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“Cosmetopoeia: a path to creativity and sustainability for the cosmetics industry.”

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1. Introduction

Cosmetopoeia is to cosmetics what pharmacopoeia is to pharmaceuticals. It's about discovering our botanical heritage and history. The concept of the cosmetopoeia is underdeveloped in our regions, whereas it has emerged over the last few years in French Polynesia, Africa and Quebec, ... Following in the footsteps of these pioneering countries, Europe needs to equip itself with this invaluable tool. The aim of this project is to create a new synergy between European players with complementary skills. This approach, pooling the skills of each, will lead to an innovative, local concept that will facilitate access to the production of new raw materials for the cosmetics industry and, subsequently, for all industries wishing to produce local plant extracts. The model includes the development of a comprehensive methodology drawing on the latest advances in each area of expertise.

2. Materials and Methods

The first step of this project will be to explore our **botanical history** and rediscover the properties of native plants thanks to the incredible resources of botanical gardens. They help us to find interesting plants to study. The seeds will be supplied and characterized by botanical gardens or private organizations specializing in this field. The second step will be to adapt and innovate the **farming of these native plants**. Thanks to agronomic research centers. We are going to study traditional, hydroponic & hydroponic farming with root elicitation. Thanks to this three-pronged approach, it will be possible to identify the best growing method depending on the objectives set at the outset. In other words, it depends on the target molecule or the families of target molecules. The idea is also to be able to study all parts of the plant and maximize its value. The four steps will be to **Innovate** with the know-how of our ancestors and with our lab skills and possibilities. We are going to study plant maceration, CO₂ extraction, ultrasound-assisted extraction, ... To ensure the right time-to-market, it is important to incorporate the scaling-up strategies directly from the results obtained in the laboratories. We also want to **collect, conserve, share, protect, and transmit** this heritage thanks to a digital plant conservatory accessible to all. This will serve as a showcase for the project and an entry point for contacting the various players in the chain. Finally, **the toxicity and overall composition** of the extracts will be studied to ensure that the product marketed complies with legislation.

3. Results & discussion

This project is currently under construction with several European partners. It is applying for a Horizon Europe project. However, we have already had the opportunity to demonstrate the effectiveness of the planned methodology through the study of hops. In the 11th century, Hildegard de Bingen discovered the antiseptic properties of hops. Hundreds of years later, during the brewing crisis, CeREF Technique helps hop producers define new uses for their supercritical CO₂ extracts. Development of a natural preservative would seem to be an ideal way of adding value. The extract is then treated to obtain a powder concentrated in beta-acids, the molecular family responsible for the well-known antiseptic effects of hops. The method chosen is energy-efficient, environmentally friendly, and uses only extraction products compatible with cosmetic use.

So far, hop flower extract has been used as the raw material. In the meantime, however, the use of hops in brewing has increased dramatically. Other parts of the plant need to be studied, in particular the stems and leaves for their beta-acid content. At present, these parts of the plant are simply composted. This study could lead to the use of the entire plant. This is entirely in line with the philosophy of the project currently under construction. The composition of the extract and its toxicity were studied, and the extract is currently tested by a cosmetics company to incorporate it into their range of preservatives. A study of the transition to industrial scale will need to be carried out.

5. Conclusion

In a changing society, it's important to anticipate challenges. Making our botanical heritage available to as many people as possible for cosmetic use will enable us to offer more local, sustainable, and environmentally friendly active ingredients and formulation agents. This approach is also intended to be creative in its approach, but also in the safe and innovative molecules it will make available to the cosmetics sector. The study carried out on hops shows the cosmetics sector's interest in this type of product. And the potential of plants from our regions. To amplify its proposals, it is important to have a better knowledge of our botanical heritage.