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FORMULATION AND EVALUATION OF POLY HERBAL HAIR DYE

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ABSTRACT

Globally the interest in traditional systems of medicine and particularly Ayurvedic is increasing. Herbal medicines as a major remedy in traditional systems have made a great contribution in maintaining human health. The above selected seven herbal (Henna, Indigo, Bhringraj, Tea, Fenugreek, Amla, Neem) is traditionally using in rural India. Volunteers for study of all dyes were remunerated appropriately. The identity and records of the volunteers are kept confidential; and no details about identity of said human subjects will be disclosed without valid scientific and legal reasons. In case of legal issues such as therapeutic intervention or safety evaluation / risk assessment, identity can be disclosed only upon the specific consent in writing of the said volunteer. All precautions related to preparation and use of formulations viz. Use of authenticated herbs, following Good Manufacturing Practices and clinical practices were taken. The risks such as inferior quality raw materials, contamination, microbial growth, improper storage of raw materials as well as finished products were minimized at all stages of the research and experimentation to get complete benefit of research, valid results and avoid irreversible adverse effects.

KEYWORDS

Polyherbal hair dye, Henna, Indigo, Bhringraj, Tea, Fenugreek, Amla and Neem.

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INTRODUCTION

Mixtures of chemical compounds, either synthetically produced or from natural sources, make up cosmetics¹⁻². Cosmetics are used for several things, such as skin and personal care. They can also be used to enhance natural features (such as eyelashes and eyebrows) and cover up imperfections. Additionally, makeup can enhance a person's features, add color to their face, or completely alter their face to make them look like a different person, animal, or object. For thousands of years, people have used cosmetics to improve their

look and take care of their skin. Over the centuries, both men's and women's visible cosmetics have been in and out of style³⁻⁵.

Lead was one of the dangerous elements used in some early cosmetics, which led to major health issues and occasionally even death. Although the safety of modern commercial cosmetics is usually vetted, they may contain contentious compounds including formaldehyde releasers and polyfluoroalkyl substances (PFAS), and additives that trigger allergic reactions. Cosmetics are subject to strict rules from the European Union and international regulatory bodies. The FDA does not need to approve cosmetic products or ingredients in the US. Some nations have outlawed the use of animals in cosmetic research⁶⁻⁹.

Introduction about hair

The protein filament that makes up hair develops from dermal follicles¹⁰. One of the traits that distinguishes animals is their hair. Aside from patches of glabrous skin, the human body is covered in follicles that generate fine vellus hair and thick terminal hair. Although hair development, kinds and care are the most frequently discussed topics, hair is also a significant biomaterial that is mostly made of proteins, particularly alpha-keratin¹¹⁻¹³.

Natural Colour

Melanin, which gives human hair its dark color and UV protection, is found in human hair. A vast spectrum of light wavelengths can be absorbed and emitted by human hair. Melanin auto fluorescence at 365-400nm excitation from a dark strand is shown in the above images. A girl whose hair is reddish brown. Two kinds of hair pigments are responsible for all natural hair colors. Produced within the hair follicle and contained in granules within the fibers, both of these pigments are melanin kinds. Pheomelanin is the predominant pigment in red hair, whereas eumelanin is the predominant pigment in brown and black hair. The lack of melanin in the hair strand causes blond hair. Whereas poliosis causes white hair (and frequently the skin to which the hair is attached), usually in areas that never had melanin at all or halted for

natural reasons, usually genetic, in the first few years of life, gray hair happens when melanin synthesis declines or stops¹⁴⁻¹⁸.

From through literature search there are some research reported on synthetic and semi synthetic dyes, Khan *et al.*, (2004) at present, from total uses of dyes contribution of natural dyes is negligible. Rajesh Yadav *et al.*, (2014) were studied about Herbal cosmetics are formulated by using various colouring ingredients to form the base in which one or more colouring ingredients are used to provide defined cosmetic benefits. Pijush Das *et al.*, (2021) performed the preparation of poly herbal hair oil by using various herbal ingredients like Amla, Bhringaraj, Watermelon seeds, Curry leaves, Methi etc. Ravichandran *et al.*, (2023) in evaluation to natural hair dyes, artificial hair dyes are suggested to reason pores and skin and other pores and skin associated diseases. Sweta Joshi *et al.*, (2024) is study about to develop and evaluate a polyherbal hair dye powder in various shades using herbs. The main objective is to prepare polyherbal hair dye to utilize everyone without side effects because now a day's increased awareness among consumers of side effects associated with prolonged use of some synthetic coloring compounds and free from ammonia base and to keep the hair healthy and clean. In this herbal hair dye we utilized following herbs such as Henna, Amla, Reetha, Shikakai, Hibiscus, Neem, Jatamansi, Bhringraj, Tea, Tulsi, Black catechu, Lohbhasma, Brahmi, Methi, Orangepeel powder, etc.

MATERIAL AND METHODS

MATERIALS

Electrical balance (V-Tech), Multiple rotary punching machine (Rimek Phase-I), Vernier caliper (Mitutoya), Sonicator (bath) (Remi equipment Pvt Ltd), Dryer (Techno- Tray dryer), Micro centrifugator (Remi Rsearch Centrifugur), Micro syringe, Hot air ovan (NSW India), Bulk density test apparatus (Konark Instruments), Cyclo mixer (Rapid). Sieves, Stainless steel trays, Mortar and pestle, polybags, Air tight containers. All the

medicinal plants purchased from authorised ayurvedic shop.

