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# Feline Atopic Dermatitis: Therapeutic Potential of Vitamin C as an Adjunct Therapy

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**ABSTRACT**

***Background*:** Feline atopic dermatitis (AD), also known as non-flea, non-food hypersensitivity dermatitis, is a chronic pruritic skin condition associated with environmental allergens such as dust mites and pollens. Although the age of onset is variable, it generally occurs before 5 years of age. Similar to dogs, pruritus is a key feature of atopic dermatitis in cats, although the distribution of pruritus and lesions is often more variable. The initial workup should include a thorough history, complete dermatologic and physical examination, and routine tests such as flea combing, skin scrapings, and fungal cultures. A diagnosis of feline AD is established once other differential diagnoses have been excluded. The feline dermatitis extent and severity index (FEDESI) and the scoring feline allergic dermatitis (SCORFAD) are commonly used in the evaluation the severity of feline AD. Treatment of feline AD typically involves a combination of anti-inflammatory medications and supportive care to control pruritus and inflammation. Long-term management should be supported by identifying trigger factors and implementing environmental control measures. This study investigated the potential benefits of vitamin C as an adjunctive treatment for feline AD, utilizing the pruritus visual analog scale (pVAS) and the FEDESI as assessment tools.
***Materials, Methods & Results*:** Twenty cats with dermatological symptoms, free from infectious, parasitic, or fungal diseases, were included. After hematological and diagnostic evaluations, they were divided into 2 groups: Group 1 received methylprednisolone alone, while Group 2 received methylprednisolone combined with vitamin C (25-75 mg/kg) for 14 days. Clinical assessments, pVAS, FEDESI scores, and eosinophil counts were recorded on days 0, 7, and 14. Both groups showed clinical improvement, with reductions in pruritus and skin lesions. However, Group 2 exhibited a more rapid decrease in pVAS and FEDESI scores by day 7. Eosinophil counts also dropped more significantly in the Group 2. By day 14, clinical outcomes were similar between groups, and statistical differences were no longer significant.
***Discussion*:** Feline AD is a pruritic disease in which affected cats exhibit a hypersensitivity reaction to inhaled or contacted environmental allergens. Skin lesions may be seasonal or non-seasonal. In recurrent cases, otitis externa, miliary dermatitis, pruritis in the head and neck region, and eosinophilic granuloma complex lesions may be associated with atopy. The primary symptom is pruritus, and depending on the severity of pruritus, erosion, excoriations and alopecia may be observed in the lesions. In this study, it was observed that the clinical findings were compatible with the literature data. The primary goal of treatment is to reduce pruritus and inflammation to levels below the threshold for clinical manifestation. To achieve this, a classical multimodal approach is typically employed, incorporating both anti-inflammatory and immunosuppressive agents. Although classical treatment yields highly effective results, vitamin C may be considered as an adjunct therapy in the management of feline AD due to its roles in skin barrier support and antioxidant activity. The findings suggest that vitamin C may contribute to faster short-term relief of clinical signs in feline AD, possibly through its antioxidant, anti-inflammatory, and immunomodulatory properties. While the long-term efficacy remains uncertain, early results indicate that vitamin C can support initial treatment response when used alongside corticosteroids. In conclusion, parenteral vitamin C may serve as a supportive therapy in feline AD, helping to accelerate early clinical improvement. Further large-scale and long-term studies are necessary to confirm its role in routine treatment protocols.

**Keywords:** atopic dermatitis, feline, treatment, vitamin C.

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## INTRODUCTION

Feline atopic dermatitis (AD) is a chronic, pruritic, inflammatory skin disease caused by environmental allergens. It is also referred to as "feline atopic syndrome" or "non-flea, non-food hypersensitivity dermatitis" [11,16]. It is known that environmental factors such as house dust mites, pollens, fungal propagules (mold & yeast), bacteria and many antigens play an important role in the etiology of feline AD [2,4,24].

The primary symptom of feline AD is pruritus, and the severity of pruritus can vary seasonally. Pruritus is usually seen in the head, neck, ear, abdomen and inguinal regions. If at least 2 of the following signs are seen together: erythema, erosions, eosinophilic dermatitis, and head and neck erosions or ulcers; the absence of infectious, traumatic or external factors indicates feline AD [2,4,24]. In rare cases, atypical feline AD symptoms such as plasma cell pododermatitis, seborrhea, serous otitis, facial erythema, and exfoliative dermatitis have been reported. Additionally, noncutaneous signs such as sneezing, coughing, conjunctivitis, diarrhea, or vomiting may be observed in affected cats [10,15].

