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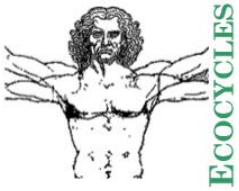

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REVIEW ARTICLE

Medicinal Plant Cultivation and Phytotherapy in Equine Medicine: Ecological Perspectives with Case Evidence from Hungary

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Abstract - In recent decades, the role of horses has increasingly shifted toward sport and leisure, resulting in heightened attention to their long-term health and welfare. Parallel to a broader interest in natural therapies, the application of herbal medicine in equine care has gained momentum. Commonly used medicinal plants - such as *Harpagophytum procumbens* (devil's claw), *Matricaria chamomilla* (chamomile), *Taraxacum officinale* (dandelion), and *Allium sativum* (garlic) - are employed to support digestive, immune, and musculoskeletal functions. Although generally considered safe, some herbs may elicit side effects, necessitating professional guidance in their administration. Hungary possesses a longstanding tradition in medicinal plant cultivation, facilitated by favourable pedoclimatic conditions. The country is divided into six principal cultivation zones and remains a key European producer, particularly of chamomile. Despite its ecological benefits - such as enhancing agro-biodiversity and promoting organic agriculture - the sector faces several challenges, including labour shortages, market fluctuations, and environmental concerns such as overharvesting and climate change. Sustainable cultivation practices and increased ecological awareness are critical for the resilience and future of this field. As a supplement to our work, we prepared a questionnaire for domestic horse owners regarding the use of medicinal herbs. Our questionnaire-based study revealed that the majority of horse owners are familiar with, and actively utilize, herbal products, primarily for managing respiratory, musculoskeletal, and gastrointestinal conditions. The significance of using medicinal herbs in horses is also supported by the results of two of our previously published experiments. In these two controlled feeding trials, we demonstrated that specific herbal mixtures, administered in dried or fermented form, significantly improved the digestibility of crude fiber, crude protein, and dry matter. The preparations were well tolerated, with no adverse effects observed. These findings suggest that phytotherapeutic supplementation may offer a viable, natural strategy to support equine gastrointestinal health. However, further research is warranted to optimize herbal formulations and evaluate efficacy across larger, more diverse equine populations.

Keywords - Horses, herbs, medical plant cultivation, equine health, ecological aspects

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1. INTRODUCTION

In recent decades, the role of horses in everyday life has shifted significantly. Their use in sports and leisure activities has become increasingly prominent, while the unique value of these animals has also risen markedly (Bartos et al., 2023). Due to their intensive, performance-oriented use and relatively long lifespan of approximately 20–25 years, maintaining the health and long-term usability of horses has become a key concern for owners. For optimal performance, the locomotor, respiratory, and digestive systems must all function efficiently.

Herbal medicine—also known as phytomedicine—is the use of therapeutic plants, plant parts, or plant-derived substances to combat infections, prevent disease, and promote overall health (Jonas, 1997). The herbal market gained popularity in human medicine during the 1990s, with garlic and echinacea emerging as the top-selling herbs (Blumenthal, 2005). In contrast, the use of herbs in equine medicine remained relatively limited (Mátray et al., 2005). In a 2025 market

survey analyzing data from the past 4 years, it was observed that the use of horse feed supplements has steadily increased, and by 2026, the market value is expected to exceed USD 75 million. Europe accounts for approximately one-third of this market. The survey data indicate that horse owners predominantly prefer organic and herbal formulations. Consequently, a significant increase in the use of herbal products is also anticipated (Equine supplements product market size, 2025), Thus, it can be seen that in recent years, horse owners are turning to herbal remedies as complementary treatments, especially when conventional medications—such as steroids—prove ineffective (Marton, 2005). The successful use of herbs in human medicine, coupled with growing concerns over the side effects of antibiotics, growth promoters, and steroids in livestock diets, has fueled interest in plant-based alternatives. Rodriguez and colleagues (2021) investigated the market for herbal products used in veterinary medicine. They found that the sector is exceptionally broad, with the 54 largest companies located primarily in India, the Netherlands, and the United Kingdom. The use of herbal products is most substantial in productive livestock species, yet such preparations are also popular among companion animal owners. Among farm animals, cattle production accounts for the greatest share of herbal product use, but considerable amounts are also used in the treatment of sheep and poultry. The study further demonstrated that, in addition to dog and cat owners, these products are also used significantly by horse owners. According to predictions by Mona et al. (2018), the global market for herbal products reached about USD 111 billion by the end of 2023. In Hungary, Zsófia Marton's books *Horseherba* (2005) and *Medicinal Plants* (2023) provided detailed overviews of the most important medicinal plants used in veterinary medicine. The primary aim of our work is to draw the attention of horse owners and feed manufacturers to the importance of using medicinal plants in modern equine management. Our objectives are to present the most important medicinal plants used in horse feeding, to assess the current situation in Hungary, to provide an overview of domestic herb cultivation, and to explore horse owners' opinions and practices regarding the use of medicinal plants. In addition, an essential aim of this work is to emphasize the need for scientific experiments on medicinal plants to ensure their safe use and strengthen consumer confidence.

1.1 Methods of Literature Review

To develop this article, we sought to identify the most relevant scientific sources on the use of medicinal plants in horses, alongside key findings from human phytotherapy that may offer conceptual parallels. The literature search was conducted primarily in PubMed, MDPI, and ResearchGate, focusing on international publications from the 2000s onward. In addition, the WHO monographs on medicinal plants were reviewed to provide an authoritative pharmacognostic background. Wherever possible, we relied on studies published within the past few years to ensure the inclusion of up-to-date evidence. To assess the current status of medicinal-plant cultivation in Hungary, we consulted domestic sources, including the national medicinal-plant cultivation strategy and relevant statistical analyses on production and agricultural trends.

