# EIP-AGRI Focus Group

## Plant-based medicinal and cosmetic products

DISCUSSION PAPER

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# 1. Introduction

## EIP-AGRI Focus Groups

**EIP-AGRI Focus Groups** (FG) collect and summarise knowledge on best practices in a specific field, listing problems as well as opportunities by taking stock of the state of play in research and practice and highlight possible solutions to the problems identified. Based on this, the Focus Groups suggest and prioritise innovative actions. They identify ideas for applied research and for testing solutions in the field, involving farmers, forestry stakeholders, advisers, the industry and other stakeholders, and propose ways to disseminate good practices. Focus Group results provide new and useful ideas to solve practical problems and start new Operational Groups or research projects.

The purpose of this starting paper for the Focus Group on **Plant-based medicinal and cosmetic products** is to establish a common understanding about the scope of the Focus Group and its objectives, and also identify key questions for discussion within the Focus Group.

## Scope of the Focus Group

Many products such as essential oils, pharmaceuticals and cosmetics contain or are based on extracts from plants. Plant material for medicinal and cosmetic products can come from horticulture or wild harvesting. According to work by the Erasmus+ project Good Herbs (http://good-herbs.eu/) about 90% of species are harvested from wild flora and only 10% are cultivated commercially. There are also indications that the markets for natural and organic cosmetics in Europe are developing fast, increasing the demand for plants used for cosmetic purposes. The need for plant materials used for cosmetic and medicinal purposes, combined with the need to protect plant biodiversity, create an opportunity for farmers and foresters to diversify their production and improve their income. However, the competitiveness and sustainability of the value chains working with newly cultivated or wild managed plants used for medicinal and cosmetic products is often under pressure due to various issues. These may include lack of availability of information and technical support, weak links between the economic actors in the value chain and distrust regarding collaborative approaches, especially in marketing/commercialisation.

**How to create diversification opportunities for farmers through innovative value chains of plant-based medicinal and cosmetic products?**

The experts of the Focus Group will carry out the following main tasks:

- **Collect data, studies and existing knowledge** regarding the demand for plants for medicinal and cosmetic use;
- **Identify existing value chains** of plant-based medicinal and cosmetic products where farmers play a substantial role. The identified value chains should take into account different climatic conditions, agro-ecosystems and forms of cooperation along the value chain;
- **Identify the main actors and drivers** of the value chains of plant-based medicinal and cosmetic products considering knowledge, skills, technical, legal, economic and organisational requirements;
- **Assess the economic viability and environmental performance** of the identified value chains, notably with regard to the diversification of farmers' and foresters' income and the environmental performance of the holding and of the whole value chain;
- **Suggest innovative business models** to foster integrated links between production/agribusiness/applied research;
- **Identify further research needs** from practice and possible gaps in technical knowledge;
- **Suggest innovative solutions** and provide ideas for EIP-AGRI Operational Groups and other innovative projects.



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# 2. Context

## Market of plant-based extracts

There is an expanding interest worldwide in medicinal and aromatic plants (MAPs) due to their use as raw materials in the production of medicinal and cosmetic products. Furthermore, consumers are becoming more health-conscious paying attention to sustainably produced natural ingredients of known origin. This, in turn, has driven a rising demand for plant-based extracts from pharmaceutical, food & beverage, cosmetic and agrochemical industries.

The global market for botanicals continues to grow and valued $108 billion in 2015 with a share of 48% **herbal medicines**, 17% **cosmetics** and 35% **supplements & functional food**[1]. Germany plays a dominant role in the European market (27%), followed by France (22%) and Italy (11%).

Phytopharmaceuticals are herbal medicinal products with pure active substances that derive from plants or parts of plants. There are different European Directives and Regulations according to the type of products such as medicinal products for human use (2001/83/EC), traditional herbal medicinal products (2004/24/EC), medical devices made of substances (Regulation EU 2017/745) and food supplements (2002/46/EC).

According to statistics from the European Cosmetics Association[2], around €77 billion is spent on cosmetics in the EU member countries, making Europe the largest cosmetics market in the world. Germany is the leader in the production of natural cosmetics with a value exceeding €1 billion in 2014, followed by France (€410 million in 2013) and the UK. Also, in Austria and Switzerland a continuously increasing number of consumers tend to prefer natural cosmetic products[3].

Apart from the traditional market segments, the rapidly growing market of supplement and functional food in Europe poses significant opportunities for all actors in the value chain i.e., farmers, local collectors, resource managers, processors and distributors.

