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特別セミナー、ランチョンセミナー、動物遺伝子疾患研究会  
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## Effects of TrichoS on Hair Growth Promotion in Alopecia X and Other Hair-loss Conditions

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### Abstract

**Background:** We have found positive effects on hair growth promotion of the combination preparation containing *Pantoea agglomerans* lipopolysaccharide (LPS) and *Pinus pinaster* polyphenol as active ingredients and reported the results in the 36th Annual Meeting of Japanese Society of Clinical Veterinary Medicine. (1,2) We also obtained a patent (Patent No. 6227594).

Here we report summarized results of the multicenter clinical study of the product for hair growth in animals.

**Methods:** An oral combination preparation of LPS and *Pinus pinaster* polyphenol (TrichoS) was given to a total of 273 small animals including 237 dogs, 18 cats, and 8 other animals for approximately 30 days. Hair growth promoting effects were evaluated visually or photographically. Cases of hair growth noted in thinning hair areas were rated as improved.

**Results and discussion:** Of 273 animals, 152 (56%) showed improved hair growth. We consider that LPS may also improve skin conditions from telogen to anagen by promoting production of the vascular endothelial growth factor or fibroblast growth factor. We also consider that the antioxidative effects and blood circulation promoting effects of *Pinus pinaster* polyphenol may contribute to the hair growth synergistically with LPS. This combination preparation is expected to become a supplement or medicine to improve hair loss in pets by enhancing their natural healing potential.

**Keywords:** *Pantoea agglomerans* LPS, *Pinus pinaster* polyphenol, TrichoS

### Introduction

Hair loss or extremely thinning hair owing to skin disorders in pets seriously affects their appearance, potentially causing emotional stress for their owners. Known causative disorders of hair loss include atopic dermatitis, parasitic dermatitis, fungal or bacterial infections, hormonal disorders, stress, and sebaceous gland inflammation. More pets are developing allergies these days possibly because they are kept indoors and are less exposed to lipopolysaccharide (LPS), resulting from improved hygienic environment and increased availability of processed food. At the same time, Stress and lack of physical activity may also cause an increased number of allergic diseases. (3)

Based on the above considerations, we studied skin conditions, especially improvement in hair growth, in animals receiving a combination preparation of LPS and *Pinus pinaster* polyphenol in cooperation with practicing veterinarians. Reportedly, LPS normalizes the immune balance and *Pinus pinaster* polyphenol has high antioxidative activities.

## Materials and Methods

A total of 273 animals with hair loss were included in the study, including 237 dogs (mean age, 4.8 years), 18 cats (mean age, 4.9 years) and 8 other animals (mean age, 3.9 years). Oral tablets of the combination preparation of LPS and *Pinus pinaster* polyphenol (TrichoS, Scarecrow Incorporated) were given at a dose of 0.4 tablet/kg/day for approximately 30 days. The LPS used was an animal food substance (Institute of Applied Technology for Innate Immunity) prepared by hot-water extraction of the cultured *Pantoea agglomerans*, which had been isolated from wheat. *Pinus pinaster* polyphenol used was extracted from the cortex of pines growing on the coast of France (Horphag Research). (1) Consumption of pet food or pharmaceutical products was permitted, except for concomitant use of other supplements, in principle.

The study animals received the oral combination preparation twice daily for approximately 30 days. Hair growth promoting effects were evaluated visually or photographically by the veterinarians by comparing skin conditions before and after the study supplement consumption. A reduction in hair loss area by 80% or higher was rated as highly improved, 79% or less as alleviated, and 0% as unchanged.

## Results

Of 273 small animals, 152 (56%) had highly improved hair growth.

The number of animals with highly improved hair growth was 136 of 237 dogs (57%), 13 of 18 cats (72%), and 3 of 8 other animals (38%). Five dogs, three cats, and two other animals were withdrawn from the study because of difficulty in receiving the study drug.

