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Rosa canina (Lito) works as an anti-oxidant support the immune system and improves litheness, endurance, well-being and the fur in dogs – a parallel, placebo-controlled, double-blind, randomized clinical study

Abstract

Background and aim: LitoVet a standardized powder made from a subspecies Lito from Rosa *canina* L (Rose-hip) containing seeds and shells has in several human studies and studies on horses shown anti-oxidative and anti-inflammatory properties and improved the flexibility and pain of joints. Dogs are lovable and family members in many homes worldwide. Like humans dogs also are getting older and older and attain more or less the same diseases as humans – amongst these osteoarthritis and pain in their muscles. The present study aims to test if a powder based on Rose-hip, subspecies Lito, containing seeds and shells of rose-hip can work anti-oxidative and anti-inflammatory and improve litheness, endurance, well-being and the fur of dogs.

Methods: Eighty greyhound dogs represented by both sexes mean age 4.25 +/-1.75 years and mean weight 30.95 +/-4.0 kg were randomly entered into a treatment with either LitoVet or placebo of similar, smell, taste and color, for a three month treatment period. The anti-oxidative capacity was estimated by using chemiluminescence and the anti-inflammatory capacity by counting total peripheral leucocytes initially and after 3 month. Changes in motivation for different activities, mood, willingness to cooperate, performance, litheness, endurance, speed, quality of the fur and appetite was evaluated by the dog owners and staff training the dogs by using standard questionnaires after 6 and 12 weeks of either active or placebo treatment. The two treatments were compared using Wilcoxon and Mann-Whitney statistical models. A p value less than 0.05 was regarded as statistically significant.

Results: There was a significant improvement in anti-oxidative and anti-inflammatory capacity in favor of active treatment, after twelve weeks of treatment ($p < 0.001$ and $p<0.043$), respectively. After 6 and 12 weeks of treatment there was a significant improvement in litheness ($p<0.017$ and $p<0.002$) respectively. And after 3 month of treatment there was a statistically significant improvement, in favor of active treatment, in all symptoms estimated including speed and quality of the fur ($p<0.047$). Neither of the treatments did change the appetite of dogs.

Conclusion: The present results suggest that in dogs LitoVet works as an anti-oxidant and an anti-inflammatory agent and improves litheness and motivation for different activities as well as the fur.

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Introduction

In humans and also in animals, osteoarthritis (OA) is a progressive degenerative joint disease associated with chronic pain, stiffness, and functional limitations and reduced mobility and quality of life – and the disease seems to positively correlate with aging.[1] Pets like dogs and cats[2] as well as horses[3] also suffer osteoarthritis and as many pet owners keep their animals up to even an age above 12 years osteoarthritis is a main issue in many homes where pets are a central part of the family. Also in families where hunting and grey hound racing is a great interest (OA) is central. In many dogs used for hunting and greyhounds used for racing, a certain amount of (OA) is present even early in life, and it can be hard to observe ones beloved dog climb a staircase with great pain and suffer when resting by the fire.

Treatments are often fatty acid supplementation, NSAID therapy (can have certain side effects), glucosamine or chondroitin sulfate, monoclonal anti-bodies, ketamine, acetaminophen and even the synthetic opioid, tramadol.[2,4,5] Many of the treatments mentioned are also used in the treatment of humans and known for their side effects in pets and humans.[2,4–7] As side effects are an issue not even in humans, but also when treating animals (pets) nutraceuticals and dietary supplements, known for having less side effects, have also been tested in double blinded randomized placebo controlled clinical trials in dogs with some success.[8,9]

