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Herbs for horses

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By

Maria Fors

Svensk titel: Örter till hästar
Handledare: Cecilia Müller
Institutionen för husdjurens utfodring och vård
Examinator: Peter Udén

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Detta arbete har genomförts inom ramen för kursen EX0553, Kandidatarbete i Husdjursvetenskap – C15. Kursen består i huvudsak av handledd litteraturgenomgång som leder fram till examensarbete inom ämnesområdet husdjursvetenskap. I kursen ingår undervisning i att söka och värdera vetenskaplig litteratur samt i muntlig och skriftlig presentation.

Institutionen för husdjurens utfodring och vård

Swedish University of Agricultural Science
Department of Animal Nutrition and Management

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Abstract

The aim of this study was to find out how many and which of the herbs used for horses that have been scientifically studied with results to justify the use. In order to find out which herbs that are commonly used by horse-owners a phone interview was performed where six companies selling herbs for horses was contacted and asked to provide information on the most sold herbs for horses in Sweden. Devil's claw (*Harpagophytum procumbens)*, chamomile *(Matricaria recutita)*, dandelion *(Taraxacum officinalis)*, nettle *(Urtica dioica)* and monk's pepper *(Vitex agnus-castus)* where the most sold herbs, followed by marshmallow *(Althaea officinalis)*, burdock *(Arctium lappa)*, marigold *(Calendula officinalis)*, purple coneflower *(Echinacea angustifolia/purpurea)*, cleavers *(Galium aparine)*, licorice *(Glycyrrhiza glabra)*, rose hip *(Rosa canina)*, thyme *(Thymus vulgaris)* and vervain *(Verbena officinalis)*, in no particular order. Of the most used herbs, research with focus on the use for horses was found for purple coneflower, licorice, devil's claw, monk's pepper, rose hip, thyme, and vervain. These studies did not cover the whole range of traditional use for the mentioned herbs, and more studies are needed to be able to claim that these herbs have, or have not, scientific support for use in equine management.

Sammanfattning

Syftet med det här arbetet var att undersöka hur mycket vetenskapliga fakta det finns bakom användningen av örter till hästar. För att få en uppfattning om vilka örter och örtprodukter som är de mest sålda i Sverige utfördes telefonintervjuer med sex företag som säljer örter specifikt till hästar. Djävulsklo (*Harpagophytum procumbens)*, kamomill *(Matricaria recutita)*, maskros *(Taraxacum officinalis)*, nässla *(Urtica dioica)* och munkpeppar *(Vitex agnus-castus)* var de mest sålda örterna, följda av läkemalva *(Althaea officinalis)*, stor kardborre *(Arctium lappa)*, ringblomma *(Calendula officinalis)*, röd solhatt *(Echinacea angustifolia/purpurea)*, snärjmåra *(Galium aparine)*, lakritsrot *(Glycyrrhiza glabra)*, nypon *(Rosa canina)*, timjan *(Thymus vulgaris)* och järnört *(Verbena officinalis)*, utan inbördes ordning. Studier gjorda på häst återfanns inte för alla de nämnda örterna och de studier som finns täcker inte alla aspekter av traditionell användning. Fler studier behöver göras för att man skall kunna påstå att det finns vetenskaplig bakgrund för användande eller förkastande av dessa örter till hästar.

Introduction

Herbs have a traditional use as medicines all around the world; even some animals, such as chimpanzees, have demonstrated use of herbs for medicinal purposes (Page, 1992). It has also been noticed that different primates, including humans, have the same preferences when selecting herbs for particular diseases (Huffman, 1998). Some of the earliest known books deal with the subject of medicinal herbs. The first known *Materia Medica* was written in ancient Greece by Dioscorides, and included 24 different books, where 500 different herbs with medical uses were described. The medicine developed in prehistoric China has largely survived by continuous use, and today it represents the most comprehensive clinical strategies for the use of herbal medicines (Mills & Bone, 2000).

Today, herbal supplements comprise approximately 0,5 % of the global drug prescription for humans. Even though this sounds like a small percentage, the global market for herbal supplements was $5.6 billion in 2006. The market is predicted to grow to $6.1 billion by 2011

(Gray, 1996). This does not include all the herbs that are possible to grow on your own or collect from nature. In a survey done in the US in 1998, 70% of the horse-owners stated that they used some kind of supplement for their horse. Of these, 4.9 % were pure herbal supplements (United States Department of Agriculture, 1998). Williams & Lamprecht published a review paper in 2008 containing information on commonly fed herbs and other functional foods in equine nutrition. Herbs such as flaxseed (*Linum usitatissimum*), garlic (*Allium sativum*), ginger (*Zingiber officinale*), ginseng (*Panax spp*.), valerian (*Valeriana spp*.), devil's claw (*Harpagophytum procumbens)*, purple coneflower *(Echinacea angustifolia/purpurea)* and yucca (*Yucca schidigera*) were included. However, no corresponding paper exists for Swedish conditions.

Herbs have played an important role in our history, and still attract many people. It is no wonder that horse owners like the idea to give herbs to their horses, but are there any evidence that herbs are useful for horses? Can we assume that the herbs we would use on our selves are beneficial for similar conditions in horses? This essay is an attempt to collect some of the scientific information about the use of herbs for horses. The herbs included in this essay were selected after performing a phone-interview with companies in Sweden selling herbs for horses, where the companies were asked to provide information on which herbs were most sold. These herbs have been included in the essay.