Furthermore, a promising sector in the agrochemical market is the use of plant extracts as organic plant protection products. Indeed, alternatives to synthetic pesticides have a great potential for further development due to the increasing consumer demand for organic products and the limited agricultural area covered by organic farming in Europe.

In addition, requirements for sustainability in wild-harvesting and cultivation of medicinal plants from consumer and regulatory side are increasing. All actors in the value chain are required to address consumers' expectations (e.g., raw material sourcing, product innovation, traceability, quality and safety) while also considering sustainability in different contexts (e.g., environmental, social, economic) and a direct competition with synthetic-chemically produced molecules.

Plant-derived extracts formed the basis of traditional medicine systems in nearly all cultures. Europe has a long tradition in wild-collection of plant resources and cultivation of medicinal and aromatic plants. Ensuring a secure and sustainable supply of plant raw materials is extremely important for both end-use industries and consumers.

[1] https://dechema.de/dechema_media/Downloads/Positionspapiere/Position+Paper+Phytoextracts+2017-p-20002740.pdf
[2] https://www.cosmeticseurope.eu/
[3] https://ec.europa.eu/growth/content/study-european-cosmetics-industry-2007-0_en



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Sustainable collection is considered as the most important conservation strategy for wild plant species, given their positive impacts to local economies and their higher value to local collectors[4]. To this point, the **Nagoya Protocol of the Convention on Biological Diversity[5]** creates greater legal certainty and transparency for both providers and users of genetic resources.

An enhanced production and steady supply of plant raw materials in Europe can be guaranteed under controlled conditions by field or green house cultivation of MAPs, which in some cases may contribute to conservation of threatened medicinal plant species.

Although domestication of the medicinal plant resource is not always technically feasible, cultivation offers a number of benefits over wild-collection for production of plant-based medicinal products and active compounds. Main advantages for the value chain actors include: uniform quality of plant raw material, regularity of supply, controlled postharvest handling, compliance to regulations, organic or biodynamic certification[4].

**DISCUSSION QUESTIONS:**

- What type of plant-based medicinal and cosmetic products can enhance farmers' or foresters' income?
- How will the value chain actors address major challenges for sustainable wild-collection?

## Medicinal plant production

According to FAO, the worldwide production of medicinal and aromatic plants is estimated to 330 million tons from a total area of 77 million ha. However, it is not easy to accurately assess how many MAPs are commercially traded on an international or even on a national level.

In Europe, there are over 36,000 companies dealing with the cultivation, processing and distribution of medicinal and aromatic plants with an area exceeding 200,000 ha, most of which is located in France (52,000 ha), Poland (30,000 ha), Spain (27,800 ha), Bulgaria (16,800 ha), Croatia (8,500 ha), Czech Republic (7,225 ha), Italy (7,191 ha), Greece (6,800 ha) and Austria (4,136 ha). More detailed description of the German case is presented below as enough relevant data is available.

In Germany, medicinal and aromatic plants are cultivated by 750 farmers in a total area of 12,240 ha, most of which is located in Thuringia, Bavaria, Hesse, Lower Saxony and covers more than 70% of the domestic cultivation[6]. The most important medicinal plant species are Chamomile (*Matricaria chamomilla* L.), anise (*Pimpinella anisum* L.), fennel (*Foeniculum vulgare* Mill.), flax (*Linum usitatissimum* L.), peppermint (*Mentha x piperita* L.) and milk thistle (*Silybum marianum* L.).

In fact, the current area under medicinal plant cultivation covers only 12% of the growing area required to fulfil industry's needs (Figure 1). Due to the growing demand for plant-based medicinal products in Germany, supply of plant raw material in the industry is approximately 30,700 tons with an economic value of more than €84 million. Domestic cultivation represents only a niche and almost 90% of dried plant material is imported.

[4] Schippmann U, Leaman D, Cunningham AB, 2006. A comparison of cultivation and wild collection of medicinal and aromatic plants under sustainability aspects. In: Bogers RJ, Craker LE, Lange D (Eds), Medicinal and aromatic plants - agricultural, commercial, ecological, legal, pharmacological and social aspects. Springer, Berlin, pp. 75-95.
[5] https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf
[6] Stelter W, Oehme F, Daebeler S, 2017. Vorstellung der Besonderheiten des Arzneipflanzenanbaus und Förderaktivitäten des Bundesministeriums für Ernährung und Landwirtschaft (BMEL). In: 3. Tagung Arzneipflanzenanbau in Deutschland - mit koordinierter Forschung zum Erfolg, Schweinfurt, Germany, June 20-21, pp. 7-21.


