall physical appearance and self-perception. With today's increasing life-expectations, the desire to look youthful plays a bigger role than ever. The hair care industry has become aware of this and is delivering active products directed towards meeting this consumer demand. Hair oils are the hair care formulations applied for treatment of hair disorders such as baldness, aggression of hair, discoloring of hair, hair falling, and dryness of hair etc. Hair oil is applied to the scalpfor soothing and revitalising it. The nature of oil is non sticky and addition of perfumes enhances the fragrance and overall improves its popularity.(Journal of Chemical and Pharmaceutical Research, 1(1), 2009, 261-267) Proper application of hair oil gives lustre to hair, softening the hair, gives flows to hair and more important gives cooling effect to the brain. They moisturize the scalp and also helpful in dry scalp and dry hairs. Hair oil maintains normal functions of sebaceous glands they supply normal essential elements for hair to naturally grow.

A plethora of commercial brands use ingredients that make our hair glow, but which also damage it in the long-term, stripping it of vital proteins and moisture. Some hair oils contain heavy metals like Pb and Cd

which is carcinogenic. (Word Journal of Pharmaceutical Research. 3(2): 2014:3278-3294)

Hair oils also contain Mineral oil which has been used for decades to treat a number of scalp and skin ailments. It is often claimed that mineral oil can rid the skin of dryness and help alleviate dandruff. However, experts state that mineral oil can actually clog the pores. Recently, it has been proven that untreated mineral oil can actually be carcinogenic, leading to the potential of causing cancer.

In the present study, therefore we have attempted to probe four branded hair oils and subjected them to physical and chemical evaluation and performed tests for the presence of heavy metals and mineral oil.

Materials and Methods :

Hair Care, Keo Karpin, Patanjali Kesh Kanti and Dabur Sarson Amla oil were purchased from local market from Patna district of Bihar, India. The above brands were selected on the basis of a survey in girl's hostels of Boring Road, Patna.

Physicochemical evaluation was done using conventional methods. The various parameters like sensitivity test, viscosity, irritation test, heavy metal test, mineral oil test of hair oil was evaluated.

Physical evaluation: Determination of colour and odour

Determination of specific gravity: The specific gravity of the oils were determined with specific gravity bottle.

Determination of viscosity: The viscosity of hair oils was determined using Ostwald's Viscometer.

Determination of heavy metals: Two metals i.e. lead and cadmium was determined through atomic absorption spectrophotometer.

Determination of mineral oil: The presence of Mineral was indicated by Holde's test.

Results and Discussion :

On the basis of the tests performed following results were obtained.

Colour and Odour : The general characterisation of the oils proved that the formulations do not show any objectionable colour and odour and reported in Table 1.

Table 1. General characterisation of the oils

General character	Hair care	Keo karpin	Kesh kanti	Dabur Sarson amala
colour	Light green	Light green	Dark green	Yellow
odour	characteristics	characteristics	characteristics	characteristics

Specific Gravity : Specific gravity (relative density) is the ratio of the density of a substance to the density of a reference substance, here water.

Table 2. Specific Gravity of the oils

Hair oils	Specific gravity
Hair care	0.862
Keokarpin	0.869
Kesh kanti	0.916
Dabur Sarsonamla	0.860

KESH KANTI>KEO KARPIN>HAIR CARE>DABUR SARSON AMLA

Viscosity : Viscosity by definition, is an oil resistance to flow and shear. It is the single most critical physical property of the oil. Viscosity of the oils are shown in Table 3.

Table 3. Viscosity of the oils

Hair oils	Viscosity (poise)
Hair care	0.17
Keokarpin	0.22
Kesh kanti	0.49
Dabur Sarsonamla	0.34

KESH KANTI>DABUR SARSON AMLA>KEO KARPIN>HAICARE

Heavy Metals : Using Atomic absorption spectrophotometer (AAS) hair oils was tested for the presence of heavy metals (Cd and Pb).

Table 4. Concentration of lead in the oils

Sample	Conc (ppm)	% rsd	Mean abs
Kesh kanti	0.011	13.02	0.0037
Sarson amla	0.003	High	0.0009
Keo karpin	Nd	High	-0.0013
Hair care	Nd	High	-0.0006

From table 4 we analysed that the highest concentration of lead was detected in Kesh Kanti followed by sarson amla. Pb was not detected in keo karpin and hair care. The presence of lead in cosmetics and hair oils has also been reported and thus the European Union (EU) law for cosmetic banned lead and lead compounds in cosmetics since 1976, however trace amount of lead are unavoidable under conditions of good manufacturing practice.

KESH KANTI>DABUR SARSON AMLA>KEO KARPIN= HAIR CARE

Table 5. Concentration of cadmium in the oils

Sample	Conc (ppm)	% rsd	Mean abs
Sample	Conc	%rsd	Mean abs
Kesh kanti	0.003	High	0.0072
Dabur Sarson amla	0.001	High	0.0020
Keo karpin	Nd	High	-0.0007
Hair care	0.000	High	0.0001

The highest concentration of cadmium was detected in Kesh Kanti followed by sarson amla. Although the presence of cadmium in the samples was in less amount but the slow release of cadmium with low amount may also cause harmful effects to the human body. Even small amount of cadmium is not safe. It targets blood vessel and heart tissue, as well as, the kidneys, lungs and brain, and results in heart disease, hypertension, liver damage, suppressed immune system and other nasty symptoms

KESH KANTI>DABUR SARSON AMLA>HAIR CARE>KEO KARPIN

Mineral Oil : The turbidity indicates the presence of Mineral oil, the depth of turbidity depends on the percentage of mineral oil present. Hair oils on the basis of decreasing amount of turbidity observed are:

DABUR SARSON AMLA>KESH KANTI>KEO KARPIN>HAIR CARE

Conclusion :

In the present study, we determined the lead, cadmium in various cosmetics of different brands. Based upon the results, we concluded that lead is one of most prominent toxic heavy metals in cosmetic products; however both cadmium and lead were under the permissible limit. The continued use of products contaminated with such heavy metals may cause slow release of these metals into the human body and thus show their harmful effects. So the extensive uses of such products should be avoided.

We also determined the presence of mineral oil in all the sample of hair oils. There are mineral oil side effects on hair by excess use. Mineral oil on hair can cause damages to the hair cells as well, and this is where the hair sequence takes place. Irritation to the hair cells can disturb healthy hair growth.There is a Report on Carcinogens which confirms that unprocessed and mildly treated mineral oils are known to be the main problem for cancer in the human based on sufficient evidence of carcinogenicity from studies in humans.

From the present study we concluded that keo karpin and hair care oils were found to be the best among the others.

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