2. MOST IMPORTANT MEDICINAL PLANTS USED IN EQUINE MANAGEMENT

The most commonly used herbs and herbal mixtures for horses are as follows (Fors, 2009): devil's claw (*Harpagophytum procumbens* L.), chamomile (*Matricaria chamomilla* L.), dandelion (*Taraxacum officinale* L.), stinging nettle (*Urtica dioica* L.), marshmallow (*Althaea officinalis* L.), common burdock (*Arctium lappa* L.), marigold (*Calendula officinalis* L.), anise (*Pimpinella anisum* L.), cleavers (*Galium aparine* L.), peppermint (*Mentha* × *piperita* L.), licorice (*Glycyrrhiza glabra* L.), rosehip (fruit of *Rosa canina* L.), thyme (*Thymus vulgaris* L.), linseed (*Linum usitatissimum* L.), garlic (*Allium sativum* L.), and vervain (*Verbena officinalis* L.). The use of medicinal herbs and their mixtures in horses is based partly on equine-specific experience and observations, and partly on knowledge and practices adapted from human medicine. However, robust and well-documented scientific evidence remains limited. Key information on the aforementioned medicinal herbs is summarized in Table 1. Interestingly, most studies conducted in humans and other species have found that certain herbal supplements can modulate the immune system. However, they generally do not enhance immune function in healthy individuals, but may provide support in cases of immune impairment (Parnham, 1996; Sultz et al, 1998)

Table 1. Most commonly used herbs for horses

herb name	positive effects	rarely occurred side or negative effects	used parts	publications
Anise (*Pimpinella anisum* L.)	antispasmodic, carminative, and mild estrogenic effects. Often used in respiratory conditions and digestive disorders, especially flatulence and mild spasms	allergic reactions or interact with hormone-sensitive medications	seeds (fruits), essential oil	Preedy et al. 2011 Poppenga et al., 2023 (*research involving animals, including horses*)
Chamomile (*Matricaria chamomilla* L.)	anti-inflammatory, immunostimulant, stomachic	unknown	flower, essential oil, wet extract	Mehmood et al, 2015;, El Mihyaoui et al, 2022

	(acid-reducing), antispasmodic effects *effects observed in horses:* enhance the palatability of horse feed (Stachurska et al. 2022); Roman chamomile essential oil calming effects, muscle relaxation, calm behavior (Kosiara and Harrison 2021)			
Common burdock (*Arctium lappa* L.)	detoxifying, diuretic, and mild anti-inflammatory effects. It may support liver function and digestion externaly use to treat skin conditions	allergic reactions	root, seeds, leaves	WHO, 2003; Chan et al., 2011
Dandelion (*Taraxacum officinale* L.)	fetid, antispasmodic, antimicrobial, antioxidant effect	hyperacidity, rarely allergic symptoms	root, flowering shoot and leaves	Tanasa et al, 2025
Devil's claw (*Harpagophytum procumbens*)	painkilling, appetite stimulating and antirheumatic effects	gastric ulcers, prolong bleeding time	root, dry extract.	Williams and Lamprecht, 2008, Pearson et al., 2000 (*study on horses*)
Garlic (*Allium sativum* L.)	antibacterial, antiviral, antifungal and antiparasitic effects	anemia, prolonged bleeding time and stomach ulcers	dried garlic clove, flower extract	Tattelman, E., 2005

Table 1. (Contd.)

herb name	positive effects	rarely occurred side or negative effects	used parts	publications
Licorice (*Glycyrrhiza glabra* L.)	anti-inflammatory, mucoprotective, and antiviral effects. Used for gastritis, ulcers, and respiratory conditions	Long-term or excessive intake may cause hypertension, hypokalemia, and fluid retention.	roots, root extract	Wang &Nixon, 2001
Linseed (*Linum usitatissimum* L.) (flaxseed)	rich in omega-3 fatty acids and mucilage anti-inflammatory, laxative, and skin-supportive effects. Used in digestive health and to support hoof and skin condition in horses.		seeds (whole or crushed), oil	Fehlberg et al., 2020; (study on horses) Kajla et al., 2015
Marigold (*Calendula officinalis* L.)	anti-inflammatory, wound-healing, antimicrobial, and immunomodulatory effects, healthy for gastrointestinal part,externally for treating minor wounds, dermatitis, and skin infections	contact dermatitis or allergic reactions (mostly in individuals sensitive to Asteraceae plants)	flowers (fresh or dried), flower extracts, tinctures	WHO, 2003; Preethi et al.,2009
Marshmallow (*Althaea officinalis* L.)	antiulcer effect, reduction in oxidative stress and histamine release			Bonaterra et al., 2020; Kulcsár et al., 2022

Peppermint (*Mentha* × *piperita* L.)	antispasmodic, carminative, and mild antimicrobial effects. Widely used to treat irritable bowel syndrome, indigestion, and respiratory complaints.	allergic reactions, heartburn, or exacerbate GERD in sensitive individuals	leaves, essential oil	McKay &
Rosehip (*Rosa canina* L.)	fruit is rich in vitamin C, antioxidants, and has mild anti-inflammatory and immunostimulant effects. Commonly used to support immune function and joint health	nausea or allergic skin reactions	fruit (hip), seed oil	Chrubasik et al., 2008
Sticky galangal (*Galium aparine* L.)	diuretic, detoxifying, and mild anti-inflammatory effects. It supports lymphatic drainage and is sometimes applied in skin and urinary disorders.		aerial parts (fresh or dried)	Weiss & Fintelmann, 2001

Table 1. (Contd.)

herb name	positive effects	rarely occurred side or negative effects	used parts	publications
Stinging nettle (*Urtica dioica* L.)	anti-inflammatory and diuretic effects, externaly use as a shampoo for hair and skin	digestive disorders and diarrhea	leaves, roots, and some flowering shoots	Parente et al., 2025
Thyme (*Thymus vulgaris* L.)	antimicrobial, expectorant, and antitussive properties. Often used in respiratory tract infections, digestive issues, and as a feed additive	mucosal irritation in high doses	aerial parts, essential oil	Miguel, 2010
Verbena (*Verbena officinalis* L.)	mild sedative, anti-inflammatory, spasmolytic, and diuretic properties. It has also been used to support digestion and relieve symptoms of stress-related gastrointestinal discomfort.	High doses may cause hypotension or gastrointestinal irritation in sensitive animals.	aerial parts, flowering tops, infusion, dry extract	Wichtl, 2004

3. MECHANISM OF ACTION AND EXPERIMENTAL EVIDENCE

Medicinal plants exert their effects through their bioactive chemical constituents. These are compounds that either influence physiological processes in the organism or inhibit the growth and activity of pathogens. However, not all substances produced by plants have pharmacological or therapeutic activity. A compound is considered a bioactive agent if it exerts a well-defined biological or pharmacological effect on vital functions or pathological processes. Such constituents are collectively referred to as biologically or pharmacologically active substances (El-Saadony, et al. 2025)

A key characteristic of phytopharmaceuticals—medicinal products of plant origin—is that they typically contain multiple active compounds. These components act harmoniously and often synergistically, complementing and enhancing each other's effects, or mitigating potential adverse reactions. For example, the spasm-inducing effect of anthraquinone glycosides in rhubarb can be alleviated by smooth muscle relaxant herbs such as fennel (*Foeniculum vulgare*) or anise (*Pimpinella anisum*) (Barnes et al., 2007).