Material and Methods

To get an idea of which herbs are most popular among horse owners and horse keepers, a telephone interview was performed. Six companies selling herbs specifically for horses were selected on the Internet and the following questions were asked:
1. Which herbs/herb products are the most sold? If a blend; which herbs are included?
2. In which forms does your company sell herbs?
3. Is there any control of the active ingredients in the herbs?
4. Are you aware of any research done on herbs with horses as the main focus?

Results

Out of the six companies contacted, four answered the questions. Twenty-seven herbs were mentioned as parts of the most popular blends or as the most sold single herbs (Figure 1).

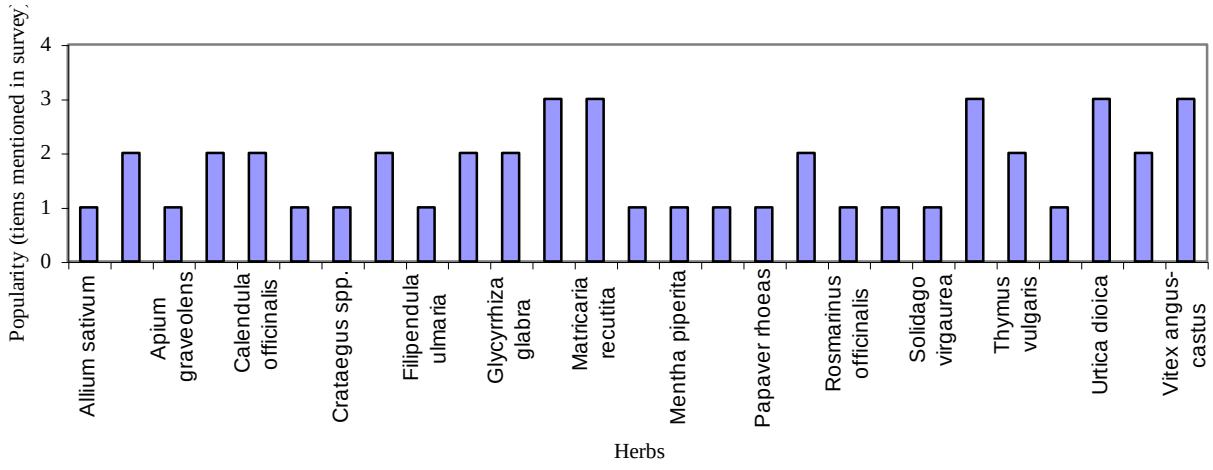

Figure 1. The most sold herbs according to four companies selling herbs for horses (see appendix 1 for English and Swedish names of the herbs).

Marshmallow *(Althaea officinalis)*, burdock *(Arctium lappa)*, marigold *(Calendula officinalis)*, purple coneflower, cleavers *(Galium aparine)*, liquorice *(Glycyrrhiza glabra)*, devil's claw, chamomile *(Matricaria recutita)*, rose hip *(Rosa canina)*, dandelion *(Taraxacum officinalis)*, thyme *(Thymus vulgaris)*, nettles *(Urtica dioica)*, vervain *(Verbena officinalis)* and monk's pepper *(Vitex agnus-castus)* were mentioned more than once by the companies. Among these, devil's claw, chamomile, dandelion, nettle and monk's pepper were mentioned more often than the others.

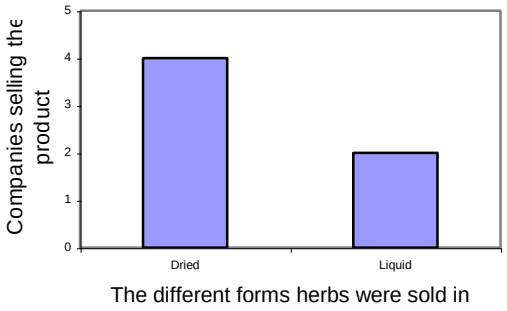

Figure 2. Four companies sold herbs in dried form and two of the companies also sold herbs in liquid form.

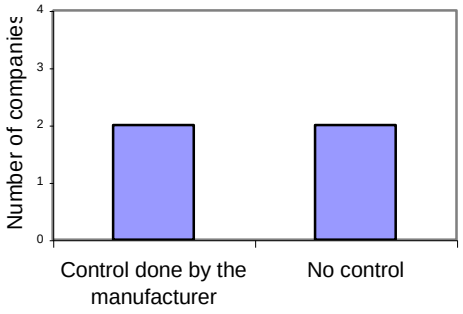

Figure 3. Two of the companies had control of active constituents in the herbs sold.

Most companies replied that most herbs were sold in dried form (figure 2); only devil's claw seemed to be sold more as a liquid solution. Some blends where also available in liquid solution. On the question about control of active ingredients, two of the companies where not aware of any controls and two stated that there was control done by the manufacturers and that the products were approved by the rules of racing and the Fédération Equestre Internationale, FEI. Devil's claw was specifically mentioned as a herb with controlled levels of harpagosides, with a minimum 1.2%. When the companies were asked about research done on herbs for horses, no one was able to give specific references to any research done on horses regarding herbs.

Literature study

Marshmallow (Althaea officinalis)

Traditional internal uses in humans for marshmallow root are respiratory diseases involving the mucus membranes, kidney and urinary tract infections, and gastrointestinal irritations and inflammations. Topically it has been used on wounds, swellings and bruises. The leaves have been used internally for bronchitis, respiratory catarrh and different urinary problems and topically for abscesses, boils and ulcers. Demulcent and emollient actions[1] are attributed to marshmallow. The active constituents in both the root and the leaves are acidic polysaccharides forming mucilage, but the concentration is higher in the root (Bone, 2003).

