Chapter

Therapeutic Use of Some Romanian Medicinal Plants

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Abstract

Romanian traditional medicine has an extremely old history. The Dacian knowledge of the curative properties of medicinal plants was documented by Herodotus, Hippocrates, Galen, and Dioscorides. It must be emphasized that modern chemical screening has confirmed the therapeutic properties of the medicinal plants used by the Dacians. More interesting is that Dacians used many of these herbs for different dishes. Practically, for Dacians, food was medicine. Recent research on some Romanian medicinal plants has highlighted their pharmacognostical importance. It is known that currently, the importance and dynamics of the research on medicinal plants in the area of drug discovery continues to increase worldwide. The main reason is not only the high efficiency of secondary metabolites in case of serious diseases (cancer, viral infections, malaria, etc.) but also the minimization of the side effects of the synthetic drugs.

Keywords: Dacians, phytotherapy, secondary metabolites

1. Introduction

Phytotherapy has always played an essential role in the development of humanity. Traditional medicine still continues to have major importance in many areas of the world, especially in low-income regions [1–7].

Although in developed countries, alternative medicine has been outdated by modern medical techniques, at present, there is a growing trend toward natural remedies. The importance of medicinal plants emerges from the fact that worldwide, almost 50% of existing synthetic medicaments are derived from natural extracts [2–7].

The main ancient medicinal systems are considered to be: Ayurvedic, Greek, and Chinese medicine [8, 9]. However, there are very few documents about Dacian medicine, considered by their contemporaries and later by archeological evidence as highly advanced [8, 10–21].

In traditional Romanian medicine, almost all the natural remedies taken from the Dacians are found [8, 10–23].
2. Romanian medicinal plants

Romanian phytotherapy is an important part of our natural and cultural heritage. In this respect, it should be emphasized that in the flora of Romania, there are about 4000 plant species, of which over 20% are medicinal plants. Scientific research has confirmed the therapeutic properties of almost 50% of Romanian medicinal plants and about 25% plants are already used to obtain botanical products on large scale [2, 4, 5, 12, 23].

Between the Romanian people and traditional medicine, there was always a very deep connection. Basically, through the entire evolution of Romanians, healing herbs played an important role. Daco-Getic civilization was considered as the most evolved society at that time in Europe [10, 12, 18]. The Dacian’s vast knowledge about healing plants has been certified by several personalities of those times (Herodotus, Discorides, Tucidide, Pseudo-Apuleius, Ovid, Virgil, etc.) [10, 12, 13, 17, 18]. The Dacian’s knowledge about medicine, surgery, phytotherapy, and astronomy was confirmed by historical documents and archeological evidence [11, 12, 18].

In fact, the life philosophy of our ancestors proves to be more current than ever. In this regard, it must be mentioned that the Dacians knew the psychosomatic concept and the interdependence between the psychological and the somatic factors that triggered different affections [10–13, 18]. This is not only extremely interesting but at the same time extremely rare for that time period. It must be underlined that psychosomatic medicine was recognized as a branch of medicine only many centuries later.

According to the Dacians, the human body represents a complex energy system which maintains the physical body [10, 12, 18].

Our ancestors believed that there was a perfect balance between man and nature. Each plant or tree is a being to be respected. Thus, plant harvesting must take place only at a certain time of year, when the plant is mature and the concentration of active principles is maximal. For instance, Herb Robert (Geranium robertianum) is collected on the morning of August 15 [11, 12, 16, 18].

