# MEDICINAL PLANTS IN LATVIA: FROM FOLKLORE MATERIALS TO PRACTICAL APPLICATIONS NOWADAYS

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The application of plants in traditional medicine has a long history, and the use of plants as medicine is as old as human civilization. Historically, medicinal plants have gained considerable recognition for prevention and treatment of different sicknesses. Numerous biologically active components have been isolated from traditional medicinal plants. It is estimated that 122 drugs from 94 plant species have been discovered based on ethnobotanical leads [1]. The local people in the territory of Latvia used medicinal plants to treat different ailments. The knowledge about the chemical composition of plants might not be known to the local people, but they knew medicinal plants that were useful to treat many kinds of diseases and health conditions. Information about herbal medicine is documented in various folklore materials including the records of Latvian folk medicine (more commonly known as folk beliefs). During the 19th century, across Europe and including in the territory of Latvia, folklore research became increasingly popular [2]. Folklore materials collected during the 19th century today are an integral part of Latvia's cultural heritage. The analyses from two neighbouring Baltic states, Estonia and Lithuania, have been published recently [3–5], and now, also the extensive folk knowledge from Latvia and overview of the Latvian folk herbal traditions in the 19th century have been analysed and brought to an international audience [Sile 2019; Sile 2020].

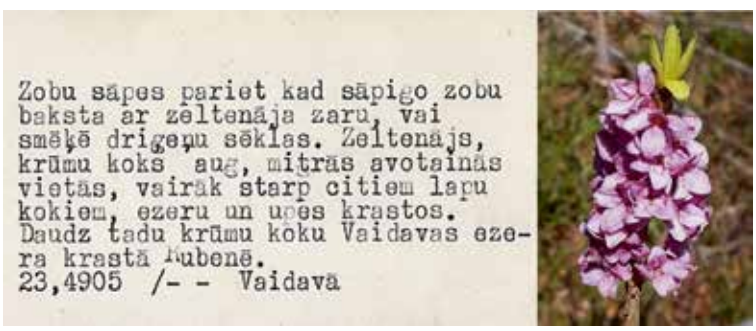
Zobu sāpes pariet kad sāpīgo zobu
baksta ar zēltenāja zaru, vai
smēķē drīgeņu sēklas. Zeltenājs,
krūmu koks aug, mitrās avotainās
vietās, vairāk starp citiem lapu
kokiem, ezeru un upes krastos.
Daudz tādu krūmu koku Vaidavas eze-
ra krastā Rubenē.
23,4905 /- - Vaidavā

*Fig. 1.*
An exemplar file card from the Archives of Latvian Folklore with information about the medicinal use of a highly poisonous plant mezereon (*Daphne mezereum*) from the village Vaidava. Translation of the record of Latvian folk medicine: The toothache goes away when the sore tooth is pocked with a twig of mezereon or by smoking henbane seeds. Mezereon is a shrub/tree that grows in wet soil around spring waters, among other deciduous trees, on the shores of lakes and rivers. There are many such shrubs/trees on the shores of Lake Vaidava in Rubene

Records of Latvian folk medicine collected by the folklore researcher Pēteris Šmits from four volumes of *Latvian Folk Beliefs* (Rīga, 1940–1941) and additional materials stored in the Archives of Latvian Folklore were analysed (Fig. 1). In total, more than 40 000 records were reviewed to select those con-


*Fig. 2.*
The most frequently mentioned plants from the records of Latvian folk medicine

taining information about plant usage in medicine. Indications, plant parts used, preparations of the medicine, and their administration were described for each plant mentioned in the records. Over 1900 records containing information about medicinal plant usage in the Latvian-populated territory were found in folklore materials. In total, 211 genera belonging to 71 families were mentioned. Several local plants were mentioned more than 40 times: yarrow (*Achillea millefolium* L.), chamomile (*Matricaria chamomilla* L.), onion (*Allium cepa* L.), wormwood (*Artemisia absinthium* L.), greater plantain/ribwort plantain (*Plantago major* L./ *P. lanceolate* L.), birch (*Betula* sp. L.), oak (*Quercus robur* L.), bird cherry (*Prunus padus* L.), and juniper (*Juniperus communis* L.) (Fig. 2). The most frequently mentioned foreign plants were tobacco (*Nicotiana* L.) and aloe (*Aloe* sp. L.). At the same time, a large number of plants (135) were mentioned only in 1–2 records.

All plants from the records of Latvian folk medicine were compared with plants included in the Russian pharmacopoeia (1891). A large proportion (78%) of Latvian medicinal plants was not mentioned in this official document of the 19th century. This discrepancy could be explained by the fact that a large number of medicinal plants included in the pharmacopoeia were not common in the flora of the territory where the records of Latvian folk medicine were collected. Unlike the pharmacopoeia, the records of Latvian folk medicine were a source of information on plant species used traditionally. The information in pharmacopoeias was scientific evidence-based and was not appropriately understandable for broader public. During the 19th century, there were two parallel medicinal plant-related knowledge systems: one based on folk pharmacy and another based on scientific pharmacy. According to information provided in records, Latvians generally limited their tradition of plant use to locally growing plants, but the Latvian pharmacopoeia compiled by pharmacy specialists included quality standards for the most frequently prescribed herbal drugs available in pharmacies, including also foreign plants.