No research seems to have been done on the use of marshmallow to horses, but research has been performed *in vitro* and in other species *in vivo*. The antitussive effect of marshmallow has been shown in a study with cats. The cats received 1000 mg/kg bodyweight of an extract, or 50 mg/kg bodyweight of polysaccharides isolated from marshmallow, orally.

[1] Herbal actions are explained in Appendix 2

After mechanical stimulation of the mucus membranes to produce cough in both the laryngopharyngeal and tracheobronchial tracts, the antitussive effect was found to be comparable to non-narcotic antitussic drugs (Nosál'ova *et al.*, 1992). An experiment on guinea pigs indicated that the antitussive effect was associated with the function of serotogenic 5-HT_2 receptors (Šutovská *et al.*, 2009). In a study by Li *et al*. (2002), agonists of serotogenic 5-HT_2 receptors showed antitussive properties in capsacininduced cough. Šutovská *et al.* (2009) used serotogenic 5-HT_2 receptor antagonists to decrease the effect of a known antitussive. In vitro studies have indicated that the adhesion of polysaccharides to mucous membranes might have a part in the therapeutic effect of mucilage on irritated membranes (Schmidgall *et al.*, 2000).

Burdock (Arctium lappa)

Traditional uses for burdock on humans involve skin conditions such as eczema, psoriasis, boils and other conditions associated with weak circulation or with nutrition. Rheumatism, cystitis, gout, anorexia nervosa and dyspepsia are other conditions where burdock is used because it is considered to be a good depurative. Mild diuretic and mild laxative effects are also attributed to burdock (Bone, 2003).

Antimutagenicity, anticarcinogenicity, and antiaging properties given to burdock, as well as the hepatoprotectic activity, may be due to the antioxidant activity of caffeoylquinic acid derivatives present in the plant. The antioxidant activity has been found to be highest in the seeds, followed by the leaves and the root. The constituents of burdock also include flavonoids and lignans (Ferrance *et al.*, 2009). A fructan extracted from burdock and given to cats produced an antitussive effect. Codeine was more effective than the fructan from burdock, but the fructan was more effective than both dropropizine and prenoxdiazine (Kardosová *et al.*, 2003). No research involving horses was found.

Marigold (Calendula officinalis)

Traditional internal uses for marigold include inflammatory skin lesions, enlarged or inflamed lymph nodes, gastric and duodenal ulcers, amenorrhoea, dysmenorrhoea, nosebleed and fever in humans. Topically it has been used for wounds and different skin problems such as acne, eczema, haemorrhoids and varicose veins. Vulnerary, anti-inflammatory, lymphatic, styptic and antimicrobal, topically also antiviral and antifungal actions are attributed to marigold (Bone, 2003).

The vulnerary effect has been shown on rats with thermal burns (Preethi *et al.*, 2008). The rats where given oral doses (20 mg, 100 mg and 200 mg/kg body weight) of flower extracts from marigold. Collagen-hydroxyproline and hexosamine levels where raised in treated animals compared to the control group, indicating an improved wound healing among the treated animals. The animals receiving the marigold extract also had a decreased level of acute phase proteins, an increased level of antioxidants in the liver and a lower amount of lipid peroxidation (Preethi *et al.*, 2008). Oleanolic acid is probably at least one of the constituents responsible for the antimicrobal activity of marigold, and has also shown antiparasitic activity in *vitro by* inhibiting the growth of the intestinal nematode *Heligmosomoides polygyrus*, infecting rodents (Szakiel *et al.*, 2008). Low doses of marigold extract have showed an anti-genotoxic activity in rat liver cells, but in high doses, the extract was genotoxic. The difference between the high and the low dose was however large, as the magnitude of the low

dose was ng/ml and of the high dose g/ml (Pérez-Carreón *et al.*, 2002). Antioxidant properties of marigold have also been confirmed *in vitro* on human neutrophils (Herold *et al.*, 2003).

Purple coneflower (Echinacea angustifolia/purpurea)

Traditional uses of purple coneflower on humans include remedies for different skin conditions such as boils, insect and snakebites, wounds, eczema and psoriasis. Other use has been for respiratory catarrh and gastrointestinal problems, such as indigestion or diarrhoea. Purple coneflower has also been used for fevers, influenza and mastitis. Immune modulating and enhancing, depurative, anti-inflammatory, vulnerary and lymphatic are actions attributed to purple coneflower. Alkylamides, caffeic acid esters (including echinacosides), polysaccharides, flavonoids and essential oils are some of the constituents considered to have a therapeutic effect (Mills & Bone, 2000).

Chicoric acid, one of the constituents in purple coneflower, has been found to have an antioxidant activity, increased by the presence of alkamides, *in vitro* (Thygesen *et al.*, 2007). An immune enhancing effect in horses has been shown in a double blind, placebo-controlled, randomised study where eight healthy horses where given a purple coneflower solution for 42 days. The administered amount was equivalent to 1000 mg standardized extract (containing 0.04 echinacosides). The placebo substance was an identical sucrose/water solution without the purple coneflower extract. Blood-samples where collected once a week during the study. At day 35, an increased level of lymphocytes was notable and the phagocytic effect of neutrophils was increased, as well as their migration into tissues, in horses receiving the purple coneflower. The concentration of haemoglobin in the blood was also increased, as well as the concentration of peripheral red blood cells. The conclusion in the study was that purple coneflower functions both as a haematinic agent and as an immune enhancer in horses (O'Neill *et al.*, 2002).