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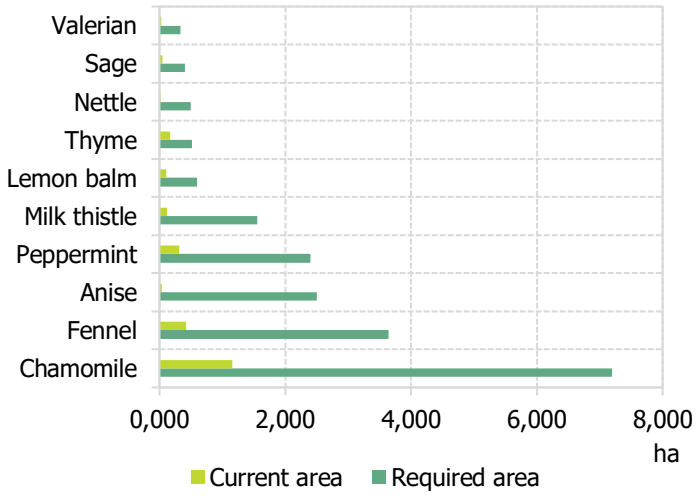
As a result, the target of the Federal Ministry of Food and Agriculture (BMEL) was to expand the domestic production of medicinal and aromatic plants by increasing the cultivation area to 20,000 ha until the year 2020.




| Plant species | Required Area (ha) | Current area (ha) | Share (%) |
|---|---|---|---|
| Chamomile | 7,200 | 1,155 | 16 |
| Fennel | 3,640 | 426 | 12 |
| Anise | 2,500 | 35 | 1 |
| Peppermint | 2,400 | 312 | 13 |
| Milk thistle | 1,550 | 117 | 8 |
| Lemon balm | 600 | 113 | 19 |
| Thyme | 514 | 174 | 34 |
| Nettle | 500 | 21 | 4 |
| Sage | 400 | 51 | 13 |
| Valerian | 330 | 31 | 9 |
| | **19,634** | **2,435** | **12** |

**Figure 1.** Agricultural area for cultivation of the 10 most important medicinal plants in Germany[7]

Although domestic cultivation of medicinal and aromatic plants is relatively small compared to other EU countries, Germany is a leading importer and exporter, expressing the country's major role as a trader for medicinal plant raw materials worldwide.

The fact that the majority of the dried plant material is wild-harvested and/or imported outside the EU, appears as a good opportunity to intensify the cultivation of medicinal and aromatic plants in Europe. Many farmers, in turn may consider MAP cultivation as more profitable than traditional crops.

**DISCUSSION QUESTIONS:**

- What are the most important medicinal plant species produced by each country/region?
- How will domestication of wild-collected species and cultivation ensure steady supply of raw material?
- How can remote sensing technologies be used to optimise weed management?
- Can organic farming of medicinal plants be more profitable than conventional?
- How will farmers, individually or associated in cooperatives establish direct contacts with industry?

# 3. State of the art

## Medicinal and aromatic plant value chain

Figure 2 shows the value chain of medicinal and aromatic plants from the raw material to final formulated product. In order to ensure appropriate and consistent quality of herbal substances via active ingredient purification, high quality requirements, such as Good Agricultural and Collection Practice (GACP) and Good Manufacturing Practice (GMP) need to be fulfilled. The value chain of medicinal and aromatic plants encompasses all processing steps to produce plant-based medicinal and cosmetic products. The main process steps are: selection of plant raw materials, cultivation and sustainable wild-harvest, postharvest processing

[7] Pforte L, 2013. Der Phytopharmazeutika-Markt und sein Bedarf an Arzneipflanzen. In: 2. Tagung Arzneipflanzenanbau in Deutschland - mit koordinierter Forschung zum Erfolg, Bad Blankenburg (Thüringen), Germany, October 16-17, pp. 21-23.



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(disintegration and drying), on-farm storage, distillation or extraction, purification (and/or isolation), product formulation and packaging.

