

# The effect of sea buckthorn oil on the dryness of paw pads and eye discharge in dogs

## INTRODUCTION

Sea buckthorn (*Hippophaë rhamnoides*) has been used in Asian traditional medicine for centuries. Sea buckthorn berries are mentioned in the Chinese Pharmacopeia [1], which states that they can be used to improve blood circulation, among other things. The berry is also mentioned in several historical myths. Horses roaming freely in the Himalayas eat sea buckthorn, and their exceptionally shiny coat is thought to be due to the effects of the berry. In Greek mythology, sea buckthorn was the main food of the winged horse Pegasus, and war horses came back healthy after eating sea buckthorn. 'The health benefits of the berry are also reflected in the plant's scientific name, meaning 'shining horse.'

Sea buckthorn is particularly known for its high vitamin C content and as a good source of flavonoids [2, 3], but it also differs from many other berries because of its high oil content. The oil in the fleshy part of the berry is rich in fat-soluble antioxidants such as vitamin E and carotenoids, the latter giving the berries their characteristic orange colour [4, 5]. The oil in sea buckthorn seed is rich in essential (n-3) and (n-6) fatty acids [4, 5].

Sea buckthorn berry and seed oil, extracted by a supercritical (high-temperature and high-pressure) carbon dioxide extraction process, has been shown in clinical studies to have beneficial effects on serum lipids and lipoproteins [6], dry eyes [7], markers of endothelial inflammation [8], platelet aggregation [9] and skin and mucosal health [10, 11, 12]. In animal studies, sea buckthorn oil has been shown to promote wound healing [13], and to alleviate atopic eczema when applied directly to the affected area [14].

However, very little research has been done on the health effects of sea buckthorn oil in dogs. The purpose of this trial was to test the effects of a standardised formulation of sea buckthorn oil on dogs suffering from dry and/or cracked paw pads, runny ey

eyes, stuffy and dry nose or a dry tip of the snout.

## RESULTS

### Dry and cracking paw pads

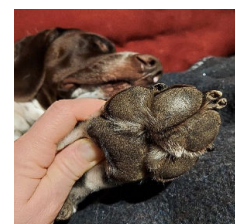
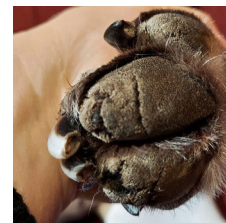
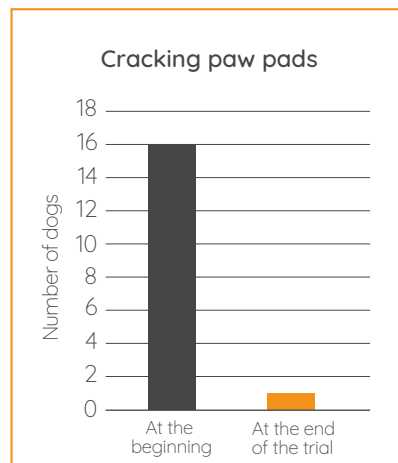
During the 8-week trial period, the frequency of licking or gnawing of the paw pads was assessed, as well as their degree of dryness and cracking. The sea buckthorn capsules significantly reduced dryness and cracking of paw pads, and also reduced the licking and gnawing of paws. Almost none of the dogs included in the trial suffered from lameness. Of the dogs that participated in the trial, 49 dogs were reported to have symptoms related to dryness of the paw pads. Of the dogs in this group, which we labelled the 'paw group', 27 dogs were reported to lick or gnaw at their paws at least once a week at the beginning of the trial. Of these 27 dogs, at the end of the trial, 48% were reported to lick or gnaw their paws less frequently than once a week, and 26% were reported to have stopped doing so altogether.

In the case of 16 dogs from the paw group, cracking of the paw pads was

reported at the beginning of the trial to be very severe or clearly visible. Of these dogs, 15 dogs (94%) were reported at the end of the trial to have little or no cracking of the paw pads (Figure 1). Similar results were obtained in the case of dryness of the paw pads (96%) (Figure 2).

