



STUDY REPORT ON NATURAL PIGMENTS

A practical exploration of natural plant-based dyes in hairdressing education

Valkeakoski Vocational College

Valkeakosken ammattioppilaitos VAAO



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Introduction

About the Study

At Valkeakoski Vocational College (VAAO), the hairdressing program has experimented with using plant-derived dyes for hair colouring. This practice will continue in the future, as ecological choices are gaining popularity in the hair industry among both clients and hairdressers, driven by growing health and environmental awareness. Finland—and also Sweden—have been pioneers in eco-hairdresser training and certification.

In some cases, plant-based dyes can also be an alternative for individuals with allergies, as these dyes do not contain PPD. However, plant dyes cannot be marketed as completely non-allergenic, since depending on their place of origin, they may contain substances such as pollen.

The use of plant dyes also aims to revive traditional methods that can be adapted for modern use. It is also important to identify and utilize native plants instead of importing them from distant countries, thereby reducing environmental impact.

Project & Work Package Overview

The hair industry is also a creative field where various experiments can be conducted, and plants can be used for both scalp and hair care as well as for colouring. Thus, the use of plant-based dyes also includes a wellbeing perspective.

According to eco-hairdressers, an eco-genre is emerging: customers are increasingly asking for products based on natural materials. Especially people aged 25 to 65 are looking to pamper themselves with raw materials sourced from nature.

In Finland, the new haircare education curriculum includes an introduction to dyeing with plants. It is important for hairdressing students to be aware of the wide range of options so they can answer customer questions accurately and avoid spreading misinformation. Many students also want to find a way of working that suits their personal values and style.

In addition to the curriculum, VAAO's new strategy emphasizes various aspects of sustainable development. Through plant-based dyeing, the hairdressing program at VAAO contributes its expertise to the international Plant&Paint project, offering knowledge that can be applied across different countries and industries.

Participants

Teachers of Hairdressing field: Outi Mäkiselkä and Sini Mäkinen

Students: Salla Flinkman and Elena Chausovskaia

Experts: Hanna Jalkanen, Ecohair Hanna

1. Discovering Local Plant-Based Colours

1.1 Exploring Regional Plants

Most of the hair dyes used in the hair industry are primarily derived from Indian plants, such as henna, indigo, and cassia. Among Finnish plants, the following are especially used for colouring and hair care: blueberry, woad, currant, cornflower, chamomile, nettle, birch, berry extracts, sugar beet, oat, birch sap, calendula, heather, peat, tar, and cotton grass.

Beetroot has also been used (for reddish tones), chamomile (for golden tones), rosemary (infused into conditioners), and nettle (as a rinse).

1.2 Historical & Cultural Insights

Hair colouring has been popular in Finland throughout centuries. Nowadays, there are more hair dyes sold annually in Finland than in other European countries. The origin of hair dyes leads back to the use of plants (see chapter 1.1). Synthetic colours were developed in the 1930 – 1950 in the US and especially lightened hair was considered attractive. Home based colouring generalized in the 1970's. During 2010 - 2020 the trend has been back to henna and indigo based colours and this way to more eco-friendly materials and more natural, deepened or slightly tinted colouring.

1.3 Sustainable Aspects

Health and environmental awareness has increased, making natural dyes an ecological choice.

In some cases, plant-based dyes are also a viable alternative for individuals with allergies.

From an environmental perspective, the use of plant dyes in the hair industry creates a lighter process compared to traditional dyeing: effective results can be achieved with fewer substances and ingredients. Often, warm water is sufficient to rinse out the dye, although a long processing time is typically required during colouring.

More broadly, the use of plant-based dyes places less strain on the environment, for example, due to fewer ingredients being washed into the sewage system and waterways compared to the effects of

synthetic substances. In Finland, eco-hairdressers also use filters at hair-washing stations to prevent plant dye residues from entering the sewage system.

2. Experimenting with Natural Pigments

2.1. Methods of Extraction

First, suitable plants are dried and ground into powder. The dyes are stored in powder form in (paper) bags. During the hair dyeing process, the powder is mixed with warm water. Warm water is sufficient to activate the dye mixture.

New plants suitable for dyeing are being identified all the time. This expands the range of available colours, reduces the need for imported plants, and supports local dye and service production.

2.2. Testing on Different Materials

At VAAO's hairdressing department, plant-based dyes were tested on hair wefts and on clients' hair to see how the colour appears on different hair shades.

2.2.1. Testing on hair strands



In the first picture there are blueberry, manjistha (*rubia cordifolia*) and cassia/henna powder. Our Student Elena mixed the powders into water at about 60 degrees celsius and applied the mixture to light hair strands. The processing time was one hour, after which she rinsed and dried the hair strands.

Here are the beautiful shiny results. Blueberry powder gives a beautiful blue-violet colour to the hair, henna and cassia dye the hair a lovely apricot copper, and manjistha creates a gorgeous red colour.



2.2.2. Test customer Pihla



We selected plant-based dyes containing henna (*Lawsonia inermis*), indigo (*Indigofera tinctoria*), and manjistha (*Rubia cordifolia*). The goal was to achieve a beautiful warm brown colour for the client. Indigo is a dye that adds depth and darkness to the hair. When dyeing with indigo, the colour initially appears green, but it develops over the next two days and the green shade disappears. Other plant-based dyes also deepen in colour within 1–2 days.