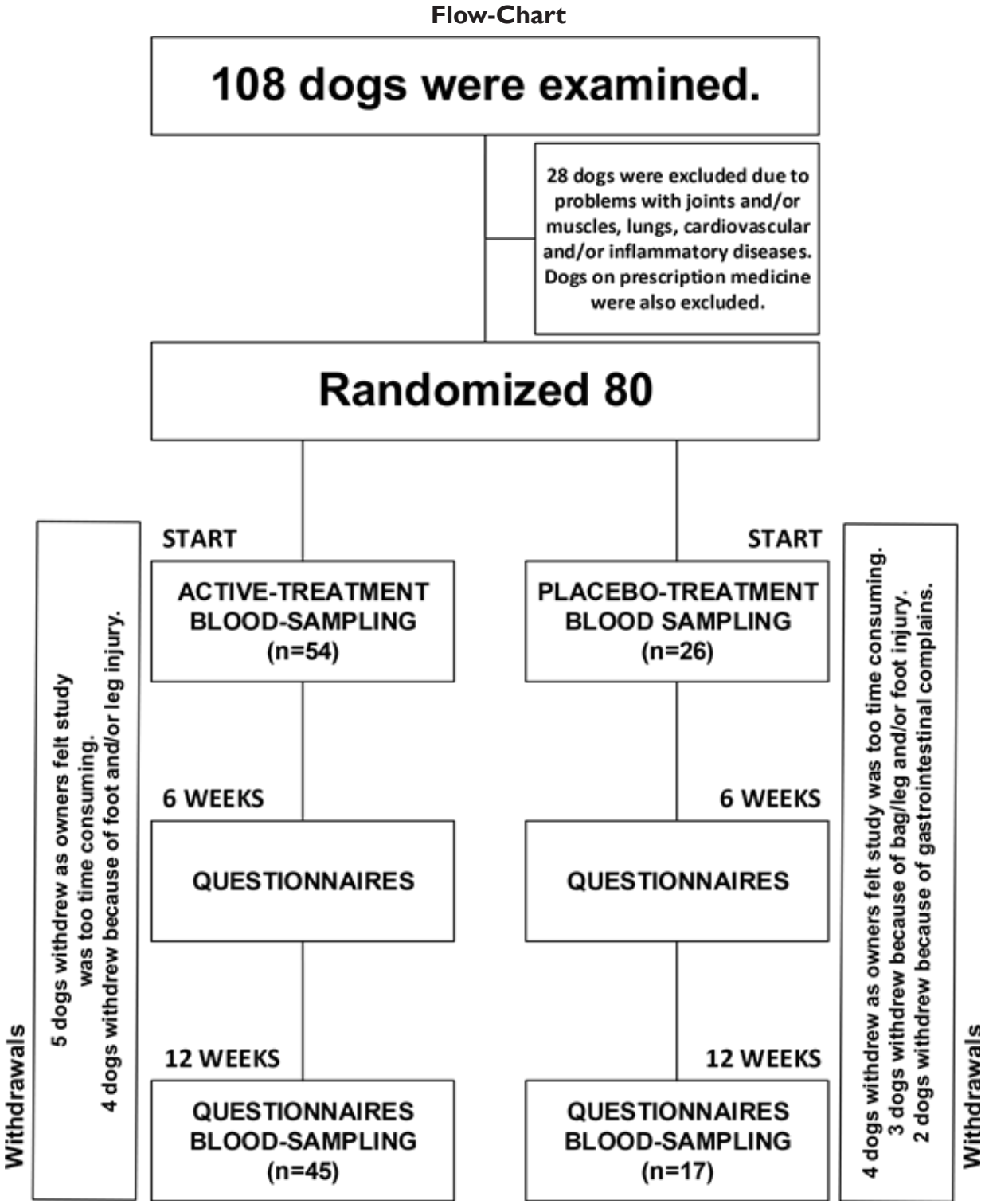
Rose-hip (Rosa *Canina* L) containing subspecies Lito and sold under the names LitoVet and LitoPet, has earlier been shown to be effective in alleviating pain and improving daily activities in humans[10,11] and in horses[12] without any indications of side effects. The aim of the present study was to test in a double-blinded randomized, placebo-controlled set up, if Rose-hip, subspecies Lito can work anti-inflammatory, and improve the immune system as well as litheness, endurance and performance in dogs. After considerations the grey hounds were chosen, as these racing dogs live a standardized life and

are fed a constant diet making it easier to administer control of the dogs during the three month, the study was planned to run.