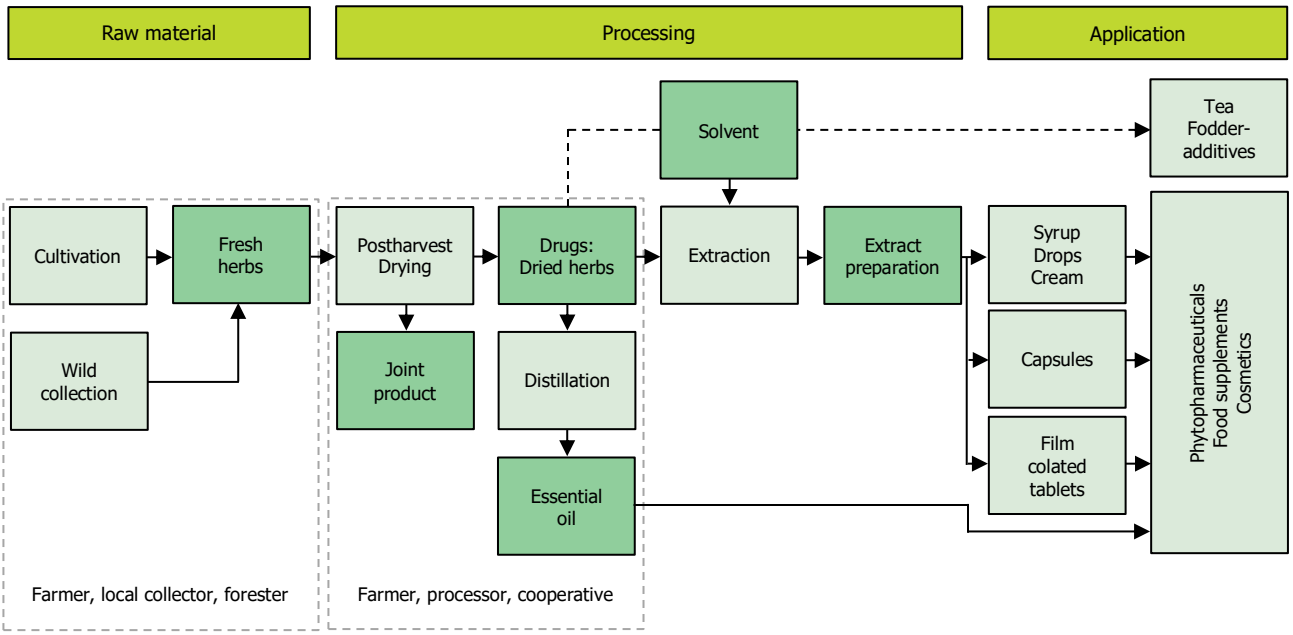


**Figure 2.** MAP value chain: from raw materials to various plant-based medicinal and cosmetic products[8]

The process steps of raw material sourcing, postharvest handling and drying are performed by farmers/local collectors and processors individually or in a cooperative and therefore constitute a special interest of this focus group. Also, the vast majority of the trade worldwide is based on dried herbal drugs.

## Medicinal plant raw material

The active ingredients of medicinal plants are typically localized in different parts e.g., leaf, flower, seed, fruit, bark, rhizome or root. Plant raw materials vary significantly in terms of consistency and physical properties, thereby harvesting and processing equipment of individual parts is usually selective.

The limited stability of the target compounds requires careful handling. Bruising of fresh bulk of harvested material should be avoided. Farm drying must begin immediately to prevent spoilage by enzymatic processes with subsequent quality deterioration.

## On-farm drying process

Different dryer types are used for MAPs e.g., typical grain dryers for seeds, tray dryers for flowers, fruits and roots. Drying of herbs, in turn, is performed in flat-bed dryers or conveyor-belt dryers following low or high mechanized processing lines, respectively. The drying behaviour of medicinal and aromatic plants is mainly affected by the conditions of drying air such as temperature, relative humidity and velocity.

Drying of medicinal plants involves low drying temperatures in order to protect the heat sensitive active ingredients[9].

[8] Schmitz N & Pforte L, 2014. Pharmazeutische Produkte. In: Marktanalyse Nachwachsende Rohstoffe, Fachagentur Nachwachsende Rohstoffe e. V. (FNR), Band 34, pp. 573-674.



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**Low-mechanized processing line:** Whole plants can be dried by forced air in modular flat-bed dryers. The drying air passes through material bulks with a height of 50 cm or more. The bulk, representing uncut harvested plant material should be turned and mixed several times during drying to avoid uneven moisture distribution and over-drying of the lower layers. The drying air is usually heated indirectly by oil or gas burners. After drying the drug is crushed to separate the worthless stalks from the leaves. This process is characterised by a prolonged drying time and considerable energy losses. As a specialised construction, a flat-bed dryer can be integrated into a solar greenhouse dryer.

**High-mechanized processing line:** For drying of herbs in multi-belt conveyor dryers, the herb is cut to size of 5 cm and the leaf particles are separated from the stalks by winnowing. The bulk leafy material of 10 cm in height is continuously transported by a conveyor belt into the dryer. The dryer is divided into different temperature zones. Higher air flow is provided in the upper belts, which is proportional to the amount of evaporated water. Oil or gas heating systems are commonly used to heat the drying air. Drying of leaves reduces the drying time and the energy costs substantially, however a higher investment is required in comparison with flat-bed drying.