| Plant name   | Main secondary metabolites identified                                                                 | Therapeutic effect                                                                 | References                     |
|--------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| Dandelion    | Flavonoids, phenols, fatty acids                                                                  | Hepatoprotective, diuretic, anti-inflammatory, antitumoral [82]                   | [4, 5, 12, 15, 16, 19, 23, 66, 82] |
| Daisy        | Saponins, triterpenes, anthocyanins, polyphenols, flavonoids                                        | Antimicrobial, neuroprotective, cicatrizating effect, emollient, anti-inflammatory, antioxidiant, hypolipidemic, hemostatic | [4, 5, 12, 15, 16]               |
| Allheal      | Tannins, sterols, phenolic acids, alkaloids                                                        | Astringent, hemostatic agent, cicatrizating effect                                 | [4, 5, 12, 15, 16]               |
| Borango      | Fatty acids, alkaloids                                                                               | Anti-inflammatory, antitumoral, anti-diabetes, cardioprotective, immunomodulatory agent | [4, 5, 12, 15, 16, 78]          |
| Hogweed      | Coumarine, lignans, flavonoids                                                                     | Neuroprotective, antioxidiant, anticancer, antimicrobial, antidiabetic, antiviral, and anti-inflammatory | [4, 5, 12, 15, 16, 79]          |
| Fat grass    | Vitamins (A, C, B), fatty acids (omega 3), proteins, saponins, phenolic acids, coumarine, flavonoids, coenzyme Q10, alkaloids | Cicatrizating effect, wound healing, antibacterial, antipyretic, depurative, diuretic, regenerative |                                |

Table 1. Main bioactive compounds of some healing herbs included in Dacian’s diet.
| Dacian medicinal plant | Scientific name of plant | Dacian therapeutic recommendation |
|-----------------------|--------------------------|----------------------------------|
| Aniarsexe            | Onobrychis vicifolia (Fabaceae) | Diuretic, abscess, sudorific |
| Ionits               | Aconitum napellus (Ranunculaceae) | Astringent, antidote (snake bite), poison for arrows |
| Sopitis              | Aristolochia clematitis | Analgesic, contraceptive, anti-inflammatory |
| Dacina               | Adonis vernalis (Ranunculaceae) | Diuretic, analgesic, cardiotonic |
| Boudathla            | Anchusa officinalis (Boraginaceae) | Sudorific, diuretic, anti-inflammatory effect, respiratory infections |
| Cinouboila           | Bryonia alba L. (Cucurbitaceae) | Antibacterial, depigmentation effects, antiepileptic, snake bite antidote (viper venom), headaches, anti-inflammatory, analgesic, induce abortion, wet cough, hemostatic agent, induce lactation |
| Coadama              | Alisma plantago-aquatica L. (Alismataceae) | Astringent, dermatologic diseases (irritation, inflammations) |
| Coicolida            | Physalis alkekengi L. (Solanaceae) | Hepatoprotective, diuretic, laxative, edema |
| Dielleina            | Hyoscyamus niger L. (Solanaceae) | Analgesic, hallucinogenic, hypnotic, anti-inflammatory, antitussive, hemostatic, antibacterial, antipyretic, toothache, sedative, psychomotricity |
| Diesema              | Verbascum phlomoides L. (Scrophulariaceae) | Astringent, diarrhea, antitussive, antispastic, toothache, analgesic, cicatrizating effect, expectorant, anti-inflammatory |
| Doctila              | Ajuga chamaepitys L. (Lamiaceae) | Liver disease, sciatica pain relief |
| Duodela              | Achillias millefolium L. (Asteraceae) | Anti-inflammatory, gallbladder relief, antiasthmatic, hemorrhoids, stimulating appetite, detoxifying, sedative, analgesic, antiviral, liver diseases, cicatrizating effect, antitussive digestive diseases |
| Dyn                  | Urtica dioica L. (Urtiaceae) | Wound healing, anti-inflammatory, antitumoral, abscess, hemostatic, aphrodisiac, expectorant, cicatrizating effect, antimicrobial, detoxifying, disinfectant |
| Guoleta              | Lithospermum arvense L. (Boraginaceae) | Nephrolithiasis, diuretic |
| Malva                | Mallow sylvestris (Malvaceae) | Anti-inflammatory activity, cicatrizating effect, laxative, respiratory disorders |
| Mendruta             | Veratrum album (Melanthiaceae) | Anti-inflammatory, antispastic, antibacterial (dysentery), hypotensive |
| Dacian medicinal plant | Scientific name of plant | Dacian therapeutic recommendation |
|------------------------|--------------------------|----------------------------------|
| Mizela                 | *Thymus vulgaris* L. (*Lamiaceae*) | Anti-inflammatory, antiasthmatic, increase fertility, anthelmintic, antiedema |
| Priadila               | *Clematis vitalba* L. (*Ranunculaceae*) | Diuretic, analgesic, antiepileptic, antitussive, hair growth, dizziness |
| Propodila              | *Potentilla reptans* L. (*Rosaceae*) | Toothache, anti-inflammatory for diseases of oral and pharyngeal cavity, antiviral, detoxifying, antipyretic, cicatrizating effect |
| Riborasta              | *Arctium lappa* (*Asteraceae*) | Anti-inflammatory, disinfectant, antimicrobial, cicatrizating effect, detoxifying effect |
| Salia                  | *Datura stramonium* L. (*Solanaceae*) | Anti-inflammatory, diuretic, menstrual induction, psychomotricity |
| Sciare                 | *Dipsacus pilosus* L. (*Caprifoliaceae*) | Anti-inflammatory, hemorrhoids, anal fissures, antiviral |
| Stirsozila             | *Erythraea centaurium* Pers. (*Gentianaceae*) | Cicatrizating effect, wound healing, biliary dyskinesia, menstrual induction, anti-inflammatory, analgesic, induce abortion, eye infections, sedative |
| Tendila                | *Mentha piperita* L. (*Lamiaceae*) | Snake bite treatment, diuretic, anti-inflammatory, anthelmintic, detoxifying, antispastic |
| Usazila                | *Cynoglossum officinale* L. (*Boraginaceae*) | Hair growth, laxative, cicatrizating effect, wound healing |