Methods

Study participants

Dogs were included for an initial examination after announcements from posters in different training centers for grey hounds in Denmark and southern Sweden. The greyhounds could be included if they were not pregnant and if they did not suffer joint and/or muscle, any lung or cardiovascular or inflammatory disease. Details in Flow-chart. Dogs were excluded if they were treated anti-biotics or any prescription medicine and if they were not easy to corporate with. Dogs who were competing as well as dogs who were kept more as pets were included. Flow chart giving the flow of the study.



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Randomization and composition of the tested remedies

Aften an initial examination the dogs were randomly allocated to either LitoVet or placebo treatment in blocks of three. Such blocks were computer generated and consisted always of 2 actively treated and one placebo. The powdered rose-hip is generated by Erik Farmer, Hyben-Vital ApS, Hyben-Vital, Langeland, Denmark and consisted of dried whole fruits from selected Rosa canina subtype Lito, containing equal parts of shells and seeds. The product was processed using a patented drying method in which seeds and flesh are dried separately and then combined, with a drying temperature never exceeding 39 degrees Celsius. This methodology also ensure that all itchy hairs on the seeds are removed. The placebo version had a similar taste, smell and color. The active ingredient as well as the placebo were packaged by Bifodan (Deerland), Bogbindervej 6, 3390 Hundested, Denmark, who have the license to produce powders and capsules for clinical trials.

Dosage and compliance

Each dog was given either 10 gram of active treatment or 10 gram of placebo, daily, for a three month period. Compliance was ascertained as the staff handling the dogs were carefully instructed always to be sure that the dogs were eating the total amount of powder added to their daily diet.

Blood for white cell count and hemoglobin and measurements of oxidative capacity using chemiluminescence[13] was drawn initially and after three month of either active or placebo treatment.

The owners of the dogs and the staff training the dogs were asked to register, in a questionnaire on the numerical basis, changes in the dog's motivation for different activities, mood, ability to cooperation, performance, litheness, and endurance as well as the running speed, the quality of the fur and appetite after 6 and 12 weeks, respectively. The more the improvement the higher the number.

Demography

Of the 80 included dogs 34 were females and 46 were males. In the placebo group there were 16 males and 10 females, and in the LitoVet group there was 30 males and 24 females. The mean weight in the Lito group was 30 kg +/-3.8 kg and in the placebo group the weight was 31.9 +/-4.2 kg ($p<0.032$). Age: LitoVet group 4.7 +/- 1.9 years and Placebo 3.8 +/- 1.6 years ($p<0.024$)

Outcome measures

Primary effect variables: Changes in white Blood Cell Counts and Haemoglobin.

Secondary effect variables: Changes in anti-oxidative capacity estimated as chemiluminescence (mV), symptom scores, quality of the fur.

Statistical evaluation

Data are given as mean values +/- SD and data are evaluated on the basis of per protocol (PP) for dogs who participated all three month. The Wilcoxon test is used when comparing within group differences and the Mann-Whitney when comparing groups.

Results

Of the 80 included dogs 54 were treated powdered rose-hip and 26 were treated placebo. In each group nine dogs left the study during the course of the study, for details see Flow-chart. There was a statistical significant decline in the liberation of oxidative anions from leucocytes indicating anti-oxidative capacity in the group actively treated (Figure 1). Due to technical problems there were no data on the placebo group for what reason a comparison between groups could not be made. In the actively treated group the total leucocyte count declined when compared to the observations in the placebo group indicating anti-inflammatory property (Table 1). Moreover treatment with rose-hip also resulted in an improvement in red blood cell counts and a higher level of hemoglobin (Table 1). Questionnaires for the evaluation of different symptoms including litheness, mood, cooperation, endurance and also speed, fur-quality and appetite was evaluated after 6 and 12 weeks respectively. After 6 weeks litheness had significantly improved in favor of active treatment, whereas the remaining part of the questions did not discover any change (details in Table 2). After 12 weeks, however, there was a significant improvement in the dogs motivation, their mood, their ability to cooperate, their performance, litheness, endurance, speed and fur quality (details in Table 2). There were no change in the appetite of dogs.