Cleavers (Galium aparine)

Cleavers have a traditional use for kidney problems, kidney stones, painful urination and inflammation of the kidneys and the urinary bladder in humans. Skin diseases such as eczema and psoriasis are also targets. Actions attributed to cleaver are diuretic and depurative (Bone, 2003). There seems to be very little research done on cleavers even though it is frequently mentioned as a herb of traditional use.

Liquorice (Glycyrrhiza glabra)

Traditional uses for liquorice in humans include reducing irritation of mucous surfaces around the body, bronchial catarrh, gastritis, ulcers, colic, rheumatism and arthritis. The key active constituents are triterpenoid saponins, including glycyrrhizin (GL), glycyrrhetinic acid (GA), flavonoids and sterols. Actions include anti-inflammatory, mucoprotective, demulcent, adrenal tonic, expectorant, antitussive, anticariogenic, mild laxative and antiulcer (Bone, 2003).

Liquorice is included in several herbal blends figuring in studies on horses. In a study on horses with recurrent airway obstruction, liquorice was combined with thyme (see thyme for further information) (Pearson *et al.*, 2007a). In a study of Chinese herbal medicine, liquorice

was included in a herbal blend for horses with chronic diarrhoea, following a “cold pattern”. The symptoms for “cold pattern” diarrhoea included watery faeces, or normal faeces combined with water, and increased bowel movements. Two hundred horses received either 200 g of the blend a day for three to five days, or 30 g twice a day for 10-14 days. It was stated that the horses responded well to the treatment and recovered after the second dose. Horses with acute typhitis-colitis (“heat-pattern” diarrhoea) also received a herbal blend including liquorice. "Heat pattern” diarrhoea included “mucoid faeces with a foul odour.” Other signs were described as “depression, loss of appetite or no appetite, fever, abdominal pain and scanty, dark urine.” The horses received 300 g of the blend once a day for five days or 50 g twice a day for ten days. Of the 57 horses, 46 recovered after the treatment when combined with fluid and electrolyte supportive treatment (Xie *et al.*, 2008).

GL and GA have both been shown to affect the adrenal-kidney-pituitary axis in rats. The plasma-levels of cortisol, adrenocorticotropic hormone, aldosterone and potassium where decreased while levels of renin and sodium where increased after oral administration of freezedried extract of dried liquorice root in water (Al-Qarawi *et al.*, 2002). Hepatoprotective activity of liquorice has been showed *in vivo* by its free radical scavenging effects and ability to block the bioactivation of carbon tetrachloride. The study was performed on mice, which received GA (10-100 mg/kg subcutaneosly) once a day for three days. The mice pre-treated with GA coped better with the administration of carbon tetrachloride compared to a control group (Joeng *et al.*, 2002).

Devil’s claw (Harpagophytum procumbens)

Rheumatism, arthritis, gout, loss of appetite and digestive disorders are conditions that traditionally have been treated by administration of devil’s claw in humans. Its actions include anti-inflammatory, antirheumatic, analgesic and a bitter tonic. The key active constituents are iridoid glycosides, where harpagosides are the most notable (Bone, 2003).

In a blind, placebo controlled, crossover designed study, a joint supplement containing devil’s claw was tested on horses. Devil’s claw was combined with burdock, nettle, dandelion and comfrey (*Symphytum officinalis*) in a herbal blend. Six horses suffering from osteoarthritis participated in the study. The study was divided into two phases lasting for 28 days each, where the horses randomly got either the herbal treatment or placebo, containing alfalfa. Each horse had received both the placebo and the herbal treatment after both phases was completed. An anti-inflammatory effect was noticed in a reduction in prostaglandin E2 in synovial fluid, but most of the horses did not show any improvement in lameness due to the treatment (Pearson *et al.*, 1999). The anti-inflammatory effect of a similar herbal blend has also been shown in a cartilage model of osteoarthritis (Pearson *et al.*, 2007b).

Devil’s claw was combined with black currant *(Ribes nigrum)*, horsetail *(Equisetum arvense)* and white willow *(Salix alba)* in a study on horses with bone spavin by Montavon (1994). Twenty horses participated in the study; ten horses received the herbal blend and ten horses received phenylbutazone. After 120 days the horses that received the herbal blend had an average lameness score of 6 (on a scale ranging from 0-12) and the horses that received phenylbutazone had an average lameness score of 8.6. No additional information was found in English.

Chamomile (Matricaria recutita)

Chamomile has a traditional use in humans for digestive disorders due to nervousness and restlessness, and catarrhal conditions of the nose, ears end eyes. Topically it has been used for inflammations and irritations of the skin, such as mastitis and ulcers. The active ingredients are considered to be the essential oil, containing α-bisabolol and chamazulene, and flavonoids. Chamomile is considered to have anti-inflammatory, spasmolytic, carminative, mild sedative, antiulcer, vulnerary and diaphoretic actions (Bone, 2003).