Figure 1

The number of dogs with clearly cracked paw pads at the beginning of the trial and at the end (graph on the left). Elmo's paw pads at the beginning of the trial (top left) and at the end (bottom right).



### Watering of the eyes

For the eyes, the trial assessed rubbing of the eye area against surfaces such as a mat or couch, squinting, eye redness, eye watering or discharge, or hair discolouration under the eyes. Of the dogs studied, 47 were reported to suffer from one of the above symptoms. At the beginning of the trial, very severe or clearly visible watering of the eyes and/or discharge from the eyes was reported in 30 dogs. Of these dogs, at the end of the trial 18 had only mild eye watering or discharge from the eyes, and these symptoms had stopped completely in 2 dogs (Figure 3). There was also a reduction in hair discolouration under the dog's eyes over the course of the trial (Figure 3). A trend towards reduced rubbing of the eye area against surfaces such as a mat or couch was also observed, i.e. eye rubbing decreased during the experiment.

### Groups in which symptoms related to the nose and tip of the snout were studied

The number of dogs with nasal congestion and dryness of the tip of the snout was low, and any such symptoms were mostly very mild. This significantly limited the interpretation of the results.

### General symptoms

At the end of the trial, the dog owners were asked what other changes in the dog's general wellbeing they had observed during the trial. The most marked change the owners reported was the sheen of the dog's coat, which increased during the trial. There was also a slight reduction in itching and skin flaking, although dogs suffering from skin symptoms were not specifically recruited to the trial. No changes for the worse in stool quality or heartburn symptoms were reported. These problems are known to occur often when oil-based supplements are added to a dog's diet. As only those who completed the trial answered the questions related to the general wellbeing of their dogs, it is possible that there may be dogs suffering from heartburn or other digestive problems among those that were withdrawn from the trial.

Figure 2

The number of dogs with clearly detectable dryness of the paw pads at the beginning and end of the trial (graph on the left). The paw pads of Mauno, and Australian Shepherd, at the beginning of the trial, at 4 weeks, and at the end of the trial (right).

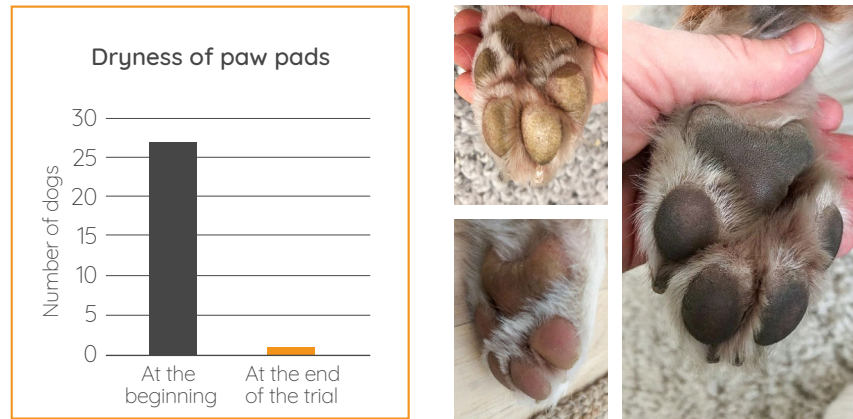
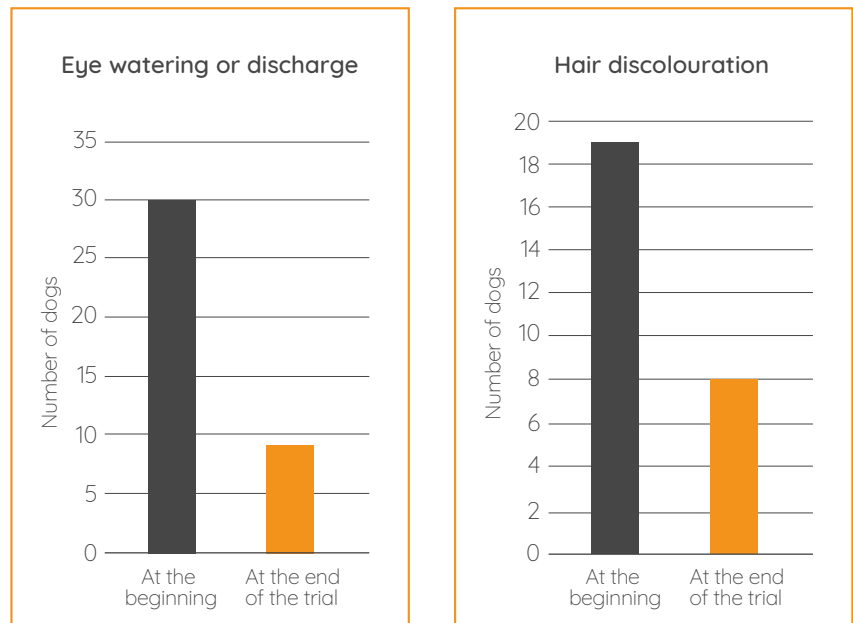