Table 1 White (WBC) and Red blood cell counts (RBC) together with Haemoglobin (HGB) in dogs treated actively and with Placebo

		Active				Placebo				
Item	**Week**	**N**	**Mean**	**SD**	**Wilcoxon**	**N**	**Mean**	**SD**	**Wilcoxon**	**Mann-whitney**
	0	7	5.31	0.42		8	5.92	0.91		0.183
WBC	12	7	4.90	0.51		8	6.10	1.22		0.049
	Diff 0/12	7	0.41	0.40	0.047	8	-0.20	1.10	0.750	0.043
	0	7	7.80	0.73		8	8.75	0.32		0.032
RBC	12	7	8.40	0.33		8	8.33	0.42		0.728
	Diff 0/12	7	-0.60	0.70	0.078	8	0.42	0.50	0.780	0.013
	0	7	12.63	1.13		8	13.80	0.70		0.037
HGB	12	7	13.62	0.52		8	13.21	0.50		0.103
	Diff 0/12	7	-1.00	1.21	0.0781	8	0.61	0.80	0.094	0.013

Total leucocyte counts (10^9 /L), Red blood cell counts (10^{12} /L) and hemoglobin level (mmol/L).

Table 2 Symptom scores, speed, fur-quality and appetite in dogs treated actively and with placebo

		Active			Placebo			
Item	**Week**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**Mann-Whitney**
Motivation	6	32	1.39	0.49	11	1.27	0.47	0.478
	12	45	1.24	0.41	17	1.00	0.00	0.014
Mood	6	32	1.42	0.48	11	1.36	0.50	0.704
	12	45	1.30	0.43	17	1.06	0.24	0.026
Cooperation	6	32	1.50	0.48	11	1.23	0.41	0.987
	12	45	1.47	0.48	17	1.18	0.39	0.028
Performance	6	32	1.47	0.42	11	1.45	0.47	0.917
	12	44	1.23	0.31	17	1.06	0.24	0.021
Litheness	6	32	1.47	0.47	11	1.09	0.30	0.017
	12	44	1.36	0.45	17	1.03	0.00	0.002
Endurance	6	32	1.47	0.49	11	1.18	0.40	0.086
	12	44	1.24	0.38	17	1.06	0.24	0.047
Speed	6	32	1.25	0.36	11	1.14	0.32	0.289
	12	44	1.24	0.35	17	1.06	0.24	0.027
Fur-Quality	6	32	1.34	0.47	11	1.23	0.41	0.496
	12	44	1.23	0.38	17	1.03	0.12	0.045
Appetite	6	32	1.17	0.37	11	1.09	0.30	0.847
	12	43	1.12	0.26	17	1.09	0.26	0.569

Motivation, mood, ability to cooperate, performance, litheness, endurance, speed, fur-quality and appetite evaluated on a numerical questionnaire after 6 and 12 weeks. (Some of the dog owners/staff behind the dogs did not supply questionnaires after 6 weeks).