Table 2.
*A brief overview of most popular Dacian medicinal plants.*
| Herb name | Scientific name of plant | Main chemical composition | Biological activity |
|-----------|--------------------------|--------------------------|---------------------|
| Aniarsexe (Sparceta) | Onobrychis viciifolia (Fabaceae) | Tanins, flavons, proteins, minerals (Cu, Ca, P) | Anti-inflammatory, detoxifying action, urinary diseases, sexual dysfunctions, hypoglycemic, anticholesterolemic, etc. [4, 5, 26] |
| Cinouboila | Bryonia alba (Cucurbitaceae) | Flavonoids,cucurbitacins, sterols, lectins, aminoacids, etc. | Wound healing, hemostatic, diuretic, antispasmodic, anti-inflammatory, hepatoprotective, antiatherosclerotic agent, rheumatism, antitumoral activity [4, 5, 27–29] |
| Wolfsbane | Aconitum napellus (Ranunculaceae) | Aconite (alkaloid) | Antirheumatic, analgesic, neuralgia, respiratory tract disorders, anti-inflammatory activity, etc. [4, 5, 30–32] |
| Pheasant’s eye | Adonis vernalis (Ranunculaceae) | Flavons, quinones, saponins, coumarins, etc. | Sedative, diuretic, cardiotonic effect [83, 84] |
| Mallow | Mallow sylvestris (Malvaceae) | Phenols, terpenoids, flavonoids, vitamins (A,B,C,E), minerals (Fe, Zn, Ca, Se, K, Mg), mucilage, inulin | Anti-inflammatory activity, asthma, respiratory diseases, antimicrobial, kidney infections, wound healing, dermatological diseases (eczema, acne), antioxidant, hepatoprotective, anticancer [4, 5, 34, 35, 82] |
| Budathla (ox tongue) | Anchusa officinalis (Boraginaceae) | Flavonoids, polyphenols, choline, allantoin | Antioxidant, antimicrobial, wound healing, emollient, antitumoral, expectorant, diuretic, analgesic, etc. [4, 5, 36] |
| Common water-plantain | Alisma plantago-aquatica (Alismataceae) | Terpenoids, phenolic acids, sterols, alkaloids, | Antibacterial, antialergic anti-cholesterolemic, diaphoretic, diuretic, hypoglycemic, hypotensive [36] |
| Winter cherry | Physalis alkekengi (Solanaceae) | Alkaldois (solanină și fisolină), vitamins (C), glucocorticoids, lycopene | Diuretic, laxative, anti-inflammatory activity, sedative, hepatoprotective, analgesic, antiseptic [37–39] |
| Black henbane | Hyoscyamus niger L. (Solanaceae) | Alkaldois (hyoscyamine, scopoelamine and atropine), flavonoids, lignans, phenols, coumarin, saponins, glycosides | Sedative, analgesic, antispasmodic, hypnotic, hallucinogenic, hypotensive, antimicrobial [4, 5, 40] |
| Mullein | Verbascum phlomoides L. (Scrophulariaceae) | Phenols, terpenes, sterols, fatty acids, alkaloids, glycosides | Anti-inflammatory activity, wound healing, antispasmodic, anthelmintic, expectorant, antifungal effect, diuretic [41–43] |
| Yellow bugle | Ajuga chamaepitys L. (Lamiaceae) | Tanins, alkaloids, anthocyanins, sterols, terpenes, glycosides, essential acids | Diuretic, anti-inflammatory activity, tonic, antimicrobial, antioxidant activity, antirheumatic, anthelmintic, antifungal effect [44–46] |
| Herb name          | Scientific name of plant | Main chemical composition                                                                                       | Biological activity                                                                 |