The flavonoid apigenin found in chamomile has been found to have an antianxient and mildly sedative effect in mice, in an elevated plusmaze, after injection. No muscle relaxant effects where noticed (Viola *et al.*, 1995). The effect on tumorigenesis practiced by chamomile has been investigated by Wei *et al*. (1990). Mice that received a topical application of apigenin did not develop tumours 33 weeks after initiated tumorigenesis, while 48 % of the non-treated mice developed tumours. A partially double blind, randomised study in humans with medium-degree atopic eczema, was carried out as a half-side comparison where half the body was treated with a cream containing chamomile extract and the other half with a placebo. The results were compared to a group where half the body was treated with 0.5% hydrocortisone cream and the other body half with placebo. The cream with chamomile extract was found to be more effective than the 0.5% hydrocortisone cream, but the placebo effect was high (Patzelt-Wenczler & Ponce-Pöschl, 2000). In a German study by Aertgeerts *et al.* (1985) a cream with chamomile extract showed similar results as a 0.25% hydrocortisone cream while the effect was superior to non-steroidal anti-inflammatory creams and glucocorticoids. The study was performed on 161 humans with inflammatory dermatosis. No research including horses was found.

Rose hip (Rosa canina)

Rose hip is not mentioned in the herbals by Mills & Bone (2000) or Wynn & Fougère (2007), indicating that rosehip has had a larger use as food than medicine. In a double blind, placebo controlled trial by Winther *et al.* (2008), seventy-four trotters where given a preparation containing galactolipids isolated from powdered rosehip The horses in the placebo group where given a powder with similar colour, taste and smell as the powder containing the galactolipids. The horses received 210 g of the powder daily. After three months the horses treated with the preparation showed an enhanced anti-inflammatory activity by declined neutrophil chemotaxis and increased their ability to run 1000 m (by decreasing the time). The horses where also considered by the staff to be more lithe after exercise. Jansson (2009) argued that some of the positive effects seen by Winther *et al*. (2008) could be due to the effect of training. The horses in the treatment group hade more space to improve their physics, as their initial record running 1000 m was slower compared to the placebo group record. After the experiment had finished, the groups had the same record for 1000 m. The changes seen in the immune defence could be due to individual differences, since data to contradict or confirm this was not included in the study.

Dandelion (Taraxacum officinalis)

Traditional use of dandelion in humans includes impaired digestion, constipation, uterine obstruction, chronic skin diseases and muscular rheumatism. Both the root and the leaves are

considered to have the same actions: bitter tonic, choleretic, diuretic, mild laxative and antirheumatic (Bone, 2003).

Dandelion leaves have shown a strong diuretic effect when administered orally to rats, while dandelion root showed only a mild diuretic effect. The high potassium content in both leaves and root may prevent from depletion of potassium through the increased urine production (Rácz-Kotilla *et al.*, 1974). Dandelion extracts have been found to inhibit the production of the pro-inflammatory mediator nitric oxide and COX-2 expression *in vitro* and *in vivo* in rats. Dandelion is thereby considered to have anti-inflammatory and antinociceptive actions (Jeon *et al.*, 2008). No research including horses was found.

Thyme (Thymus vulgaris)

Traditionally thyme has been used for gastrointestinal problems such as dyspepsia, colic, flatulence and diarrhoe in humans. Respiratory problems such as sore throat, bronchitis and catarrh are also conditions for which thyme has been used for relief. Key constituents are the monoterpenes thymol, carvacrol and thymol methyl ether in the essential oil, and different flavonoids, such as methylated flavones, phenolic glycosides and aliphatic alcohols. Biphenylic compounds and phenolic acids (such as rosmarinic acid) are also parts of the key constituents. Expectorant, spasmolytic, antibacterial, antifungal, antioxidant and topically rubifacient and antimicrobal are actions attributed to thyme (Bone, 2003).

A randomised crossover pilot study including horses with recurrent airway obstruction (heaves) indicated that a blend of herbs consisting of thyme, garlic, white horehound (*Marrubium vulgare*), boneset (*Eupatorium perfoliatum*), aniseed (*Pimpinella anisum*), fennel (*Foeniculum vulgare*), liquorice and hyssop (*Hyssopus officinalis*) could be useful in reducing elevated respiratory rates. Six horses with heaves were divided into two groups, each group receiving the treatment for 21 days during one of two experimental periods. The tree horses not receiving the treatment were assigned as control group and received 55 g chopped alfalfa instead of the herbal blend. The respiratory rates where decreased in the horses receiving the herbal treatment compared to the control group, and the authors wanted to continue the research in a study including more horses (Pearson *et al.*, 2007a).

In a study by van den Hoven *et al.* (2003) involving horses with recurrent airway obstruction, a preparation made from thyme and cowslip (*Primula veris*) improved the pulmonary pressure and airway resistance of the horses' lungs after one month of treatment. The clinical signs of heaves were not improved. The study was performed as a longitudinal, self-controlled study. Five horses were given 15 tablets, containing 160 mg of thyme and 60 mg of cowslip, twice a day with their feed, and were kept in poor environmental conditions (poor quality hay etc.).

Nettles (Urtica dioica)

Traditional use of nettle leaves in humans includes chronic or nervous eczema, diarrhoea, nosebleeds, bronchial conditions and bladder disorders. Topical uses are for joint pains, burns, wounds and inflammations of the mouth and throat. The key constituents are flavonol glycosides, sterols, carotenoids and vitamins. The stinging hairs contain histamine, seratonine and acetylcholine. Antirheumatic, antiallergic, depurative and styptic actions are attributed to nettle (Bone, 2003).