Figure 3

The number of dogs with heavy or noticeable discharge at the beginning and end of the trial (graph on the left). There was also a reduction in facial hair discolouration in the dogs in the test group (graph on the right).



## CONCLUSIONS

BERRYOMG® sea buckthorn oil capsules were found to significantly reduce dryness and cracking of the paw pads of dogs. Dogs often suffer from cracked paw pads for a variety of factors - the abrasive effect of walking on asphalt, very cold weather, intense strain due to activities such as agility, racing or work. In addition to such factors, a diet low in beneficial fatty acids can predispose the paw pads to dryness or wear. The owners

often have to resort to using various balms to treat dry and cracked pad paws, and some dogs may even suffer daily pain and limping if the paw pads cannot be effectively treated at home. Giving the dogs the oil supplement in capsule form with their food could be an easier solution for many owners than having to regularly apply oil to their paws. This added convenience could make it easier for owners to stick to a course



of treatment, as it is easier and less time-consuming.

There was clearly more variation in the results for eye-related symptoms than for paw-related symptoms, but there was still a clear trend towards less eye watering or discharge. Discharge from the eyes can occur in dogs for a variety of reasons. As the trial was carried out in wintertime, it is very likely that, as with humans, dogs suffer from some degree of dryness of the eyes more frequently at that time of year than otherwise. The results suggest that eye discharge due to dryness of the eyes can be alleviated by the use of sea buckthorn oil capsules. Some owners also reported a reduction in the amount of discharge from the eyes that sticks to the hair of dogs with a light-coloured coat. For many owners, reddening of the dog's facial hair is unsightly and can be problematic, and they may consider it necessary to seek treatment of the eye problem by a vet. However, if no inflammation or other condition requiring medical treatment is found in the eyes, sea buckthorn oil capsules could be added to the dog's diet to try to reduce the discolouration.

The small size of the groups in which symptoms related to the nose and tip of the snout were studied limits the interpretation of the results. A few positive experiences were reported in terms of reduced nasal congestion and ulceration, supporting previous findings on the efficacy of sea buckthorn oil on mucosal health and healing of ulcers [13].

In the case of general symptoms, a clear improvement was observed only in the coat sheen. It was also notable that the capsule form of sea buckthorn oil was not found to cause heartburn, which is a common problem when dogs are fed oil-based dietary supplements. The dietary supplement can therefore be a good alternative for dogs that are susceptible to heartburn from fish-based or non-encapsulated oil products, for example.

### Experimental setup of the trial

The owners of the dogs that were included in the trial were recruited via Facebook. As a condition for inclusion in the trial, the dogs had to be otherwise healthy apart from any dryness and/or cracking of the paw pads and/or the tip of the snout, discharge from the nose and/or from the eyes. A total of 129 dogs were included, with 82 breeds.

The age range of the dogs was 1.5 to 9 years, and their median weight was 19 kg.

Of the aforementioned total, 103 dogs completed the trial. There were a number of reasons for dogs being withdrawn from the trial: the product did not seem suitable for the dog, for instance due to digestive problems; the dog refused to swallow the capsules; or the dog became ill with a disease unrelated to the product during the trial. However, the majority of owners who withdrew their pets from the trial did not give a reason for doing so.