|--------------------|--------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Yarrow             | *Achillea millefolium* L. *(Asteraceae)* | Flavonoids, choline, sterols, vitamin K, volatile oils, tannins                                               | Anti-inflammatory activity, hemostatic, wound healing, analgesic, disinfectant, antispasmodic, gastroprotective, astringent, hypotensive, antitumoral [4, 5, 47, 48] |
| Stinging nettle    | *Urtica dioica* L. *(Urticaceae)* | Coumarine, sterols, terpenoids, carotenoids (β-carotene lutein and lycopene) fatty acids, poly-phenols, amino acids, chlorophyll, vitamins (A,C,B D,E,F,K,P), tannins, carbohydrates, sterols polysaccharides, isolecitins, minerals (Fe, Ca, Zn, Co, Na, Cr, I, S, Cu), lignans | Diuretic, anemia, laxative, anti-inflammatory, anti-allergic, antimicrobial, hypoglycemic, anti-histamine effect, hemostatic [4, 5, 49] |
| Gromwell           | *Lithospermum canescens* *(Boraginaceae)* | Phenolic acids, flavonoids, vitamins, sterols, phenols, allantoin                                              | Sedative, anti-inflammatory, antipyretic, diuretic, antiseptic, colargol, antipruritic, contraceptive [4, 5, 50] |
| False hellebore    | *Veratrum album* *(Melanthiaceae)* | Alkaloids, fatty acids, sterols, amino acids                                                                | Antithrombotic activity, hypotensive, anti-inflammatory, hypoglycemic [4, 5, 51, 52] |
| Thyme              | *Thymus vulgaris* L. *(Lamiaceae)* | Terpene, flavonoids, antiviral, essential oils, tannins                                                       | Anti-inflammatory, antitussive, antiseptic, antimicrobial, astringent, antihelminthic, tonic, carminative, disinfectant [4, 5, 53–55] |
| Old man’s beard    | *Clematis vitalba* L. *(Ranunculaceae)* | Terpenoids, saponins, volatile acids, alkaloids                                                               | Diuretic, diuretic, analgesic, diuretic, anti-tumor, anti-inflammatory agent, antipyretic, antirheumatic [4, 5, 56–58] |
| Creeping cinquefoil | *Potentilla reptans* L. *(Rosaceae)* | Tanins, flavonoids, terpenes, anthocyanins, phenolic acids                                                  | Anti-inflammatory, antimicrobial activity, hypoglycemic hepatoprotective, anticancer effect, spasmolytic [4, 5, 59–61] |
| Burdock            | *Arctium lappa* *(Asteraceae)* | Tanins, minerals (K), vitamins (B), volatile oils, phenolic acids                                            | Hypoglycemic, detoxifying, anticancer, anti-inflammatory, antimicrobial, antiseptic, regenerating activity, hair growth, hepatoprotective, diuretic, anticancer, antidiabetic, antiviral activities, hypolipidemic [4, 5, 62, 63] |
| Jimson weed        | *Datura stramonium* L. *(Solanaceae)* | Alkaloids (atropine, scopolamine), saponins, lignins, sterol, tannins, flavonoids, carbohydrates, proteins | Analgesic, antiasthmatic activities, antimicrobial, wound healing, purgative [4, 5, 64] |
Their complex information about therapeutic botanicals was appreciated as being very impressive and different ancient historical texts [8, 10–13, 17, 18, 20, 21]. In the first pharmacopoeia, Discorides mentioned over 700 different medical plants and about 6% were presented as Dacian origin [8, 10–13, 17, 18, 20, 21].