All plants contain a wide variety of primary metabolites—such as carbohydrates, fats, proteins, and minerals—that are generally present in all living organisms. These compounds are only regarded as active ingredients if the plant part is used specifically because of their accumulation (e.g., high starch or oil content). Otherwise, they are considered accompanying or supportive substances. Occasionally, even minerals may be treated as active components, though they are most often classified as secondary constituents.

In most cases, however, the pharmacologically significant compounds are specialized metabolites, including alkaloids,

saponins, essential oils, and flavonoids. The active principle of a herbal drug may consist of a single compound or a complex mixture of multiple constituents—some essential oils, for instance, may contain several thousand chemical components (Elshafie et al, 2023; Santiago et al, 2021). These mixtures may consist of structurally similar molecules or chemically diverse substances. Essential oils, for example, often comprise compounds of similar structure, whereas other plants, such as chamomile (*Matricaria chamomilla L.*), contain diverse groups of active compounds. In chamomile, the anti-inflammatory effect is attributed to the combined action of flavonoids, mucilaginous substances, and essential oils (Akram et al., 2023; Bhukta et al., 2021).

Several medicinal plants are well known for their digestion-enhancing properties**,** primarily documented in human medicine (Klein et al., 1998; Rácz & Szabó, 2012). However, favourable effects of certain herbs and their mixtures on equine digestion have also been reported (Naujoks, 2005). Marshmallow (*Althaea officinalis*) is well known for the management of cough and other respiratory problems (Mahboubi, 2020)

It should be emphasized, however, that the effects of most herbal preparations currently available on the market have not yet been validated through controlled scientific experiments**.** Furthermore, it is important to note that certain phytochemicals may interact synergistically or antagonistically, and, in some cases, cause adverse reactions, such as allergic or toxic responses, when combined improperly (Williams & Lampercht, 2008).

In recent years, our research has focused primarily on improving the digestibility of fibrous feeds in horses**.** Based on our investigations, we can conclude that medicinal herbs—whether in dried or fermented form—can be effectively and safely incorporated into equine nutrition to enhance nutrient digestibility and support gastrointestinal function. In our experiments, herbal mixtures containing plants such as anise (*Pimpinella anisum*), peppermint (*Mentha piperita*), wormwood (*Artemisia absinthium*), and dandelion (*Taraxacum officinale*) improved the apparent digestibility of dry matter, crude protein, and crude fibre in horses. The observed positive effects are consistent with the known pharmacological actions of these plants, including stimulation of digestive secretions, spasmolytic activity, and the support of a balanced gut microbiota. (Bartos et al., 2015; Bartos et al., 2023). Despite the relatively small number of horses available for the trials, our results are noteworthy, particularly given the scarcity of scientifically validated experimental data on this topic in equine research.

Importantly, no adverse reactions or feed refusals were recorded in either trial, indicating good tolerability and palatability. One possible explanation for this effect is the flavor-enhancing property of chamomile, as described by Stachurska et al. (2022). Given the sensitivity of the equine digestive tract and the high prevalence of colic, the integration of carefully selected phytotherapeutic ingredients offers a promising, natural approach to supporting digestive health and efficiency.

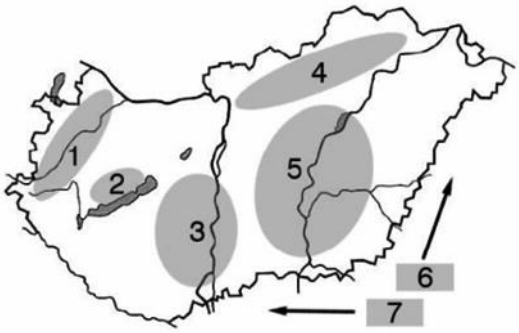
4. HERBAL CULTIVATION AREAS IN HUNGARY

The development of medicinal plant cultivation regions in Hungary can be traced back to the early 20th century. Their emergence was driven primarily by the increasing consumer demand and the growing importance of export activities. Key factors in this development include agroclimatic conditions (e.g., sunshine duration and suitable temperatures), which are essential for optimal growth of specific plant species (Panyor, 2012).

Hungary's territory can be divided into six well-defined medicinal plant cultivation regions (Figure 1.), with a seventh category representing species that can be successfully cultivated across the entire country. The regional divisions established in the early 20th century are as follows:

1. The Western Transdanubian region specialized in autumn poppy cultivation;
2. The Balaton Uplands;
3. Southern Hungary;
4. The Northern Hungarian Mountains;
5. The Great Hungarian Plain (Alföld);
6. The nationally extensive region for spring poppy cultivation;
7. Species potentially cultivable throughout the whole country

Figure 1. Specialized medicinal and aromatic herb production areas



Source: Panyor,,2012.

In Hungary, the cultivation and wild collection of medicinal and aromatic plants (MAPs) represent a significant sector within agriculture, both economically and culturally. The country is one of the leading producers of medicinal plants in Europe. According to data from the Hungarian Central Statistical Office (KSH) and the Medicinal Plant Section of the Hungarian Chamber of Agriculture (NAK), medicinal plant production covers approximately 6,000–8,000 hectares annually, involving over 80 plant species cultivated for

commercial purposes. In addition, wild collection still plays an important role, supplying species such as *Crataegus*, *Sambucus*, *Hypericum*, and *Urtica*. The cultivation of medicinal plants is coordinated by the Hungarian Medicinal Plant Association and Product Council, an organisation established in 1992 (Czirbus, 2021).

The most commonly cultivated species include chamomile (*Matricaria chamomilla* L.), peppermint (*Mentha* × *piperita* L.), lemon balm (*Melissa officinalis* L.), valerian (*Valeriana officinalis* L.), and echinacea (*Echinacea purpurea* L.). These medicinal plants are also among the most widely known and most preferred by domestic consumers (Panyor, 2012). Hungary is particularly known for its high-quality dried chamomile flowers, which are exported to Germany, Austria, and Switzerland.

Despite its longstanding traditions, the sector faces challenges such as labour shortages, limited mechanization, and global market competition. Nevertheless, there is growing interest in organic cultivation and phytotherapy-related research, which provides new opportunities for sustainable development (Czirbus, 2021).