The antiallergic action attributed to nettle has been shown *in vitro* by Roschek *et al.* (2009). The nettle extract competed with ligands binding to H_1-receptors and could block histamine triggered allergic reactions in the same manner as some commercial antihistamines. The extract also inhibited the synthesis of prostaglandin D2. Anti-inflammatory properties were found in the same study, as the nettle extract inhibited mast cell tryptase activity, preventing release of proinflammatory mediators, and inhibited the cyclooxygenases COX-1 and COX-2.

Vervain (Verbena officinalis)

Traditional use of vervain in humans includes depression, nervous breakdown, feverish conditions, intestinal colic, influenza and rheumatism. Actions are nervine tonic, mild antidepressant, mild diaphoretic and astringent. Active constituents include iridoid glycosides, such as verbenalin, and caffeic acid derivatives (Bone, 2003).

In a crossover study involving nine horses with heaves, decreased histamine sensitivity and a decreased maximal interpleural pressure difference was found after administration of tablets containing extracts of vervain, yellow gentian (*Gentiana lutea*), common sorrel (*Rumex acetosa*), cowslip and common elder (*Sambucus nigra*). The dose in the tablet was 36 mg of each herb, except for yellow gentian where 12 mg was added. The horses where randomly divided into two groups of five and four horses. While the first group was given 15 tablets twice a day for 14 days the second group was untreated. No placebo treatment was present. The tablets where given along with a muesli mix that all horses received. No significant relief of clinical signs on the lung function was noticed. All horses where kept in the same environment during the study, which made the authors certain that the decreased histamine sensitivity and the decrease in maximal interpleural pressure difference found was due to the therapeutic effects of the herbs, and not only variation. The first group also showed decreased pulmonary function in a test done 14 days after the end of the treatment. The reduction of pulmonary function was compared to the results immediately after the study and seemed to be approaching the level of function before the treatment, which further supports the assumption of therapeutic effect of the herbs (Anour *et al.*, 2005).

In a study of Chinese herbal medicine, vervain was included in a blend for treatment of diarrhoea with a "heat pattern" in horses and cattle. Of 104 cases of gastroenteritis, 57 cases where recovered and 29 cases improved after treatment. They received 200 g of the blend three to five days or 30 g a day for 10-14 days. No control group or additional treatment was mentioned (Xie *et al*., 1999).

Monk's pepper (Vitex agnus-castus)

Traditional use of monk's pepper in Europe includes gynaecologic problems and insufficient lactation. In other locations it has been used for impotence, as a galactagouge, for melancholia and has been said to "repress sexual passion". Prolactin inhibition, dopaminergic agonist, indirectly progesteronic and galactagouge are actions attributed to monk's pepper. Key constituents are essential oil, diterpenes (labdane- and cleradone- type) flavonoids, such as casticin, and iridoid glycosides such as aucubin and agnuside (Mills & Bone, 2000).

Commercial preparations of monk's pepper have been used in clinical trials including horses with Cushing's disease. Twenty-five horses with Cushing's disease received monk's pepper over a three-month period. The horses showed improvement of symptoms such as hirsutism,

fat distribution and laminitis. The results were based on questionnaires and photos (Self, 2003). In a study by Beech *et al*. (2002), 14 horses with Cushing's disease received an extract of monk's pepper for six months. The time was reduced for eight horses receiving the treatment to only two or four months due to deterioration of the condition. Nine of the horses received pergolide for three to more than four months, after or before the treatment with monk's pepper. Only one of 14 horses showed any signs of improvement when the horses received extract from monk's pepper, unlike when treated with pergolide, when most horses showed an improvement. The dose of pergolide was higher than normally used. Monk's pepper was given according to the manufacturers recommendations and no information about the amount of active constituents in the extract was given.

Safety in using herbs

The safety in using herbs is an unavoidable topic while discussing herbs for medicinal use. There are several factors to consider when choosing to use herbs. Adulteration is a common cause for toxic or adverse reactions to herbs. Adulteration includes substitution of herbs and intentional or unintentional contamination with active components, drugs, pollutants or pathogens (Mills & Bone, 2005). The type and amount of active substances in different herbs is not always analysed before use. Pearson *et al.* (2007a) tested the herbal components before use to determine the active components and O'Neill *et al*. (2002) used a standardized extract. In other experiments tests have been made to determine how much of the active constituent (or assumed active constituent) that reaches the bloodstream (van den Hoven *et al.*, 2003). However, not all studies reports tests of the active ingredients.

When administering several herbs there are possibilities for additivity and synergism. These effects may appear between different constituents in a single herb as well, or between herbs and drugs, and should always be considered (Wynn & Fougère, 2007). Some species of *Echinacea* may cause liver damage due to pyrrolizidine alkaloids depleting glutathionone. The risk might be increased when acetaminophen is used simultaneously, but this remains to be studied (Abebe, 2002). *Echinacea spp*. are sometimes contraindicated with immunosuppressive drugs and may decrease the effectiveness of the drugs, but no case rapports have been published. Chamomile might increase the effects of central nervous system depressants, such as opioid analgesics, due to the flavonoid content in chamomile. Acetaminophen may affect the blood coagulant activity negatively in combination with warfarin, and therefore caution should be taken when this drug is administered along with herbs containing coumarin, such as chamomile (Abebe, 2002). Epstein *et al*. (1977) reported that over consumption of liquorice could affect the renin-angiotensin aldosterone axis in healthy humans. In a study on 14 volunteers, four had to withdraw from the study due to hypokalemia after eating 100-200 g licorice (0.7-1.4 g glycyrrhizinic acid) daily for one to four weeks. Depressed plasma renin activity and urinary aldosterone concentrations where frequent observations among the participants (Epstein *et al.*, 1977). Other side effects, such as hypertension and oedema, after consuming too much liquorice have also been found (Mills & Bone, 2000).