Symptoms and causes of hair loss in the study animals were Alopecia X (28 of 53 animals, or 53%), atopic dermatitis (28 of 47 animals, or 60%), allergic dermatitis (4 of 11 animals, or 36%), other types of hair loss (70 of 118 animals, or 60%), and other types of dermatitis (20 of 35 animals, or 57%). The other types of hair loss included hair loss not associated with itching or inflammation (telogen, 4 of 5 animals, or 80%), hypothyroidism (7 of 14 animals, or 50%), generalized or localized hair loss (27 of 52 animals, or 52%), and hair loss and impaired hair growth due to injury or shaving (1 of 2 animals, or 50%). The other main types of dermatitis included chronic dermatitis (2 of 6 animals, or 33%), pyoderma (8 of 12 animals, or 67%), malasseziosis (3 of 6 animals, or 50%), demodicosis (3 of 3 animals, or 100%), and sore hocks (0 of 3 animals, or 0%).

## Discussion

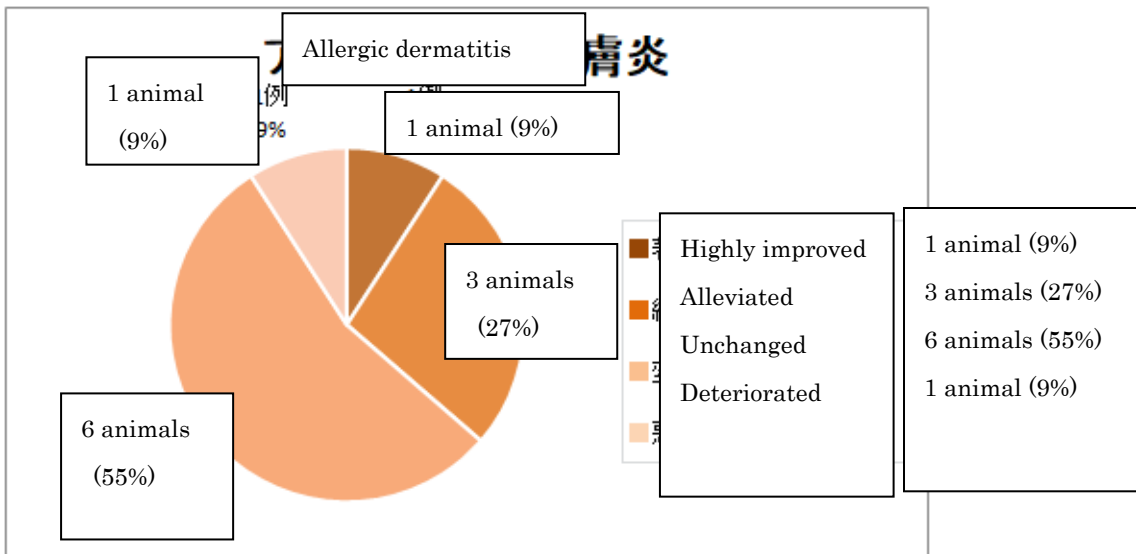
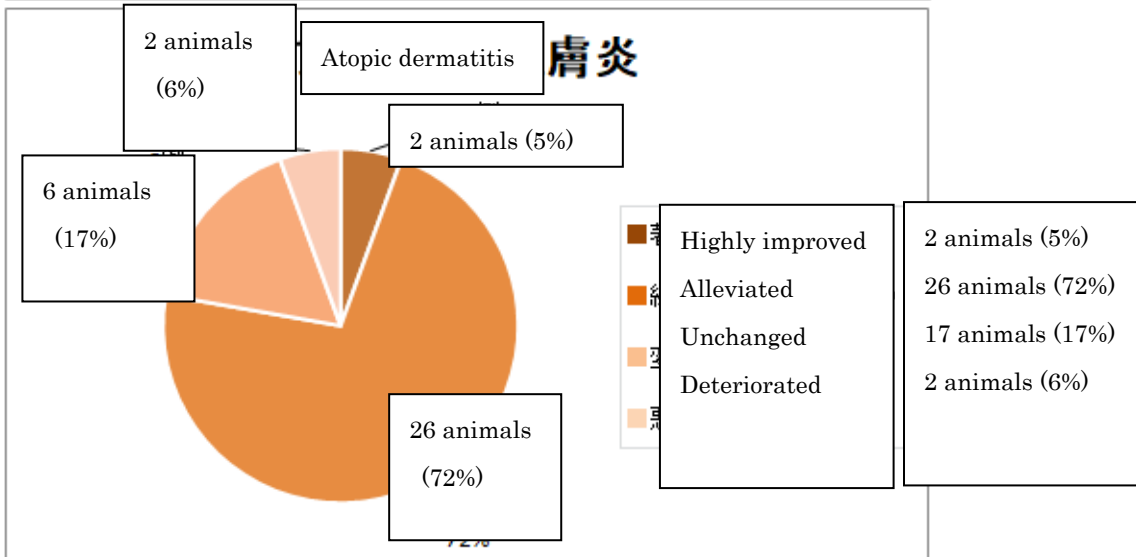
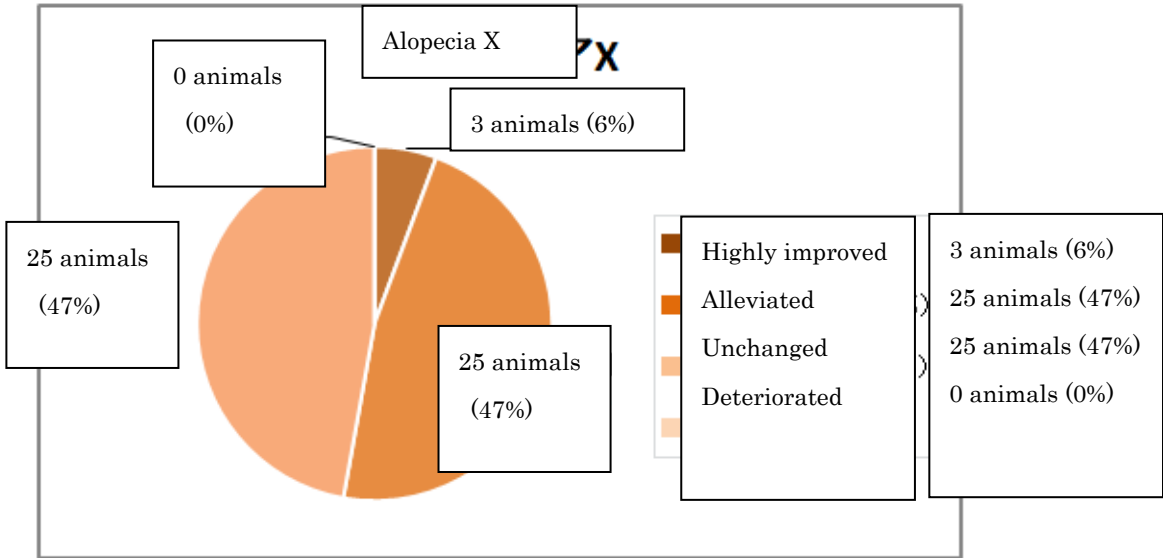
Healthy animals have normal metabolism, which maintains their biological functions. Phagocytes (macrophages) that reside in all body tissues play a central role in innate immunity, including elimination of foreign substances and tissue repair. For example, impaired action of vascular endothelial growth factor or fibroblast growth factor of macrophages may decrease the regeneration ability of many tissues, such as muscles, bones, and corpus luteum. We have found that LPS may also improve hair growth effects from telogen to anagen by promoting production of the vascular