It is certainly noteworthy that, in recent years, several agricultural funding schemes have become available to support the cultivation of medicinal plants. KAP-RD01a-RD12-1-24 "Horticulture – Orchard Establishment and Support for Medicinal Plant Cultivation"; VP2-4.1.3.3-16 "Modernisation of Horticulture – Development of Medicinal and Aromatic Plant Production"

5. Ecological aspects of medicinal plant cultivation in Hungary

Hungary offers favorable conditions for cultivating medicinal plants, with diverse climatic zones, fertile soils, and a longstanding tradition in herbal medicine (Bernáth & Németh, 2001). In recent decades, however, increasing attention has been paid not only to the economic and pharmacological value of medicinal plant species, but also to the ecological implications of their production systems.

From an ecological perspective, the cultivation of medicinal plants can contribute positively to agro-biodiversity. Many species used in phytotherapy are native or naturalized flora, and their integration into agricultural landscapes helps maintain genetic diversity and support populations of pollinators and other beneficial organisms (Schippmann et al. 2002). This is especially true for extensive or low-input systems, which are more compatible with ecological farming practices.

Organic cultivation of medicinal plants, free from synthetic pesticides and mineral fertilizers, plays a crucial role in preserving soil health and reducing environmental contamination. Numerous herbal species, such as *Melissa officinalis*, *Calendula officinalis* are well-suited to organic systems due to their resistance to pests and diseases (Zaki et al., 2018; Seidler-Łożykowska et al., 2015). Moreover, the ecological footprint of herb production is generally smaller than that of intensive field crops, provided that appropriate crop rotation and soil conservation practices are applied (Martin et al., 2023).

However, environmental concerns also arise from the overharvesting of wild populations, particularly of high-demand species such as *Artemisia absinthium*. In Hungary, although most herbal raw materials are cultivated, wild collection still plays a role in the supply chain. Unsustainable harvesting may lead to the decline of vulnerable species and disrupt native ecosystems (Marcelino et al., 2023).

Climate change further influences the ecological sustainability of medicinal plant production. Shifting rainfall patterns and temperature extremes affect the secondary metabolite content of herbs, which plays a key role in their therapeutic efficacy (Sharma & Sharma, 2020). This necessitates both the development of climate-resilient cultivation techniques and the conservation of plant genetic resources through seed banks and in situ protection (Török et al., 2011).

In conclusion, the ecological dimension of medicinal plant production in Hungary is twofold: on the one hand, it offers opportunities for sustainable agriculture and rural development; on the other, it presents challenges in resource management and environmental protection. Strengthening ecological principles in both wild harvesting and cultivation practices is essential for the long-term viability of the sector (Kulcsár et al., 2023).

6. Analysis of questionnaire data on the awareness and use of herbal products among horse owners (original research)

The purpose of this study was to examine the extent to which horse owners, whether they own one or multiple animals, use herbal preparations or blends, in what areas they apply them, and with what outcomes. A self-developed questionnaire was used, comprising single-, multiple-, and open-ended items. The target population comprised horse keepers in Hungary, who were primarily reached via social media platforms. The questionnaire was completed anonymously. The questionnaire was administered and made freely accessible to the general public from October 4–14, 2024.

In the first section of the questionnaire, respondents were asked to provide answers to socio-demographic questions. This part gathered information on the respondent's gender, age, highest level of education, place of residence, duration of involvement with horses, and the intensity of work their horses were subjected to. The subsequent section focused on medicinal plants, their use, and perceived effects. Respondents were asked whether they had previously used herbal or medicinal plant-based products in horses; for which

purpose or condition they applied them; how they selected the appropriate product; whether the use was preventive or aimed at treating an existing issue; and whether the product was used as a supplement to pharmaceutical treatment. Further questions focused on the following aspects: the amount of money spent on such products, the respondent's general preference for natural remedies, the brand and form of the product used, and finally, whether the respondent had been skeptical about the efficacy of herbal or herbal-based preparations.

6.1 Demographic and professional background of respondents

The survey received 104 responses.

A total of 81.9% of the questionnaire respondents were female and 18.1% were male. This gender distribution aligns with the growing female presence in the equestrian sector and reflects a broader trend in the use of herbal medicine, which has traditionally attracted more interest among women. Regarding educational background, the majority of participants held either university/college degree or completed secondary education (high school), accounting for 68.6% of all respondents.

The geographical distribution of respondents within Hungary: responses were received from 14 out of 19 counties, with the highest participation from Zala County, followed closely by Baranya County.

Participants were also asked about the duration of their involvement with horses or equestrian activities. Nearly half of the respondents (47.6%) reported having 11–20 years of experience. This was followed by those with 6–10 years of experience (24.3%) and those with over 20 years of experience (17.5%). Only 10.6% had less than 5 years of involvement, including a small portion with less than 1 year of experience.

6.2 Use and Perception of Medicinal Plant Products Among Equine Owners

The results reveal that 43.7% of participants had used both medicinal herbal products and herbal blends, while a further significant proportion used herbal blends alone, indicating a higher prevalence of their application. The most common reasons for use (Figure 2) were respiratory and musculoskeletal issues, followed by digestive and hoof-related problems. Other areas, such as liver detoxification, skin, coat, nervous system, immune function, and geriatric support, were also reported.

Regarding product selection, 42.7% of owners relied on a veterinary recommendation, while others chose independently (30.1%) or based on peer advice (22.3%). Notably, a few respondents used personalized consultations provided by product brands. The majority of users (74.8%) used herbal products to manage existing health issues, with only 25.2% using them preventively. Herbal supplements were used alongside conventional medical treatments in 39.8% of cases.

Financially, 74.8% of respondents reported spending between 10,000 and 30,000 HUF (per month) on such products, with some stating they would spend "as much as needed." A strong preference for plant-based products was evident, with 96.1% favouring them over alternatives. Among brands, FitoCavallo and Pacitea were the most frequently used, followed by TopVet, Biodopp, and Stiefel. A few owners reported using self-collected herbs or consulting herbalists.

In terms of formulation, 50% of respondents preferred dried herbs, while powdered forms (22.5%) were also popular. Other formats included creams, liquids, pellets, syrups, and tablets.