Chamomile is contraindicated in pregnancy according to Harman (2002) due to its apigenin content, but this is not mentioned by either Wynn & Fougére (2007) or Mills & Bone (2000). Harman (2002) also lists monk's pepper as contraindicated in pregnancy, along with thyme, burdock, garlic, red clover (*Trifolium pratense*) and turmeric (*Curcuma longa*). According to Mills & Bone (2000), monk's pepper have shown positive results in clinical trials in humans when using in low doses during the early stages of pregnancy even though the dopaminergic

activity of monk's pepper is not beneficial during pregnancy. For thyme, burdock, red clover and turmeric, Bone (2003) expects no adverse reactions during pregnancy.

When administering herbs to horses participating in competitions the active constituents in the herbs should be carefully investigated, to avoid using any substances that are classified as drugs. Using herbs such as meadowsweet *(Filipendula ulmaria)*, white willow bark and yucca may result in a positive drug test due to their salicylate content. Herbs with a high essential oil content or mixes and lotions with ingredients such as menthol, thymol or camphor are also prohibited (Harman, 2002). Of the herbs included in this essay chamomile, devil's claw and vervain are prohibited in the US (Wynn & Fougére, 2007). The FEI mentions valerian as prohibited, but is mostly mentioning prohibited actions that could include many herbs (Fédération Equestre Internationale, 2009).

Discussion

The aim with this study was to collect research on the use of different herbs for horses. It can be concluded that only a few studies have been done using horses as experimental animals, and only for a limited amount of herbs.

The telephone interview was done to determine which herbs to focus on in this essay, and should not be interpreted as a study reporting the most sold herbs in Sweden. Only a few selected companies were included in the interview and it was performed by phone with no opportunity for the participants to prepare answers. All companies contacted did not chose to participate, which further limits the interpretation of the interview. The result, however, gave an indication of which herbs that were of interest and further information should be searched for. The most sold herbs in Sweden differ from the herbs mentioned in the review by Williams & Lamprecht (2008). The only herbs mentioned in both studies were purple coneflower and devil's claw. Flaxseed and garlic were mentioned by Williams & Lamprecht (2008) and are probably popular in Sweden as well, but are sold at regular grocery stores and shops as well, and may therefore not be very large products for companies selling herbs and herbal blends.

A lot of the research done on herbs is not available in the English language, except for some abstracts. This makes it impossible to evaluate the research. A review of some Chinese studies on horses and cattle was included in this essay, even though the outcomes are difficult to evaluate as such. The original research papers were written in Chinese and further information in English was not found. In the review by Xie *et al*. (1999) several herbs where included in blends which makes it hard to know which herbs possibly had an effect and why. The studies also lack any mention of control groups so it is possible that the reported recovery was done without any therapeutic help. The study by Nosál'ova *et al*. (1992) was written in German and further evaluation was not possible.

Most of the studies on horses did not show a huge or rapid improvement if any improvement at all. In the study by O'Neill *et al*. (2002) where purple coneflower was given to healthy horses, a difference in lymphocyte and neutrophil count was found only during one day (day 35). The lymphocyte count was at its lowest for the control group day 35, the treatment group was at similar level as previous week. The treatment group had the lowest count of neutrophils the same day. This raises the question whether the change was due to the herbs or other circumstances. The authors of the article believed that this difference was due to the

therapeutic effect of the administered herbs as there were no known external changes that could have influenced the result (O'Neill *et al.*, 2002).

In many of the studies the horses were intentionally kept in poor conditions and/or environments to aggravate the symptoms (van der Hoven *et al.*, 2003; Anour *et al.*, 2005). Recovery due to environmental improvements may be ruled out, but such conditions also give the horses a greater possibility to improve as the starting level is set very low. Significant differences between the control group and the treated group may be present even though there would be no difference during normal conditions. An other problem is the placebo treatment. Herbs are rarely administered as pills, easily replaced by sugar pills or other substances with no medical effect. Herbs have a distinct smell and taste, which is not easily replaced by something with none medical effect when the constituents producing the taste are sometimes the same constituent that produces the effect (Mills & Bone, 2000). In the studies mentioned here both Pearson *et al.* (2007a) and Pearson *et al*. (1999) used alfalfa as placebo substance. Alfalfa is mentioned as having potential interactions with several drugs and has been used as a source for phytoestrogens (Wynn & Fougère, 2007). This makes it questionable as a placebo substance.

Many of our modern medicines have been developed from herbs and there are many studies performed on other animals or humans that have produced effective results. To rule out the effectiveness of all herbs on horses just because these few studies on horses do not indicate any effectiveness is probably too easy, as the correct herbs and dosage could be hard to find. In the studies included in this essay, the dosage is not altered to see if that would change the result, and to use the same dosage as for humans (Mills & Bone, 2000) as O'Neill *et al.* (2002) have done could be questioned. The herbal blends could be altered and other herbs with similar, or other, actions could be used that maybe suit horses better. The form in which the herbs are administered could also be altered, as tablets used by Anour *et al.* (2005) and Hoven *et al.* (2003) are a doubted way to administer herbs in human practice. The practice of using extracts of a single active constituents from a herb is not commonly used either (Mills & Bone, 2000).