Energy requirement of medicinal plant drying represents a significant cost factor (e.g., twofold in comparison with grain drying[10]) due to the high moisture content of the individual plant parts to be dried.

Alternative drying technologies such as microwave drying, vacuum drying and freeze drying can drastically enhance product quality, reduce microbial count and save energy[11].

**DISCUSSION QUESTIONS:**

- Is there any promising organisational concept to link up the farms and raise their profitability?
- What are the hurdles for the establishment of machinery rings?
- Are technical drying-related data available for medicinal plants that can be used in practice?

## Infrastructure and logistics

After drying, the bulk of the dried plant material is filled in sacks and stored at ambient indoor conditions in aerated storage facilities. On-farm storage is critical as micro-organisms i.e., moulds, yeasts and bacteria increasingly grow at water activity, $a_w > 0.7$, while enzymatic activity is also promoted by high values of water activity. A general threshold of $a_w \leq 0.6$ is recommended to prevent quality degradation by microbial or enzymatic activity of medicinal plants during storage.

To decide on suitable final moisture content for specific temperature during processing, storage and transportation, knowledge of the equilibrium relationship between the moisture content in the plant material and the relative humidity of the surrounding air is necessary.

This information in practice can be obtained by the moisture sorption isotherm[12], which represents a characteristic property of the medicinal plant species. The optimum moisture content for various medicinal plant species is prescribed in the European Pharmacopoeia.

[9] Argyropoulos D & Müller J, 2014. Changes of essential oil content and composition during convective drying of lemon balm (*Melissa officinalis* L.). Industrial Crops and Products, 52, 118-124.
[10] Müller J & Heindl A, 2006. Drying of medicinal plants. In: Bogers RJ, Craker LE, Lange D (Eds), Medicinal and aromatic plants - agricultural, commercial, ecological, legal, pharmacological and social aspects. Springer, Berlin, pp. 237-252.
[11] Argyropoulos D & Müller J, 2014. Effect of convective-, vacuum- and freeze drying on sorption behaviour and bioactive compounds of lemon balm (*Melissa officinalis* L.). Journal of Applied Research on Medicinal and Aromatic Plants, 1, 59-69.


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On-farm storage is very important to both farmers and buyers. The demand for a continuous and uniform supply of dried herbal drugs requires advanced traceability tools and short supply routes to the end-use industries.

**DISCUSSION QUESTIONS:**

- What are the advantages of having centralised storage facilities in a cooperative?
- How will sensors and digital tools support decision making in postharvest management?

## Extraction of active ingredients

Extraction of active compounds from medicinal and aromatic plants is a key process in the value chain. It requires a technical and operational know-how in order to get the most out of plant matrix, thereby is usually carried out by professional companies. The extraction cycle has to be defined for each plant species, taking into account the consistency and the physical properties of the dried drug to be extracted, its active ingredients, product formulation and end-use.

Process specific variables include the solvent to be used, dried drug/solvent ratio, number of extractions in sequence, extraction temperature and time. In terms of sustainability, extraction with the use of eco-friendly solvents, a reduced energy consumption and low $CO_2$ emissions are some important parameters to be considered.

The use of extraction solvents is regulated in Europe by Directive 2009/32/EC and it should be in compliance with good manufacturing practice for processing of food, dietary food ingredients and raw materials. Apart from water, only a small number of solvents are allowed such as propane, butane, ethyl acetate, ethanol, carbon dioxide and acetone. For certified organic products only water, ethanol and carbon dioxide are permitted. To ensure overall stability, the liquid plant-derived extracts are typically subjected to freeze drying or spray drying.

Supercritical $CO_2$ extracts provide many advantages compared to other extraction methods and they are well appreciated in the field of cosmetics, food and dietary food supplements.

**DISCUSSION QUESTIONS:**

- How feasible is for smallholder farmers to perform on-farm extraction of active ingredients?
- What are the most profitable options to manage by-product and waste?

## Quality criteria of herbal drugs

Quality and microbial safety of herbal drugs is of primary importance to the end-use industries. Not reaching the quality standards or exceeding the microbial thresholds is a frequent reason for rejection of the dried plant material by the industry. This results in economic losses for the farmers.