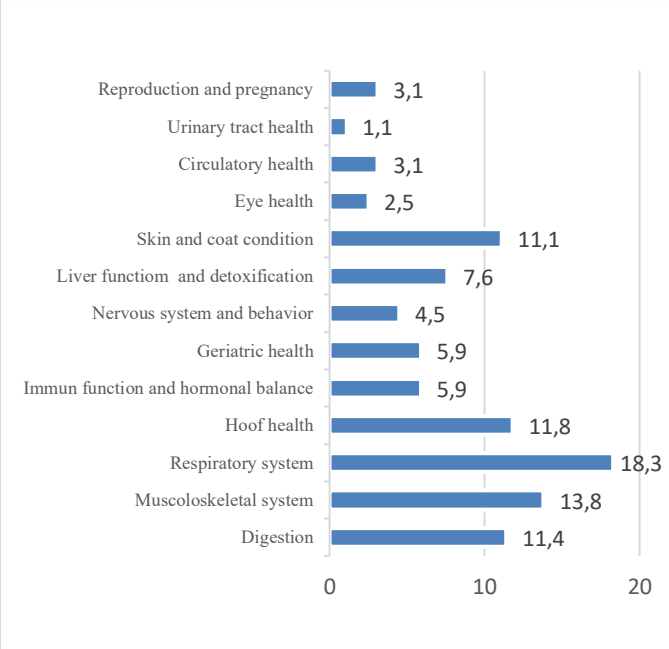
The final question aimed to assess whether the horse owners were, had become, or remained skeptical regarding the use of medicinal plants and herbal-based preparations. The results indicate that the majority of respondents (65%) held a positive opinion and continue to do so, while an additional 25.2% reported that, although they were initially skeptical, their doubts had since been dispelled. Altogether, this represents 90.2% of respondents expressing overall satisfaction or acceptance of herbal remedies. Nevertheless, a portion of participants (8.7%) remained unconvinced about the benefits of medicinal plants, and a small minority (1%) reported disappointment with the outcomes of herbal treatment.

These findings indicate significant interest and confidence in herbal therapies among horse owners, supported by increasing veterinary involvement and a trend toward natural solutions in equine health care, largely based on positive experiences.

7. DISCUSSION

In agreement with previously published literature, our findings indicate that certain medicinal plant-based formulations can be successfully utilised in equine therapy, either as preventive interventions or for targeted support in specific disorders. In recent years, interest in herbal and botanical products has grown markedly not only in human medicine but also in veterinary applications, including equine care. According to the results of resent survey, it seems that most horse owners are familiar with various herbal preparations, and an increasing proportion actively use them. The main areas of application include the prevention and management of respiratory, digestive, and musculoskeletal problems, with improved nutrient digestibility being particularly relevant. Enhanced digestion can contribute to better performance, maintenance of overall health, and a reduced risk of colic and gastric ulceration (Bartos et al., 2015).

Figure 2. The most common reasons for using herbal supplements (%)



Horses possess one of the most sensitive and vulnerable digestive systems among domesticated livestock species, necessitating careful attention to feed quality (Bartos et al., 2015). Colic remains the most common health issue in horses (Durham, 2009). Our horse related research has emphasized the improvement of equine digestion through dietary and phytotherapeutic interventions.

Respiratory health is another critical factor in equine performance. Modern stable environments often present multiple risk factors—such as elevated ammonia levels and airborne particulate matter—that may impair respiratory efficiency (Ivester et al., 2014). Certain herbs, such as peppermint (*Mentha piperita*), fenugreek (*Trigonella foenum-graecum*), and anise (*Pimpinella anisum*), have the potential to support respiratory function, even in mild cases of dysfunction, thereby positively influencing performance.

In musculoskeletal care, similar to human medicine, some medicinal plants may be beneficial for addressing common conditions such as strains and inflammation. For instance, comfrey (*Symphytum officinale*) has shown promise in promoting soft tissue healing (Staiger, 2012). Moreover, herbs such as anise, dandelion, and peppermint - also included in our experiments - have been linked to enhanced lipid digestion (McKay & Blumberg, 2006; Clare et al., 2009), which may indirectly benefit hoof health through improved absorption of fat-soluble vitamins and bioactive compounds **(**Feedmark Ltd., 2025).

In the treatment of the respiratory and musculoskeletal systems, the herbs mentioned were used partly on the basis of human clinical experience and partly on observations in animals. Specific equine-targeted experimental evidence is still limited.

It is evident that medicinal plants can play a valuable role in equine therapy. To promote knowledge in this field, educational courses and professional lectures dedicated to phytotherapy are strongly recommended. Notable examples include the professional workshop organized in 2005 with the support of the Hungarian Veterinary Chamber, which focused on the role of phytotherapy in alternative veterinary practices, and the launch of the highly regarded university-level program in Medicinal and Culinary Herb Cultivation.

Hungary offers exceptionally favorable conditions for the cultivation of medicinal plants, thanks to its diverse climatic zones, fertile soils, and longstanding traditions in herbal medicine (Bernáth & Németh, 2001). The most commonly cultivated species include chamomile (*Matricaria chamomi*lla L.)**,** peppermint (*Mentha* × *piperita* L.)**,** lemon balm (*Melissa officinalis* L.)**,** valerian (*Valeriana officinalis* L.)**,** and echinacea (*Echinacea purpurea* L.). Hungary is particularly known for its high-quality dried chamomile flowers, which are exported to many European countries.

The cultivation of medicinal plants is ecologically important because it can positively influence agro-biodiversity. Many species used in phytotherapy are native or naturalized flora, and their integration into agricultural landscapes helps maintain genetic diversity and support populations of pollinators and other beneficial organisms (Schippmann, et al. 2002; Licata et al., 2022). It is also important to highlight that medicinal plants are generally suitable for organic cultivation, which plays a crucial role in preserving soil health and reducing environmental contamination (Jiang et al., 2022). Moreover, the ecological footprint of herb production is typically smaller compared to that of intensive arable crops (Martin et al., 2023).

Despite their potential, the use of medicinal plants in equine nutrition requires caution (Poppenga, 2001). The scarcity of rigorously designed horse-specific trials makes it difficult to define standardised dosages or predict potential adverse effects. Professional guidance from veterinarians or certified phytotherapists is therefore essential, particularly when herbal supplements are used alongside pharmaceutical treatments, due to possible interactions.

To reduce the risks of side effects, allergic reactions, or interactions, further research is necessary to clarify the effects and safety profiles of specific herbs. Our recent experimental trials, along with Zsófia Marton's 2023 publication, may help raise awareness and support the integration of medicinal plants into equine healthcare.

Our previously published experiments (Bartos et al., 2015; Bartos et al., 2023) provide valuable initial data in this field, demonstrating that herbal preparations can be well accepted by horses and can measurably improve nutrient digestibility. These results highlight the potential role of phytotherapeutic

products in the prevention and management of digestive disorders in equine medicine and may increase confidence among both horse owners and veterinarians. Furthermore, the positive outcomes support the potential inclusion of such herbal blends in commercial equine feed formulations or reward-based treats.