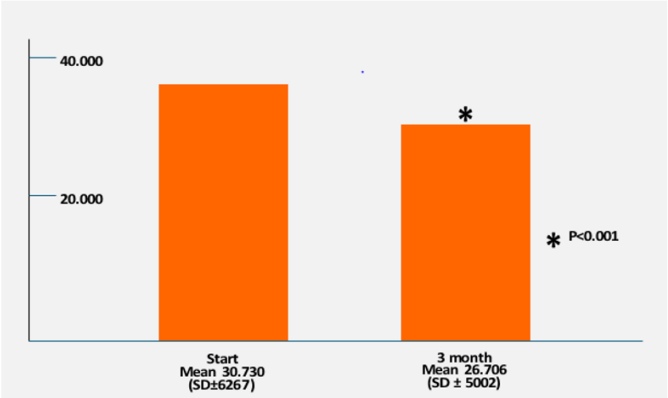

Figure 1 Chemiluminescence (mV) given for dogs before treatment and after three month of Rose-hip (Lito) treatment. A significant decline was observed after 3 month of treatment.

Discussion

The present data suggest that the subspecies of Rose-hip (Lito) can have some anti-oxidant capacity in dogs. This has earlier been documented in humans[13] and in horses.[12,14] The observed decline in total leucocyte counts also support the notion that rose-hip can work anti-inflammatory. In vitro studies on leucocytes from the same dogs performed in our laboratory using chemiluminescence to measure anti-oxidative capacity.[13] and a modified Boyden chamber technique to test polymorph nucleated leucocytes from the same dogs for anti-inflammatory activity[15] also supported the in vivo observations (data not given). The present observations are also in line with what was earlier shown for humans and horsed in which the present Rose-hip subspecies worked as an anti-inflammatory and as an anti-oxidative agent[12–14] and also was able to lower pain and improve the flexibility of joints.[10,12]

Several cat owners have replied that the present rose-hip powder can improve the wellbeing of cats – especially older cats, which have difficulties to climb a staircase or enter a sofa. However, to the best of my knowledge, no clinical trials on cats and rose-hip powder has ever been performed.

The mechanism (s) behind the present findings are not so easy to elucidate. They can, however, possibly be linked to an anti-inflammatory galactolipid earlier isolated from the present subspecies.[16] This galactolipid by name GOPO was earlier shown to work anti-inflammatory and also to improve the quality of cartilage cells when tested in vitro.[17] If some of the impact is mediated through a modification of cartilage cells it may explain why it seems to take a certain amount of time, more than six weeks, before the questionnaires were able to detect significant differences between groups in more than one of the parameter. It takes a certain time to improve the cartilage to an extent allowing a decline in symptoms. Another possible mechanism can be related to vitamin C. It is well known that Rose-hip together with citrus is the fruits which contains the highest amount of vitamin C. The daily dose of 10 gram powdered rose-hip used in this trial amounts about 200 mg of vitamin C. Vitamin C is known to improve the immune system and also to improve collagen, an important part of cartilage. But can a relatively low dose of vitamin C given to the present dogs have any influence on the immune system and litheness and performance. Possibly, the vitamin C theory is of particular interest as it was earlier shown in horses, that the absorption of natural vitamin C from the present rose-hip powder, was much quicker and much easier than what was observed when the same horses were treated commercial available C vitamin.[14] This allow the suggestion, that in rose-hip, there can be co-factors, facilitating the absorption of vitamin C. So even though the amount of vitamin C from this herbal remedy was less than when giving high dose commercial vitamin C, the rate of absorption can be high. Other possible mechanisms can also include the microbiome and factors in rose-hip not yet discovered.

Limitations of this paper

This is the first paper testing rose hip on dogs in a clinical setting. However the number of dogs included was not large and included only grey hounds. Future studies should include a larger number of dogs and not only grey hounds and more biochemistry should be included as questionnaires on symptoms filled in by dog owners and the staff behind the dogs are not the most trustable measures.

Conclusion

The present data suggest that rose-hip (Lito) can have some impact on the immune system and wellbeing of dogs, in particular dogs where pain from osteoarthritis seems to be a mayor issue.

Author's contribution

Kaj Winther wrote this paper alone and was responsible for the research performed on the dogs.

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Conflicts of interest

The author has no conflicts of interest.

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