Major classes of pharmacologically active chemical compounds in medicinal plants include alkaloids, glycosides, essential oils, anthocyanins, bitter substances, phenolic acids, flavonoids, tannins, lectins, saponins, mucilages and they are concentrated in a specific part of the plant species e.g., root, leaf, flower

[12] Argyropoulos D, Alex R, Kohler R, Müller J, 2012. Moisture sorption isotherms and isosteric heat of sorption of leaves and stems of lemon balm (*Melissa officinalis* L.) established by dynamic vapour sorption. LWT - Food Science and Technology, 47, 324-331.



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etc. The content of active ingredients is typically in the range of 0.03 to 5% (dried drug), but the yield varies across regions, years and even more specific factors such as harvesting season, growing conditions and cultivation practice.

General recommendations in terms of optimum drying temperature, cannot be given due to the high heterogeneity of the active compounds, their composition and their location among medicinal plant species[13].

However, the minimum quality requirements as well as recommended acceptance criteria for microbiological quality of air-dried herbal drugs are postulated in the European Pharmacopoeia (Ph. Eur.)[14], Europe's legal and scientific benchmark for pharmacopoeia standards which contribute to delivering high quality medicines in Europe and beyond.

Ph. Eur. monographs and other texts are designed to meet the needs of:

- regulatory authorities;
- those engaged in the quality control of medicinal products and their constituents;
- manufacturers of medicinal products and their individual components.

The following Table provides examples of the minimum requirements of active ingredients for three important herbal drugs, in which the interested compounds are located in different segments of the plant species.

Table 1. Minimum requirements of active ingredients in selected dried drugs as prescribed by Ph. Eur.

| Matricaria flower[15] | Melissa leaf[16] | Valerian root[17] |
|---|---|---|
| Dried flower | Dried leaf | Dried rhizome, roots, stolons |
| Essential oil: min 4 mL/kg | Essential oil: N/A | Essential oil: min 3 mL/kg |
| Apigenin 7-glucoside: min 0.25% | Rosmarinic acid: min 1.0% | Valerenic acid: min 0.10% |

In case of lemon balm[16], the dried drug with a maximum moisture content of 10% wet basis is assessed in terms of rosmarinic acid, the content of which should not be less than 1%. The dried herb should contain no more than 10% of stems with a diameter greater than 1 mm and not more than 2% of other foreign matter.

In addition, wholesale buyers and the pharmaceutical industry set their own specifications in terms of essential oil content and composition. Moreover, colour of MAPs is considered as a primary quality criterion to the consumers, who prefer leaves with a natural appearance. Discoloration or browning of air-dried herbs may also imply quality deterioration during postharvest processing via undesired chemical reactions[18].

**DISCUSSION QUESTIONS:**

- How will overall quality of medicinal plants be monitored by farmers along the production processes?
- Are other drying technologies needed for improving safety, process efficiency and product quality?

[13] Müller J, 2007. Convective drying of medicinal, aromatic and spice plants: A review. Stewart Postharvest Review, 3, 1-6.
[14] https://www.edqm.eu/en/european-pharmacopoeia-ph-eur-9th-edition
[15] Ph. Eur. 7.0, 2011. European Pharmacopoeia, European Directorate for the Quality of Medicines & HealthCare (EDQM). Council of Europe, Strasbourg, France, Matricaria flower, pp. 1178-1179.
[16] Ph. Eur. 7.0, 2011. European Pharmacopoeia, European Directorate for the Quality of Medicines & HealthCare (EDQM). Council of Europe, Strasbourg, France, Melissa leaf, pp. 1184-1185.
[17] Ph. Eur. 7.0, 2011. European Pharmacopoeia, European Directorate for the Quality of Medicines & HealthCare (EDQM). Council of Europe, Strasbourg, France, Valerian root, pp. 1261-1262.
[18] Argyropoulos D & Müller J, 2014. Kinetics of change in colour and rosmarinic acid equivalents during convective drying of lemon balm (*Melissa officinalis* L.). Journal of Applied Research on Medicinal and Aromatic Plants, 1, 15-22.


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# 4. Funded research projects

Few large-scale research projects dealing with the priorities of the focus group on plant-based medicinal and cosmetic products have been recently carried out or are currently ongoing across Europe.

They are funded under EU programmes managed by the Commission in the areas of research, innovation and competitiveness, in particular the Horizon 2020 Framework Programme, the Erasmus+ Programme and the European Territorial Cooperation (INTERREG) as well as national research and demonstration initiatives.

Some examples of the funded activities are listed below to illustrate the complexity of the topic and to highlight that multi-actor approach is needed to address challenges and opportunities for farmers/foresters in the MAP value chain.