It is important to note, however, that only a relatively small number of horses were available for the above-mentioned experiments. Therefore, similar studies should ideally be conducted on larger equine populations. In such studies, variability due to individual differences could be reduced, and the positive effects observed in the experiments could be more robustly supported. However, conducting equine trials is challenging in most cases due to the limited number of animals kept at a single facility and the high economic and intrinsic value of individual horses. This largely explains why studies involving large horse populations are rarely reported in the international scientific literature.

The questionnaire survey conducted during this work was designed to explore horse owners' practices regarding the use of medicinal plants and is subject to undeniable limitations, including its voluntary nature and the fact that it was conducted exclusively within the Hungarian equestrian community. Nevertheless, the results are noteworthy and clearly indicate that the use of medicinal plants in horse husbandry and nutrition may become increasingly significant in the future. According to international trends, the veterinary use of medicinal plants is most extensively applied in gastrointestinal treatments (Rodriguez et al., 2021). In horses, in addition to their digestion-enhancing applications, medicinal plants are also widely used for the management of respiratory and musculoskeletal conditions. Our survey findings strongly support this observation. The primary reason for this difference is that, in food-producing livestock, the digestive system plays the most decisive role in productivity. Horses, by contrast, are performance animals, where—beyond digestive efficiency—the proper function of the respiratory and muscular systems is equally critical.

In summary, in line with international trends (Mona et al., 2018), the use of medicinal plants in equine healthcare is becoming increasingly widespread in Hungary, as is their application in human medicine. These phytotherapeutic preparations appear particularly effective at enhancing digestion and alleviating respiratory disorders, and may also support muscle and hoof health. This growing significance is reinforced by the results of our own experimental studies and by survey findings among domestic horse owners. Beyond their nutritional value, medicinal plants offer ecological and economic advantages — particularly in regions such as Hungary, where environmental conditions are favourable for high-quality cultivation. Nevertheless, the currently available horse-specific scientific evidence remains limited, highlighting the need for further controlled trials to verify efficacy, optimise dosage protocols, and assess long-term safety. Strengthening the scientific foundation of equine phytotherapy would not only increase confidence among horse owners and veterinarians but also foster the development of targeted, herb-enriched feeds and supplements for equine health management.

REFERENCES

Akram, W., Ahmed, S., Rihan, M., Arora, S., Khalid, M., Ahmad, S., Haque, S., & Vashishth, R. (2023). An updated comprehensive review of the therapeutic properties of Chamomile *(Matricaria chamomilla L.)*. International Journal of Food Properties, 27(1), 133-164. DOI: 10.1080/10942912.2023.2293661

Barnes, J., Anderson, L. A., & Phillipson, J. D. (2007). Herbal Medicines (3rd ed.). Pharmaceutical Press. ISBN 978-0-85369-623-0

Bartos, A., Such, N., & Gál, F. V. (2023): The effect of a fermented herbal feed supplement on the digestion of horses. *Ecocycles*, *9*(2),32–36. DOI:10.19040/ecocycles.v9i2.282

Bartos, Á., Such, N., Koltay, I., Marton, Zs., & Bányai, A. (2015). Effect of a medicinal herb mixture on the apparent digestibility of nutrients in horses (in Hungarian/English). *Állattenyésztés és Takarmányozás, 64*, 198–206.

Bernáth J., Németh, É. (2001): Ecological diversity of Hungarian medicinal and aromatic plant flora and its regional consequences. International Journal of Horticultural Science. DOI: 10.31421/IJHS/7/2/260

Bhukta, P., Rath, D., Pattnaik, G., Kar, B., & Kumar Ranajit, S. (2021). A Comprehensive Review on Promising Phytopharmacological Applications of Chamomile Flower. Asian Journal of Chemistry, 33, 2864-2870. DOI: 10.14233/ajchem.2021.23390

Blumenthal, M. (2005). Herb sales down 7.4% in mainstream market. *HerbalGram, 66*, 63.

Bonaterra, G. A., Bronischewski, K., Hunold, P., Schwarzbach, H., Heinrich, E., Fink, C., Aziz-Kalbhenn, H., Müller, J., & Kinscherf, R. (2020). Anti-inflammatory and Anti-oxidative Effects of Phytohustil® and Root Extract of Althaea officinalis L. on Macrophages in vitro. Frontiers in Pharmacology, 11, 290. DOI: 10.3389/fphar.2020.00290

Chan, Y. S., Cheng, L. N., Wu, J. H., Chan, E., Kwan, Y. W., Lee, S. M. Y., Leung, G. P. H., Yu, P. H. F., & Chan, S. W. (2011). A review of the pharmacological effects of *Arctium lappa* (burdock). *Inflammopharmacology, 19*, 245–254. DOI: 10.1007/s10787-010-0062-4

Czirbus, Z. (2021): Strategy of Medicinal Plant Industry (in Hungarian) Gyógynövény Szövetség és Terméktanács (Hungarian Medicinal Plant Association and Product Council)

Chrubasik C, Roufogalis BD, Müller-Ladner U, Chrubasik S. (2008): A systematic review on the Rosa canina effect and efficacy profiles. Phytother Res. 2008 Jun;22(6):725-33.
DOI: 10.1002/ptr.2400

Clare, B. A., Conroy, R. S., & Spelman, K. (2009). The diuretic effect in human subjects of an extract of *Taraxacum officinale* folium over a single day. *Journal of Alternative and Complementary Medicine, 15*(8), 929–934.
DOI: 10.1089/acm.2008.0152

Durham, A. E. (2009). The role of nutrition in colic. *Veterinary Clinics of North America: Equine Practice, 25*, 67–78.
DOI: 10.1016/j.cveq.2008.11.003

El Mihyaoui A, Esteves da Silva JCG, Charfi S, Candela Castillo ME, Lamarti A, Arnao MB. (2022): Chamomile (*Matricaria chamomilla* L.): A Review of Ethnomedicinal Use, Phytochemistry and Pharmacological Uses. Life (Basel). 25;12(4):479.
DOI: 10.3390/life12040479

El-Saadony, M. T., Saad AM, Mohammed DM, Korma SA, Alshahrani MY, Ahmed AE, Ibrahim EH, Salem HM, Alkafaas SS, Saif AM, Elkafas SS, Fahmy MA, Abd El-Mageed TA, Abady MM, Assal HY, El-Tarabily MK, Mathew BT, AbuQamar SF, El-Tarabily KA és Ibrahim SA (2025): Medicinal plants: bioactive compounds, biological activities, and their applications. *Front. Immunol.*
DOI: 10.3389/fimmu.2025.1491777