If herbs are to be considered as effective they should also be treated as medicines. It could be a problem when common people are ordering herbs and deciding by them selves what to give their horses. A veterinarian should always be the first one to consult if a horse is sick or injured and if a horse owner then decides to give a horse herbs, a properly educated person, such as a veterinarian with further education involving herbs or a medical herbalist with a further education in animals, should be consulted to evaluate the horses problems and based on the findings decide which herbs to use. Then the possibility for follow-ups on how the herbs worked would be present to larger degree, and both adverse and beneficial reactions could be recorded as a base for further, much needed, studies.

Not all of the herbs included in this essay had any research at all performed on horses, and some herbs had only a few. The selection is greater if all research on the specific herbs are considered, but that is too large a subject for this essay. Further information on the different herbs is therefore easily found, just not on horses.

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Appendix 1.

Herbal names included in the essay.

Latin name	English name	Swedish name
Allium sativum	Garlic	Vitlök
Althaea officinalis	Marshmallow	Läkemalva
Apium graveolens	Celery seed	Selleri
Arctium lappa	Burdock	Stor kardborre
Calendula officinalis	Marigold	Ringblomma
Curcuma longa	Turmeric	Gurkmeja
Crataegus spp	Hawthorn leaf	Hagtorn
Echinacea angustifolia / purpurea	Purple coneflower	Röd solhatt, rudbeckia
Equisetum arvense	Horsetail	Åkerfräken
Eupatorium perfoliatum	Boneset	Vattenhampa
Filipendula ulmaria	Meadowsweet	Älgört
Foeniculum vulgare	Fennel	Fänkål
Galium aparine	Cleavers	Snärjmåra
Gentiana lutea	Yellow gentian	Gullgentiania
Glycyrrhiza glabra	Liquorice	Lakritsrot
Harpagophytum procumbens	Devil's claw	Djävulsklo
Hyssopus officinalis	Hyssop	Isop
Linum usitatissimum	Flaxseed	Linfrö
Marrubium vulgare	White horehound	Kransborre
Matricaria recutita	Chamomile	Kamomill
Medicago sativa	Alfalfa	Blå lucern
Mentha piperita	Peppermint	Pepparmynta
Ocimum basilicum	Basil	Basilika
Panax spp.	Ginseng	Ginseng
Papaver rhoeas	Corn poppy	Kornvallmo
Pimpinella anisum	Aniseed	Anis
Primula veris	Cowslip	Gullviva
Ribes nigrum	Black currant	Svarta vinbär
Rosa canina	Rose hip	Nypon
Rosmarinus officinalis	Rosemary	Rosmarin
Rubus idaeus	Raspberry	Hallon
Rumex acetosa	Common sorrel	Ängssyra
Salix alba	White willow	Vitpil
Sambucus nigra	Common elder	Fläder
Solidago virgaurea	Goldenrod	Gullris
Symphytum officinalis	Comfrey	Vallört
Taraxacum officinalis	Dandelion	Maskros
Thymus vulgaris	Thyme	Timjan
Trifolium pratense	Red clover	Röd klöver
Urtica dioica	Nettles	Nässla
Valeriana spp.	Valerian	Vänderot
Verbena officinalis	Vervain	Järnört
Vitex agnus-castus	Monk's pepper	Munkpeppar
Yucca schidigera	Yucca	Yucca
Zingiber officinale	Ginger	Ingefära

Appendix 2.

Herbal actions described by Bone (2003).

Antitussive	A substance that reduces the amount or severity of coughing.
Astringent	A substance that causes constriction of mucus membranes and exposed tissues usually by precipitating proteins. This action has the effect of producing a barrier on the mucus or exposed surfaces.
Bitter tonic	A substance that is bitter tasting and stimulates the upper gastrointestinal tract via the bitter-sensitive taste buds of the mouth, by direct interaction with gastrointestinal tissue, or both.
Carminative	A substance that relieves flatulence and soothes intestinal spasm and pain, usually by relaxing intestinal muscles and sphincters.
Choleretic	A substance that increases the production of bile.
Demulcent	A substance that has soothing effect on mucus membranes (e.g. within the respiratory, digestive and urinary tracts).
Depurative	A substance that improves detoxification and aids elimination to reduce the accumulation of metabolic waste products within the body.
Diaphoretic	A substance that promotes sweating and thereby controls a fever.
Emollient	A substance used to soothe, soften, or protect skin.
Expectorant	A substance that improves the clearing of excess mucus from the lungs by either altering the viscosity of the mucus or improving the cough reflex.
Galactagogue	A substance that increases breast milk production.
Nervine tonic	A substance that improves the tone, vigour, and function of the nervous system. Nervine tonics relax and energize the nervous system.
Progesterogenic	A substance that promotes the effect of or production of progesterone.
Rubefacient	A substance that produces a superficial inflammation of the skin so as to relieve a deeper inflammation (e.g., in muscles, joints, and ligaments).
Spasmolytic	A substance that reduces or relieves smooth muscle spasm.
Styptic	A substance that stop bleeding when applied topically.
Vulnerary	A substance that promotes the healing of wounds when applied topically.