Complementary to phytotherapy, various products of mineral origin were used, of which the most well known are: limestone powder (hemostatic effect), volcanic tuff (healing effect), etc. Thermal springs are used as natural remedies for bone diseases or circulatory system disorders. In this respect, they were highly appreciated the waters of Geoagiu Bath, known by the Dacians as Germisara [11–13, 18].

Fumigations of cannabis were used as anesthetic and analgesic, mainly in labor and childbirth.

Also, Dacians paid special attention to medical preventive measures. Thus, they treated the clothing with extracts of lavender (Lavandula angustifolia) [4, 5, 24].
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and wormwood (*Artemisia absinthium*) [4, 5, 25]. Scientific screenings of these two plants have highlighted the fact that lavender has antibacterial properties and wormwood is a disinfecting agent [11–13, 18].

Moreover, the inclusion of different healing herbs in the Dacian diet once again reveals their profound knowledge on plant’s active principles. Basically, for Dacians, food was more than a way to ensure daily nutrient needs, it was mainly a medicine per se. In this regard, we can remember some of the most commonly used healing herbs in Dacian and later Romanian cuisine: malva (*Althaea officinalis*), stinging nettle (*Urtica dioica* L.), dandelion (*Taraxacum officinalis*), daisy (*Bellis perennis*), allheal (*Prunella vulgaris*), thyme (*Thymus vulgaris* L.), borange (*Boranga officinalis*), hogweed (*Heracleum sphondylium*), and fat grass (*Portulaca oleracea*) [8, 10–21, 23].

In fact, modern studies have identified in these natural products different secondary metabolites with high biological activity [9, 24–83]. The main bioactive compounds and their therapeutic effect are summarized in Table 1.

The Dacian’s botanical preparations were quite diverse from decocts, infusions, oilments, plant mixtures to fumigations. This proves the Dacians knew how to extract or capitalize on the active principles of the healing plants [8, 10–21].

Table 2 summarized some of these plants used by Dacians and their therapeutic recommendations.

It is quite remarkable that Dacian’s therapeutic recommendations were corroborated by thorough scientific studies on those medicinal plants [8–21, 24–84]. This is further evidence of the fact that the Dacians had in-depth knowledge of phytotherapy, for which they were also appreciated by the great scientists of antiquity.

Table 3 summarized the main phytochemicals identified in Dacian healing herbs and their biological activity.