The dye mixture is applied section by section to clean hair using a colour brush.



The processing time is about 1 hour, after which the hair is washed and conditioned.



In the first image, the colour initially appears green. In the second picture the hair is shown when dry, and in the last image, you can see how the colour has changed and deepened after two days.

2.2.3 Test customer Maarit

When dyeing gray hair with plant-based colour, it must be pre-dyed before applying the actual colour. This means performing a so-called pre-pigmentation with plant dye before applying the final colour. For Maarit's hair, we used a copper brown shade that contains henna (*Lawsonia inermis*) and indigo (*Indigofera tinctoria*). The result was truly stunning, and the gray hairs are no longer visible. Plant-based dyes also nourish the hair, which is why the hair becomes shiny.



Maarit's hair before and after colouring.

2.2.4. Challenges Faced & Solutions Found

According to EU legislation, any plant-based dye used on a client must be a cosmetic product that has undergone an official safety assessment ¹. In practice, this means that a hairdresser cannot simply pick blueberries from the forest and use them to dye a client's hair. The plant dye product must also include an official list of ingredients, so that anyone can check its contents—for example, in the case of an allergic reaction.

Plant-based dyes are often very long-lasting, and the same lightening agents used to remove synthetic dyes are usually not suitable for removing them. That is why eco-friendly salons often use alternatives such as clay bleaching. Therefore, plant-based dyeing is not the best option for clients who frequently change their hair colour.

Plant dyes cannot lighten hair; instead, they deepen or enrich the existing colour.

Dyeing hair with plant-based colours takes time, which can make salons hesitant to include eco-friendly services in their offerings. On the other hand, techniques and methods for plant dyeing are constantly evolving, making the process also more efficient, so even “traditional” hairdressers may feel more confident in incorporating plant-based dyeing into their services.

In Finland, plant-based dyeing is classified in salons as a specialty colouring service, which increases the price. However, this is not an issue in dedicated eco-salons, where clients seek pampering and specialized services.

New plants suitable for dyeing are being identified all the time. This expands the range of available colours, reduces the need for imported plants, and supports local dye and service production.

2.2.5. Reflections from Participants

In general, experiences with plant-based hair dyeing have been positive. Clients appreciate that their hair remains in better condition thanks to the plant-based colours. The wide range of available shades and new techniques also inspire students to learn more and to specialize in plant-based dyeing.

3. Practical Applications & Creative Outcomes

3.1. Student & Teacher Creations

As the project progresses, new plants will be tested for dyeing, for example on hair strands.

Plants to be tested may include nettle, dandelion, lingonberry, cranberry, and chokeberry.

3.2. Masterclass Takeaways

Pre- and post-pigmentation: Adding colour at the wash station before or after the main dyeing process with a short processing time.

In the future, plant-based dyes will be tested with different water temperatures, as well as with colour powders mixed into conditioners, and more.

4. Conclusion & Next Steps

4.1. Key Insights & Lessons Learned

Perceptions of plant-based dyeing are changing: It is not about “hippie stuff,” but about professional practice. Techniques have evolved, and awareness is constantly increasing.

It is often assumed that plant-based dyes only produce reddish tones. However, there are many more shade options available.

Upcoming experiments will provide additional knowledge and new experiences.

4.2. Potential for Future Work

Awareness of new Finnish plants and their potential uses expands professional expertise and strengthens the role and significance of ecological hair care.

4.3. Expanding the Knowledge

Even professionals in the field sometimes have misconceptions about the safety of plant-based dyes. Therefore, it is important to provide updated and accurate information.

Information can be disseminated, for example, by offering locally available qualification modules / study units.

Details about the project and experiences will also be shared through various channels targeting industry audiences: hairdressing entrepreneurs, the Association of Certified Eco Hairdressers, and teachers in the hair and beauty sector.

This guide is perfect for both individuals and hair professionals who want to explore the beautiful world of plant-based hair colouring. You can order the guide through the link below.

[This guide gives you the essential tools to master plant colouring. — ECOHAIR HANNA](#)

5. Appendix – Additional Visuals & Resources

Example Table of Plant-Based Colours

Plant Name	Part Used	Colour Outcome	Notes
Henna (<i>Lawsonia inermis</i>)	Leaves, dried and powdered	Bright orange to warm brown	Final colour depends on the person's base colour
Indigo (<i>Indigofera tinctoria</i>)	Leaves => dissolution with water, drying, powdering	Dark brown and black tints	May cause headache for sensitive individuals
Cassia (<i>Senna italica</i>)	Leaves, dried and powdered	Golden/honey shades, won't affect darker shades	Natural conditioner, adding shine and strength
Katam (<i>Buxus dioica</i>)	Leaves, dried and powdered	Cool and brown tones (e.g. mahogany)	Better option for those sensitive to indigo
Manjistha (<i>Rubia cordifolia</i>)	Roots (red-brown)	Strawberry blonde tone	Often used with henna to deepen the tone
Blueberry (<i>Vaccinium myrtillus</i>)	Berry, powdered	Violet/purple, blue, burgundy	Gives temporary colour. Best result in blonde, gray or treated hair. Used for toning.
Table to be continued with experiments on domestic plants as the project proceeds.			

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