### KAMEL – Promoting domestic cultivation of medicinal plants in Germany

**BMEL, FNR Demonstrationsprojekt Arzneipflanzen**
https://pflanzen.fnr.de/projekte/arzneipflanzen/demonstrationsprojekt-arzneipflanzen-kamel/

The aim of the demonstration project KAMEL was to increase the product quality and profitability of three important model medicinal plant species i.e., chamomile flowers, lemon balm leaves, valerian roots through fundamental and applied research and thereby intensify the domestic cultivation practices of medicinal and aromatic plants in Germany.

A value-chain oriented research in plant breeding, cultivation, harvesting and postharvest technology aims to enable farmers to deliver high-quality dried herbal drugs, to meet market requirements and increase competitiveness.

Linking all activities in the aforementioned sectors has already led to a noticeable innovation boost.

### GRACE – Growing industrial crops on marginal lands

**BBI Demonstration Project:** GRowing Advanced industrial Crops on marginal lands for biorEfineries
https://www.grace-bbi.eu/marginal-lands/

In the GRACE project, Miscanthus and Hemp are cultivated on marginal lands, currently not used for the production of food or feed crops. In this context, marginal land is defined as land where biophysical (e.g., low soil fertility) or socio-economic constraints hinder the cultivation of food and feed crops. This also includes contaminated land for example polluted by heavy metals.

The overall aim of the project is to have commercial cultivars, which are suitable for marginal, contaminated or unused land, available at the end of the project with proven feasibility for a set of end-uses. This includes their performance in the value chain, but also their environmental and economic profile.

The specific objectives are to produce sustainable products with a strong market potential; to guarantee a reliable and affordable supply of sustainably produced biomass; and to better link biomass producers with the processing industry.



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## INCREdible – Innovation networks of medicinal and aromatic plants

**H2020 Thematic Network:** Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin
https://www.incredibleforest.net/

The INCREDIBLE project aims to build a bi-directional channel to connect science and practice in the production, processing and trade channels of Mediterranean Non-Wood Forest Products, an important natural resource to support sustainable forest management and rural development.

To connect and share the knowledge and best practices of researchers, technicians, forest owners, among other stakeholders. INCREDIBLE is developing Innovation Networks (iNets) around five different groups of Mediterranean Non-Wood Forest Products (NWFPs): Cork; Resins; Mushrooms & Truffles; Nuts & Berries; Medicinal & Aromatic Plants.

## VALUEPAM – Sustainable management of plant biodiversity

**Interreg Sudoe:** Valorisation of Aromatic and Medicinal Plants: Sustainable management of plant biodiversity and socio-economic development in rural areas of SUDOE
http://www.valuepam.eu/

ValuePAM is a transnational project involving Portuguese, Spanish and French partners. It is 75% co-financed by the European Regional Development Fund (ERDF), through an Interreg SUDOE program (Interreg V-B South-West Europe Cooperation Program).

Its objective is to improve the value of the resource of certain aromatic and medicinal plants and their management, in the perspective of an economic diversification and a sustainable development of the natural spaces as well as the rural areas of the SUDOE space.

To do this, the project carries out MAP characterisation actions in the territories involved: analyse of certain species, proposal of resource management plans and other pilot experiments such as cultivation.

## GOOD HERBS – Training in herb processing for food and supplements

**Erasmus+:** Integration of good practices and new methods for professional training in the field of herb processing for food and food supplements
http://good-herbs.eu/

The main objective of the project is to educate, train, inform and disseminate the latest, new scientific evidences, legislation in force, hygienic rules as well as the best manufacturing practices of herbs in order to ensure the quality, safety, nutritive and functional quality, useful for food and food supplements industries.

In this way the outcomes will increase the opportunities of professional development and improve the competence, cooperation and competitiveness in the MAP value chain.



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# 5. Ecosystem building

The focus group on plant-based medicinal and cosmetic products aims to foster collaboration between all stakeholders involved in the value chain strengthening the transition of medicinal plant production in Europe from a niche to a larger market share.

The experts build a fertile ecosystem of MAP growers, local/regional collectors of wild plants, processors, companies, policymakers, technology providers, researchers, end-users, investors and various associations open to multiple pathways of innovation, rural development, sustainable growth and better performing value chains.

The focus group consists of 20 experts with complementary types of knowledge i.e., seven farmers, three advisers, five researchers, one civil servant, one herbal therapist, one forester and land owner, one from industry, one NGO representative and the facilitation team from 15 European countries who offer a wide expertise from science, practical experience, industry and governmental institutions (Figure 3).