METHODS OF PREPARATION

Pulverisation of the dried powder of henna, indico, bhringraj, tea, fenugreek, amla, neem, and dried whole herb of each powder was separately sifted through 80 mesh and packed in air tight containers. Various dye formulations designated as were prepared using different proportions of all powders given in the Table No.1. The herbal powders were weighed carefully and mixed geometrically using mortar and pestle, followed by mixing in a polybag (Batch size: 100gm).

The above hair dye 2.0gm were mixed with hot water and the stirring smoothly then cool the paste of hair dye and waiting for 1.5 hour.

RESULTS AND DISCUSSION

Preliminary phytochemical screening of phytoconstituents

The chemical test has been performed individually and results of test were in the Table No.2.

In process standardization of Ayurvedic herbal hair powder dye

Various physical constants like pH, Particle size, Angle of repose, Bulk density and tapped density were determined for Formulation F1. The determination of physical constant of the final formulation is necessary to control the quality and to check batch to batch variation and the results were given in the Table No.3. Comparison between marketed commercial product and our formulation F1 was given in the Table No.4.

The Table No.5 shows that bench top as well as acceleratory stability in the possible way kept in desecrator and maintained temperature at 35°C and there is no changes are not affect the product quality and the remaining all the physic-chemical property are satisfied.

Table No.1: Formula of polyherbal hairdye dry powder

S.No	Ingredient	Weight to be taken (gm)
1	Henna	20
2	Indico	20
3	Bhringraj	20
4	Tea	10
5	Fenugreek	10
6	Amla	10
7	Neem	10
8	Total weight	100gm

Table No.2: Results for preliminary phytochemical screening of phytoconstituents

S.No	Name of crude drugs	Results of chemical test
1	Henna	It's presence of Tannins, Saponins, Flavonoids, Alkaloids, Glycoside, Phenol and Anthraquinones.
2	Indico	Presence of flavonoids, alkaloids, glycosides, terpenoids.
3	Bhringraj	Presence of carbohydrates, alkaloids, proteins, tannins, saponin and phenols.
4	Tea	Alkaloids, Tannins, Catecheu, Polyphenols, flavonoids.
5	Fenugreek	Flavonoids, alkaloids, coumarins, vitamins and saponins.
6	Amla	Flavonoids, tannins, alkaloids, carbohydrate.
7	Neem	Alkaloids, saponin, polyphenol, flavonoids, tannins, amino acids, fixed oil.

Table No.3: In Process standardization of ayurvedic powder herbal hair dye F1

S.No	Tests	Observation
1	Description	Light blackish brown coloured fine powder
2	Particle size	150 μ -250 μ
3	Bulk density	0.486
4	Tapped density	0.496
5	Angle of repose	27°
6	% Moisture	0.50 %
7	pH	6.55

Table No.4: Comparison between ayurvedic powder hair dye F1 and marketed product M1

S.No	Tests	Ayurvedic powder herbal hair dye F1	Marketed herbal product M1
1	Description	Light blackish brown coloured fine powder	Light brown
2	Appearance	Fine Powder	Fine Powder
3	Odour	Characteristic	Characteristic
4	Particle size	150 μ -250 μ	80 μ - 160 μ
5	Bulk density	0.486	0.380
6	Tapped density	0.496	0.482
7	Angle of repose	25°-35	30° - 34°
8	% Moisture	0.40 %	0.20%
9	pH	6.55	6.78

Table No.5: Stability testing of herbal hair dye powder F1

S.No	Tests	15 days	1 Month	15 days 35 °C	1 month 35°C
1	Description	Blackish brown	Blackish brown	Blackish brown	Blackish brown
2	Appearance	Fine Powder	Fine Powder	Fine Powder	Fine Powder
3	Particle size	150 μ	160 μ	155 μ	150 μ 158 μ
4	Bulk density	0.486	0.380	0.399	0.407
5	Tapped density	0.496	0.482	0.489	0.492
6	Angle of repose	25°-35	30 ° - 34°	32° - 36°	35° - 39°
7	% Moisture	0.30 %	0.40 %	0.42	0.45
8	pH	6.55	6.78	6.62	6.73
9	% Total Ash	18	19	23	20

CONCLUSION

Interest in ancient medical systems, especially Ayurveda, is growing on a global scale. As a key treatment in traditional systems, herbal medicines have greatly aided in preserving human health. In rural India, the seven herbs mentioned above are used traditionally. All dye research volunteers received fair compensation. Volunteers' identities and data are kept private and no information pertaining to the identity of these human subjects will be shared without good reason, both legally and scientifically. Only with the express written approval of the volunteer in question may identity be revealed in the event of legal concerns, such as therapeutic intervention or safety/risk assessment. Every safety measure pertaining to the creation and application of formulations, such as using verified herbs and adhering to clinical and GMP guidelines, was implemented. At every stage of the research and experimentation, the risks, such as low quality raw materials, contamination, microbial growth and improper raw material and finished product storage were reduced to ensure full research benefits, reliable results and the avoidance of irreversible adverse effects.

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CONFLICT OF INTEREST

All authors' declared no conflict of interests.

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