Fifty-nine plants reported in this study are important for medical practice nowadays, and they are used as traditional herbal medicines according to the EU monographs. Many species mentioned in the Latvian folklore materials and described in monographs of herbal drugs [6] are primarily used in folk medicine with no sufficient pharmacological evidence of their use. For those species, additional pharmacological studies and phytochemical analysis should be performed in order to obtain sufficient scientific evidence and justify their long-standing use.

In total, 1976 cases were reported for disease prevention or health improvement. The use reports were attributed to 17 medicinal use categories. A large number of the records of Latvian folk medicine mentioned the treatment of symptoms related to digestive and respiratory system disorders (Fig. 3), allowing for the mapping of useful medicinal plants. Thirteen plants were described as having activity for more than eight medicinal use categories. Plants that have the highest medicinal value were: chamomile, which was mentioned in 13 use categories, and birch, which was mentioned in 11 use categories.

In addition to wild medicinal plants, foreign plants were also used for medicinal purposes in the territory of Latvia. Aloe is a frequently used house plant that is effective in treatment of respiratory and skin disorders. Several plants such as lime tree, juniper, Scots pine, and yarrow from Latvia's flora were used

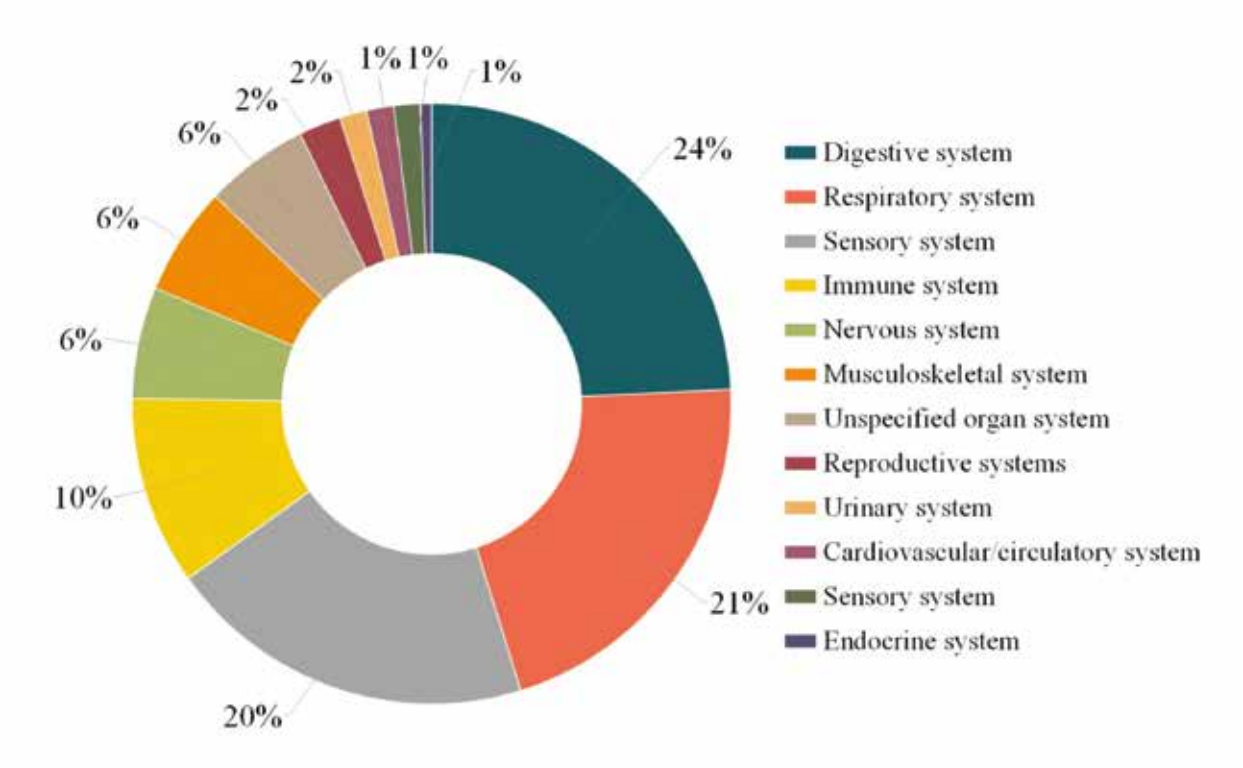


*Fig. 3.*
Percentage of medicinal use reports for different body systems

for the same purpose as aloe. The number of times aloe was mentioned suggested that this plant grew in almost every household in Latvia in the 19th century. Along with aloe, sea-onion (*Albuca bracteata* (Thunb.) J.C.Manning & Goldblatt) and pelargonium were used for cough and earache, respectively. These plants were used throughout the year, especially in winter, as fresh material.