Another aspect to be mentioned is the fact that the Dacian medicinal plants are also found in other important traditional medicinal systems, such as Chinese or Hindu medicine (Table 4).

| Herb name       | Scientific name of plant | Chinese medicine                                           | Indian medicine/other medicine systems                      |
|-----------------|--------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| Aconite         | *Aconitum napellus*      | Fever treatment and skin irritation [31, 32]               |                                                           |
| Water-plantain  | *Alisma plantago-aquatica* | Antitumor, antimicrobial, anti-inflammatory, immunomodulatory agent [36] |                                                           |
| Birthwort       | *Aristolochia clematitis* | Antispasmodic, antidote (snake venom), analgesic [73, 74, 76, 77] |                                                           |
| Black henbane   | *Hyoscyamus niger*       | Analgesic, antispasmodic [40].                             |                                                           |
| Old man’s beard | *Clematis vitalba L.*     | Anti-inflammatory, analgesic, antipyretic, diuretic         |                                                           |
| Burdock         | *Arctium lappa*          | Anti-inflammatory, cicatrizating effect, wound healing [62] |                                                           |
| Jimson weed     | *Datura stramonium*      | Anti-inflammatory, analgesic, cicatrizating effect, wound healing, antipyretic [64] |                                                           |

Table 4. Some examples of Dacian medicinal plants recognized and used in the traditional medicine of other peoples.
Currently, some of the Dacian healing herbs are appreciated worldwide for their nutritional values and even have found modern applications in several sectors of the industry (Table 5).

### 3. Aristolochia clematitis: chemical screening of main phytocomponents

*Aristolochia clematitis* is a highly regarded herb in traditional medicine and at the same time controversial due to the latest research that revealed the potential carcinogenic effect of aristolochic acid [73, 74, 76, 77, 85].

In an effort to identify the secondary metabolites from *Aristolochia clematitis*, the plant extract was analyzed in two different solvents (methanol and water). The plant material (*Aristolochia clematitis* leaves, young stems, and flowers) was obtained from a collection taken in 2017 in Timis, Romania. Plant sample was identified at Victor Babes University of Medicine and Pharmacy Timisoara. The botanical material was dried and then finely ground in a ball mill. Separation of the main constituents from different parts of the botanical material was done using two different polar solvents: water and methanol. A plant sample (2 g) was placed in a 100-mL volumetric flask containing 45 mL of solvent. The resulting mixture was sonicated for 50 min at 40°C, with a frequency of 50 kHz. Then, the solution was filtered through a 0.25-μm pore size filter. Thus, four birthwort fractions were prepared: $B_1$ (water extract from leaves and stems), $B_2$ (methanol extract from flowers), $B_3$ (water extract from leaves), and $B_4$ (methanol extract from stems). Identification of the main compounds from the birthwort fractions, $B_1$, $B_2$, $B_3$, and $B_4$, was performed using TOF-MS method.

### 4. TOF-MS analysis

The mass spectra of birthwort fractions: $B_1$–$B_4$ (acquired in positive ion mode, in a mass range of 100–3000 m/z) are presented in Figure 1a–d.

The results gained through mass spectrometry confirmed the presence of aristolochic acid in all four samples analyzed (m/z detected: 294, 293, 308, 355) among other secondary metabolites [86].

Further, thorough investigations are required to highlight:

- the maximum concentration of phytocomponents from that called perfect moment to harvest the plant and the composition of active principles from a randomly harvest plant;

- validation of curative properties/cytotoxicity effects of plant extract depending on plant dosage (plant concentration, time, etc.).

| Herb name | Other uses of Dacian herbs |
|-----------|---------------------------|
| Mallow    | Edible plant, cosmetic industry [81] |
| Stinging nettle | Edible plant, cosmetic industry [4, 5, 51] |
| Burdock   | Edible plant [62] |
| Centaury  | Cosmetic industry [4, 5, 67–69] |
| Mint      | Cosmetic industry, food industry [4, 5, 23, 67, 69, 70] |
| Thyme     | Cosmetic industry, food industry [4, 5, 53–55] |

Table 5. Modern applications of Dacian healing plants.
5. Conclusions

Natural compounds are essential for the existence of humanity; this assertion has been demonstrated by the most modern researches which once again highlights the particular curative properties of phytochemicals isolated from medicinal plants known and appreciated since the earliest times.
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