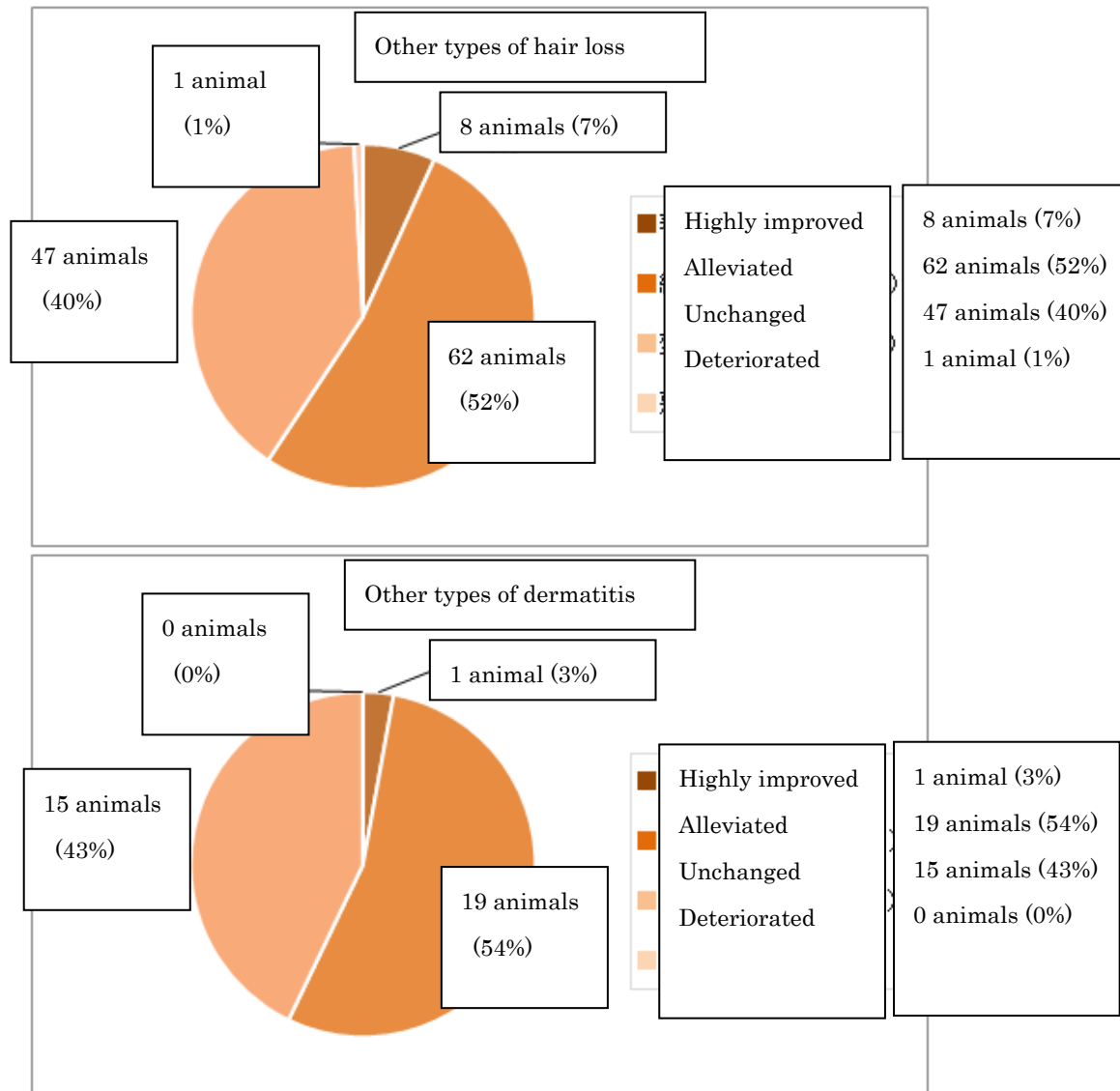
endothelial growth factor or fibroblast growth factor. We also consider that the study combination preparation showed its effects on hair growth promotion because the effectiveness of LPS was enhanced by antioxidative effects and blood circulation promoting effects of *Pinus pinaster* polyphenol. We will continue such studies by further accumulating data to determine responsive animals and the hair growth mechanism of LPS in combination with *Pinus pinaster* polyphenol.

#### Acknowledgments

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Summary of Effectiveness of TrichoS by disease





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