Elshafie HS, Camele I, Mohamed AA. (2023): A Comprehensive Review on the Biological, Agricultural and Pharmaceutical Properties of Secondary Metabolites Based-Plant Origin. Int J Mol Sci. 2023 Feb 7;24(4):3266.
DOI: 10.3390/ijms24043266

Equine supplements product market size (2025): https://www.globalgrowthinsights.com/market-reports/equine-supplement-products-market-108817?utm_source=chatgpt.com

Feedmark Ltd. (2025). *Nutrition for Hoof Health.* Feedmark. Retrieved May 1, 2025, from https://www.feedmark.com/en/nutrition-for-hoof-health

Fehlberg LK, Lattimer JM, Vahl CI, Drouillard JS, Douthit TL. (2020): Digestibility of diets containing calcium salts of fatty acids or soybean oil in horses. Transl Anim Sci. 2020 Jan 7;4(2):txaa001.
DOI: 10.1093/tas/txaa001

Fors, M. (2009). *Herbs for horses.* Swedish University of Agricultural Sciences. Retrieved from https://stud.epsilon.slu.se/1454/7/fors_m_101007.pdf

Ivester KM, Couëtil LL, Moore GE, Zimmerman NJ, Raskin RE. (2014): Environmental exposures and airway inflammation in young thoroughbred horses. J Vet Intern Med. 2014 May-Jun;28(3):918-24.
DOI: 10.1111/jvim.12333

Jiang, L., Chen, Y., Wang, X., Guo, W., Bi, Y., Zhang, C., Wang, J., & Li, M. (2022). New insights explain that organic agriculture as sustainable agriculture enhances the sustainable development of medicinal plants. Frontiers in Plant Science, 13, 959810.
DOI: 10.3389/fpls.2022.959810

Jonas, W. B. (1997). Alternative medicine. *Journal o Family Practice, 45(1)*, 34–37. PMID: 9228911.

Kajla P, Sharma A, Sood DR. (2015): Flaxseed-a potential functional food source. J Food Sci Technol. 2015 Apr;52(4):1857-71.
DOI: 10.1007/s13197-014-1293-y

KSH (Hungarian Central Statistical Office). (2023). Agricultural production statistics. Retrieved from Hungarian Central Statistical Office database.

Kosiara, S. and Harrison, A.P. (2021) The Effect of Aromatherapy on Equine Facial Expression, Heart Rate, Respiratory Tidal Volume and Spontaneous Muscle Contractures in M. Temporalis and M. Cleidomastoideus. Open Journal of Veterinary Medicine, 11, 87-103.
DOI: 10.4236/ojvm.2021.112005

Kulcsár, N., Illés, Z., Temesi, N., Szendrő, É., & Szendrő, P. (2023): Sustainable approach for the collection and processing of medicinal and aromatic plants in Hungary. Progress in Agricultural Engineering Sciences, 19(1), 83–112.
DOI: 10.1556/446.2023.00097

Kulcsár, M., Karamanová, M., Novotný, F., Vilhanová, Z., Pettenello, M., & Tóthová, Cs. (2022). Phytotherapy compared to omeprazole therapy in equine gastric ulcers. *Acta Veterinaria Brno, 91*, 309–315.
DOI: 10.2754/avb202291040309

Licata, M., Maggio A. M. La Bella, S., Tuttolomondo, T. (2022): Medicinal and Aromatic Plants in Agricultural Research, When Considering Criteria of Multifunctionality and Sustainability *Agriculture* 2022, *12*(4), 529
DOI: 10.3390/agriculture12040529

Marcelino, S., Hamdane, S., Gaspar, P. D., Paço, A. (2023): Sustainable Agricultural Practices for the Production of Medicinal and Aromatic Plants: Evidence and Recommendations *Sustainability* 2023, *15*(19), 14095
DOI: 10.3390/su151914095

Mahboubi M. (2020): Marsh Mallow (Althaea officinalis L.) and Its Potency in the Treatment of Cough. Complement Med Res. 2020;27(3):174-183. English.
DOI: 10.1159/000503747

Martin, M., Bengtsson, E., Carotti, L., Orrestig, K., Orsini, F. (2023): Environmental assessment of greenhouse herb production: A case of longitudinal improvement options in Sweden. Resources Conservation and Recycling. 193. 106948.
DOI: 10.1016/j.resconrec.2023.106948

Marton, Zs. (2005). Horseherba. Herbs for horses. Equinter Publisher.

Marton, Zs. (2023). Herbs. Dzsar Ltd.

Mátray, Á. (2005). Fundamentals of Ecological and Alternative Veterinary Medicine. Mezőgazda Ltd.

McKay, D. L., & Blumberg, J. B. (2006). A review of the bioactivity and potential health benefits of peppermint tea (*Mentha piperita* L.). *Phytotherapy Research, 20*(8), 619–633.
DOI: 10.1002/ptr.1936

Mehmood MH, Munir S, Khalid UA, Asrar M, Gilani AH. (2015): Antidiarrhoeal, antisecretory and antispasmodic activities of Matricaria chamomilla are mediated predominantly through K(+)-channels activation. BMC Complement Altern Med. 2015 Mar 24;15:75.
DOI: 10.1186/s12906-015-0595-6

Miguel, M. G. (2010). Antioxidant and anti-inflammatory activities of essential oils: a short review. *Molecules, 15*, 9252–9287.
DOI: 10.3390/molecules15119252

Mona, M. M. Y. Elghandour, Reddy, P. R. K., Salem, A. Z. M., Reddy, P. P. R., Hyder, I., Barbabosa-Pliego, A., & Yasaswini, D. (2018). Plant bioactives and extracts as feed additives in horse nutrition. *Journal of Equine Veterinary Science, 69*, 66–67.
DOI: 10.1016/j.jevs.2018.06.004

NAK – Medicinal Plant Section of the Hungarian Chamber of Agriculture. (2022): The Current Status and Prospects of the Medicinal Plant Sector

Panyor, Á. (2012): A study on medicinal herb consumption habits.
http://real.mtak.hu/id/eprint/73584

Parente, R., Paiva-Santos, A. C., Cabral, C., & Costa, G. (2025). Comprehensive review of *Urtica dioica* L. (Urticaceae) phytochemistry and anti-inflammatory properties. *Phytochem Rev* 24, 1591–1628 (2025).
DOI: 10.1007/s11101-024-09980-6