**Figure 3.** Focus Group on Plant-based medicinal and cosmetic products (Experts from 15 European countries)

Each of them has a specific role to play in the focus group and each role acts synergistically with the others. The focus group links scientists with theoretical and methodological expertise with practitioners and stakeholders knowledgeable about the medicinal plant sector.

The focus group will promote innovative ideas connecting the actors involved in the concerned value chains. The aim is to make best use of scientific and practical knowledge for the co-creation and diffusion of existing solutions ready to solve practical problems on topics around domestication, sustainable wild-collection, cultivation, postharvest processing and extraction, product development, access to markets, logistics and distribution.

Current research results on innovation will be taken into account. The focus group will make use of a strong selection of national or international research and innovation activities which will be linked to focus group's objectives.

The visibility and impact of the focus group will be boosted through wide existing networks established with experts of the focus group and direct involvement of experts in past and ongoing projects. This will permit a smooth exchange of information and the use of well-established dissemination networks.



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# Annex A. Members of the Focus Group

| Name of the expert | Profession | Country |
|---|---|---|
| Moré Palos, Eva | Adviser | Spain |
| Olsanska, Gabriela | Adviser | Czech Rep. |
| Primavera, Andrea | Adviser | Italy |
| Rode, Janko | Civil servant | Slovenia |
| Carmody, Kate | Farmer | Ireland |
| de Jongh, Willemijn | Farmer | Portugal |
| Księżopolski, Robert | Farmer | Poland |
| Mikulcic Jakopovic, Snježana | Farmer | Croatia |
| Peycheva-Miteva, Galina | Farmer | Bulgaria |
| Redek, Jernej | Farmer | Slovenia |
| Zapušek, Alenka | Farmer | Slovenia |
| Cogliandro, Alessia | Industry | Belgium |
| De Paoli, Alexandra | Herbal therapist | Sweden |
| Fernandez Moya, Jesus | Forester and land owner | Spain |
| Freire Cavaleiro, Carlos Manuel | Researcher | Portugal |
| Frémondière, Guillaume | Researcher | France |
| Grigoriadou, Katerina | Researcher | Greece |
| Nicola, Silvana | Researcher | Italy |
| Schunko, Christoph | Researcher | Austria |
| Cortegano, Marta | Representative of an NGO | Portugal |

| **Facilitation team** | |
|---|---|
| Argyropoulos, Dimitrios | Coordinating expert |
| Karasinski, Céline | Task manager |
| Fernandez-Lopez, Susana | Co-task manager |
| Ganci, Eleonora | DG AGRI contact person (Horizon 2020/Europe) |
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**You can contact Focus Group members through the online EIP-AGRI Network.**
**Only registered users can access this area. If you already have an account, you can log in here**
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**The European Innovation Partnership** 'Agricultural Productivity and Sustainability' (EIP-AGRI) is one of five EIPs launched by the European Commission in a bid to promote rapid modernisation by stepping up innovation efforts.

The **EIP-AGRI** aims to catalyse the innovation process in the **agricultural and forestry sectors** by bringing **research and practice closer together** – in research and innovation projects as well as *through* the EIP-AGRI network.

**EIPs aim** to streamline, simplify and better coordinate existing instruments and initiatives and complement them with actions where necessary. Two specific funding sources are particularly important for the EIP-AGRI:

- ✓ the EU Research and Innovation framework, Horizon 2020,
- ✓ the EU Rural Development Policy.

**An EIP AGRI Focus Group*** is one of several different building blocks of the EIP-AGRI network, which is funded under the EU Rural Development policy. Working on a narrowly defined issue, Focus Groups temporarily bring together around 20 experts (such as farmers, advisers, researchers, up- and downstream businesses and NGOs) to map and develop solutions within their field.

**The concrete objectives of a Focus Group** are:

- ✓ to take stock of the state of art of practice and research in its field, listing problems and opportunities;
- ✓ to identify needs from practice and propose directions for further research;
- ✓ to propose priorities for innovative actions by suggesting potential projects for Operational Groups working under Rural Development or other project formats to test solutions and opportunities, including ways to disseminate the practical knowledge gathered.

**Results** are normally published in a report within 12-18 months of the launch of a given Focus Group.

**Experts** are selected based on an open call for interest. Each expert is appointed based on his or her personal knowledge and experience in the particular field and therefore does not represent an organisation or a Member State.

*More details on EIP-AGRI Focus Group aims and process are given in its charter on:
http://ec.europa.eu/agriculture/eip/focus-groups/charter_en.pdf

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