The test product used in the trial was BERRYOMG® sea buckthorn oil capsules. The shell of these capsules consists mainly of corn starch. The sea buckthorn oil contained in the capsules used in the trial was extracted from sea buckthorn seeds and sea buckthorn berries by supercritical carbon dioxide extraction. The oil contained 0.1%  $\beta$ -carotene and 0.3% vitamin E. During the trial, the dogs were administered the BERRYOMG sea buckthorn oil capsules according to the schedule shown in Table 1. The trial lasted 8 weeks. After enrolment, the dog owners were sent the required amount of sea buckthorn oil capsules by post, along with instructions on adding them to their dog's food daily.

To examine the results, the dogs were divided into four groups according to their symptoms. The group in which paw-related symptoms were studied consisted of dogs with one or more signs of dryness of the paw pads. The group in which eye-related symptoms were studied consisted of dogs with symptoms related to eye health, such as watery eyes. The group of dogs in which symptoms related to the tip of the snout were studied consisted of dogs suffering from symptoms related to dryness of the snout, such as cracking of the skin or a tendency towards rubbing, and dogs in the group in which symptoms related to the nose were studied consisted of dogs with symptoms such as nasal congestion and/or discharge. The trial setup did not preclude any dog from being included in more than one group at the same time. The largest groups were the group of dogs in which paw-related symptoms were studied (n=49) and the group in which eye-related symptoms were studied (n=47). The group of dogs with symptoms with the tip of the snout (n=20) and nose (n=18) were smaller. During the trial, only the sea buckthorn oil capsules were added to dog's food – that is, no other changes were made to the dogs' diets. The dog owners answered the same questionnaire three times during the trial: at the start of the trial, after four weeks, and at the end of the trial. The questionnaire given to the dog owners for completion as part of the trial asked separately about each group of symptoms in the dogs, such as squinting, rubbing of the snout or tip of the snout, nasal congestion, or licking or gnawing of the base of the paws, and how often any such symptoms occurred. The questionnaire also included questions about dryness and cracking of the paws or tip of the snout, discharge from the eyes or nose, facial hair discolouration, and the severity of any such symptoms. Finally, they were asked if they had noticed any changes during the trial in the sheen of the dog's coat, skin flaking or itching, changes in the stool, or signs of heartburn. The owners were also asked if, at any time during the trial, they had taken the dog to the vet, had the dog vaccinated or dewormed, or had given it medication, or changed the dog's diet or administered eye drops, or applied moisturiser to the snout or paws, or given the dog vitamin E supplements or oil supplements.

**Table 1**

Daily dosage of BERRYOMG® sea buckthorn oil

Weight of dog (kg)	Number of capsules per day	Sea buckthorn oil dosage (g) per day
1-10	1	0,5
>10-20	2	1
>20-40	3	1,5
>40	4	2

## Authors



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PhD (animal science), Bachelor of Veterinary Medicine

Johanna has a doctoral degree in animal science, specialising in canine atopy and related nutritional, environmental and genetic factors. She is also in her fifth year of her veterinary medicine studies. She has over five years of experience in drawing up individual diets for sick dogs and cats, and has been researching dog nutrition for the past 12 years. She has three dogs, three cats, chickens and sheep. In her future veterinary career, Johanna hopes to treat a wide variety of animals, with a particular focus on the feeding of small animals and how this can be used to supplement other treatments for disease.



### Petra Larmo

PhD (food chemistry)

Petra carries out new product development and quality control at Aromtech. Petra has about 15 years of experience in research on berry oils. She gained her doctoral degree in food chemistry from the University of Turku for a dissertation on the health effects of sea buckthorn oil.



### Mira Povelainen

PhD (biochemistry and biotechnology), eMBA

Mira Povelainen works at Aromtech on new business and market development. Mira has more than 20 years of experience in health-promoting foods and ingredients and related international business. Mira is a dog lover, and has three Parson Russell Terriers.

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