According to information provided in the records of Latvian folk medicine, oral administration of herbals was the most commonly used, simplest and fastest route of administration. Many records mentioned that plant leaves, such as plantain, yarrow, aloe and apple tree leaves were applied directly to fresh wounds or insect or animal bites, as they had properties that reduced inflammation and healed wounds. Tinctures made of fresh birch buds, valerian roots, and wormwood stems were very convenient for use in respiratory and digestive system disorders because of their long shelf life. To improve the taste of herbal medicine, honey or sugar was added. In the records of Latvian folk medicine, milk, cream, beer, fat, oil, vinegar and even urine were mentioned as solvents instead of water. For babies, young children and adults, bathing in boiled plant water, as mentioned in the records, is commonly used to reduce pain, improve skin diseases or to calm the nervous system. The most frequently used plants in records of Latvian folk medicine, namely, yarrow, chamomile and onion, are now used for extract preparation to obtain tablets or capsules (www.zva.gov.lv; registri.pvd.gov.lv). In folk medicine, these plants were used in other kinds of preparations, such as decoctions, teas, juices and tinctures.

Now, when this information is available internationally [7–8], our results can be used in comparative ethnobotanical studies, including cross-cultural comparisons. Plant species and their uses described in the records could be potentially useful for future herbal medicine research.

Inspired by the ethnobotanical knowledge found in the records of Latvian folk medicine, we investigated anti-inflammatory effects of *Prunus padus* L. and *Pelargonium sidoides* DC [9–10]. Bird cherry was among the top ten most cited plants in the records, and pelargonium was a frequently mentioned foreign plant. In the experimental studies, we aimed to confirm ethnomedicinal benefits of these two

plants against inflammatory diseases by employing *ex vivo* inflammatory models using the ethanolic extract of bird cherry flowers (Fig. 4) and water extracts of *Pelargonium sidoides* root (PSRE) and proanthocyanidins from PSRE.

The growing interest in plant research in Latvia is also shown by the contribution of the "SIA Field and Forest", the Institute for Environmental Solutions (IES) (Fig. 5) and the Latvian Institute of Organic Synthesis (IOS) in the research project (Nr. 1.1.1.1/18/A/043) on the cultivation and use of wild spring medicinal and aromatic plants. The main objective of this research is to gain practical knowledge how to cultivate such wild growing plants as: cowslip (*Primula veris* L.), woodruff (*Galium odoratum* (L.) Scop.), mezereon (*Daphne mezereum* L.), coltsfoot (*Tussilago farfara* L.), pasqueflower (*Pulsatilla pratensis* (L.) Mill.), lily of the valley (*Convallaria majalis* L.), ground-ivy (*Glechoma hederacea* L.), greater celandine (*Chelidonium majus* L.) and lady's mantle (*Alchemilla* spp). Documentation and analysis of historical and existing knowledge of these

*Fig. 4.*
Preparation of ethanolic extract of bird cherry (*Prunus padus*) flowers for experimental analysis

*Fig. 5.*
Institute for Environmental Solutions trial site, summer 2020

nine wild plant uses in Latvia will be conducted. An ethnobotanical expedition lead by IES team in Vidzeme region (Rūjiena and Naukšēni municipalities) as part of the project already took place in the summer of 2019. Medicinal uses as well as food uses were documented across the local communities of interest. In total, thirty-eight interviewees were interviewed following a pseudo-random and snowball sampling methods. As an example of medicinal uses, for coltsfoot the most represented emic categories were the uses against cough (preparation: tea) and swelling (preparation: topical application and tea). Apart from the usages, the interviewees also added remarks on the landscape change. As for example, an elderly lady (b. 1961) recalled that *Primula veris* have been growing in the meadows but not anymore and stressed the intensive mowing as part of the reason for disappearance. IOS will perform an analysis of the chemical composition (Fig. 6) as well as evaluation of biological activity of extracts of wild growing plants and plants grown in experimental fields to assess their potential use in medicine, food, and cosmetics.
One hundred and fifty-two plants mentioned in the records of Latvian folk medicine are still not included in the EU herbal monographs. This means that safety and efficacy of use of those plants is not yet sufficiently evidenced and they deserve further exploration as traditional herbal medicines. Information from Grandma's dowry chest, complemented by the most up-to-date research technologies, can prove useful and inspire both scientific research by multidisciplinary teams (Fig. 7) and the development of new products in the 21st century.

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*Fig. 6.*
Sample preparation for chemical analysis using liquid chromatography-mass spectrometry method

*Fig.7.*
Baiba Prūse (first from the left), Inga Sīle (second from the left) and Maija Dambrova (fourth from the left) participated in Rīga International Biennial of Contemporary Art (RIBOCA 2018) and shared information about the use of medicinal plants from the folklore materials and ethnobotanical expeditions in Latvia

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