Parnham MJ. (1996): Benefit-risk assessment of the squeezed sap of the purple coneflower (Echinacea purpurea) for long-term oral immunostimulation. Phytomedicine. 1996 May;3(1):95-102.
DOI: 10.1016/S0944-7113(96)80020-1

Pearson, W., McKee, S., & Clarke, A. F. (2000). Effect of a proprietary herbal product on equine joint disease. *Journal of Nutraceuticals, Functional and Medicinal Foods, 2*, 31–46.
DOI: 10.1300/J133v02n02_04

Poppenga RH. (2001): Risks associated with the use of herbs and other dietary supplements. Vet Clin North Am Equine Pract. 2001 Dec;17(3):455-77, VI-VII.
DOI: 10.1016/s0749-0739(17)30045-7

Poppenga, V., Azimonti, G., Bastos, M. L., Kouba, M., López-Alonso, M., López Puente, S., Marcon,F., Mayo, B., Pechová, A., Petkova, M., Ramos, F., Sanz, Y., Villa,R. E., Woutersen, R., Brantom, P., Chesson, A., J Westendorf, J., Manini, P., Pizzo, F., Dusemund. B (2023): Scientific Opinion on the safety and efficacy of feed additives obtained from the fruit of Pimpinella anisum L.: anise oil for use in poultry and horses and anise tincture for use in poultry, dogs, cats and horses. EFSA Journal, 21(4):7976.
DOI: 10.2903/j.efsa.2023.7976

Preedy VR., WatsonRR., Patel VB (2011): Nuts and Seeds in Health and Disease Prevention. Elsevier Inc, London ISBN: 978-0-12-375688-6

Preethi, K. C., Kuttan, G., & Kuttan, R. (2009). Anti-inflammatory activity of flower extract of *Calendula officinalis* Linn. and its possible mechanism of action. *Indian Journal of Experimental Biology, 47*, 113–120.
https://pubmed.ncbi.nlm.nih.gov/19374249

Rodríguez Coipel Y, Domínguez Odio A, Mena Álvarez O, Toirac Proenza R, González Marrero I, Cala Delgado DL. (2021): Global market for veterinary herbal products during the 2018-2019 period. Braz J Vet Res Anim Sci. 2021; 58:e181002
DOI: 10.11606/issn.1678-4456.bjvras.2021.181002

Santiago, L.Â.M., Neto, R.N.M., Santos Ataíde, A.C., Fonseca, D.C.S.C., Soares, E.F.A., de Sá Sousa, J.C., Mondego-Oliveira, R., Ribeiro, R.M., de Sousa Cartágines, M.S., Lima-Neto, L.G., Carvalho, R.C., & de Sousa, E.M. (2021). Flavonoids, alkaloids and saponins: are these plant-derived compounds an alternative to the treatment of rheumatoid arthritis? A literature review. Clinical Phytoscience, 7, 58.
DOI: 10.1186/s40816-021-00291-3

Schippmann, U., Leaman, D. J., & Cunningham, A. B. (2002). Impact of cultivation and gathering of medicinal plants on biodiversity: Global trends and issues. In Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries. FAO.142-167
DOI: 10.3390/f11060661

Schulz, V., Hansel, R., yler, V. E. (1998): Agents that increase resistance to diseases
Rational Phytotherapy, Springer-Verlag, New York, pp. 269-285

Seidler-Łożykowska, K., Mordalski R., Wojciech Kucharski, W., Kędzia1, Kamila Nowosad, K., Bocianowski, J. (2015). Effect of organic cultivation on yield and quality of lemon balm herb (*Melissa officinalis L.*). Acta Scientiarum Polonorum. Hortorum Cultus, 14(5), 55-67

Sharma, M. & Sharma M. (2020). Impact of climate change on medicinal plants. In: Compendium of Research insides of life science students. JPS Scientic Publications India 754-756.

Stachurska A., Tkaczyk E., Różańska-Boczula M., Janicka W., & Janczarek I. (2022). Horses' Response to a Novel Diet: Different Herbs Added to Dry, Wet or Wet-Sweetened Oats. Animals, 12(11), 1334.
DOI: 10.3390/ani12111334

Staiger, C. (2012). Comfrey: A clinical overview. *Phytotherapy Research, 26*(10), 1441–1448.
DOI: https://doi.org/10.1002/ptr.4612

Tanasa, M.-V., Negreanu-Pirjol, T., Olariu, L., Negreanu-Pirjol, B.-S., Lepadatu, A.-C., Anghel, L., & Rosoiu, N. (2025): Bioactive Compounds from Vegetal Organs of Taraxacum Species (Dandelion) with Biomedical Applications: A Review. *International Journal of Molecular Sciences, 26*(2), 450.
DOI: 10.3390/ijms26020450

Tattelman, E. (2005): Health Effects of Garlic. Am Fam Physician. jul.1: 72(1): 103-6 PMID: 16035690

Török, K., Vida, G., Deák, J., Lengyel, S., & Tóthmérész, B. (2011). Grassland restoration on former croplands in Europe: An assessment of applicability of techniques and costs. *Biodiversity and Conservation, 20*(11), 2311–2332. DOI: 10.1007/s10531-011-9992-4

Wang ZY, Nixon DW. (2001): Licorice and cancer. Nutr Cancer. 2001;39(1):1-11.
DOI: https://10.1207/S15327914nc391_1

Weiss, R. F., Fintelmann, V. (2001): Herbal medicine. Second edition Thieme.
ISBN: 0865779333, 9780865779334

Wichtl, M. (2004). Herbal Drugs and Phytopharmaceuticals: A Handbook for Practice on a Scientific Basis (3rd expanded ed.). Medpharm Scientific Publishers / CRC Press. ISBN 978-0-8493-1961-7.

Williams CA, Lamprecht ED. (2008) Some commonly fed herbs and other functional foods in equine nutrition: a review. Vet J. 2008 Oct;178(1):21-31.
DOI: 10.1016/j.tvjl.2007.06.004

World Health Organization. (2003). *WHO Monographs on Selected Medicinal Plants, Volume 2.* World Health Organization WHO.

Zaki, A. Y., & Abo-Snaf R. I. (2018). Soil mites inhabiting chamomile and marigold plants under two different cultivations at Fayoum governorate. Acarines Journal of the Egyptian Society of Acarology 12(1):75-79
DOI: 10.21608/ajesa.2008.164302