Feline AD is evaluated using 2 scoring systems: the feline dermatitis extent and severity index (FEDESI) and the scoring feline allergic dermatitis (SCORFAD). The FEDESI evaluation is conducted through the allocation of a score based on the presence or absence of erythema, excoriation, erosion, and alopecia in 42 distinct anatomical locations, with a scale ranging from 0 to 5 [16]. The diagnosis of feline AD is primarily determined by a comprehensive evaluation that includes a detailed medical history, a thorough clinical examination, and the exclusion of other potential differential diagnoses. Furthermore, intradermal tests or serum allergen-specific IgE tests may be preferable for the identification of allergens [2,24].

The clinical approach to the treatment of feline AD involves a multifaceted therapeutic regimen, encompassing various pharmaceutical and non-pharmacological interventions. These include allergen immunotherapy, the administration of topical, inhaled, or systemic glucocorticoids, cyclosporine, oclacitinib maleate, antihistamines, and omega-3 and omega-6 fatty acid supplements [10,11].

Vitamin C is known as an antioxidant and enzymatic co-factor necessary for physiological reactions such as hormone production, and collagen synthesis [26]. Vitamin C has a number of functions, including supporting epithelial barrier function by increasing collagen synthesis and stabilisation, protecting against oxidative stress, increasing fibroblast proliferation and migration, and accelerating wound healing. It is also recognised that vitamin C modulates cytokine production through inflammatory mediators and reduces histamine levels, thereby impacting pruritus [5,26].

In the field of human medicine, a correlation has been observed between vitamin C deficiency and the onset or exacerbation of certain dermatological conditions, including AD [29]. Vitamin C supplementation protects the skin barrier function by promoting keratinocyte differentiation and provides protection against skin diseases such as AD [27]. It has been emphasized that vitamin C levels can decrease with the increase in clinical symptoms of AD [29]. To the best of the authors' knowledge, no studies have been published regarding the use of vitamin C in the treatment of feline AD. The aim of this study was to investigate the short-term clinical effects of parenteral vitamin C administration in the treatment of feline AD, to determine its effects on pVAS and FEDESI scores, and also to determine the effects of combined use of vitamin C and prednisolone on treatment.

## MATERIALS AND METHODS

### *Animal material*

Cats suspected of having AD (n=20), presented to the Animal Hospital of the Faculty of Veterinary Medicine with dermatological complaints and confirmed to be free from fungal, bacterial, and parasitic infections, were included in the study.

### *Hematological analysis*

For hematological examinations, blood samples were collected from the v. cephalica antebrachii of the AD-suspected cats. The blood samples were immediately analyzed using a hematology analyzer (Mindray BC-2800Vet)[1]. These analysis were performed on day 0, day 7, and day 14. Cats showing hematological signs suggestive of infectious disease were excluded from the study.

### *Microbiological and parasitological analysis*

For microbiological analysis, swab samples were collected from the lesional areas and sent to the

microbiology laboratory. Parasitological examinations were conducted by performing skin scrapings, which were then mixed with 10% potassium hydroxide and examined microscopically.

Each swap sample intended for microbiological analysis was incubated according to the required conditions [1]. As a result of the analysis, 20 AD cats with no bacteriological or mycological growth were included in the study. The cats included in the study were randomly divided into 2 groups to apply the treatment protocol.

*Treatment groups and drug administration*

Group 1: Received methylprednisolone[2] (Prednol-L® 20 mg - 1 mg/kg, q24h, IM) for 14 days.

Group 2: Received methylprednisolone[2] (Prednol-L® 20 mg - 1 mg/kg, q24h, IM) and vitamin C[3] (Maxivit-C® - 50 mg/kg, q24h, IM) both administered for 14 days.

*Pruritus visual analog scale*

Pruritus was evaluated using the pVAS, scored between 0 and 10, on days 0, 7, and 14 for each cat diagnosed with AD.

*The feline dermatitis extent and severity index*

The feline dermatitis extent and severity index was used to assess the severity and distribution of skin lesions. The evaluation included erythema, excoriation/erosion, and self-induced alopecia in the following areas: face (periocular), chin, head, ear pinnae (left/right, convex and concave), neck (dorsal, ventral, right and left lateral), axillae (left and right), sternum, thorax (dorsal, right and left lateral), inguinal region (left and right), abdomen, lumbar region (dorsal), flanks (left and right), forelimbs (left and right, medial and lateral), hindlimbs (left and right, medial and lateral), forepaws (dorsal and ventral), hindpaws (dorsal and ventral), perineal region, perigenital area, and tail. The feline dermatitis extent and severity index was recorded for each cat on days 0, 7, and 14.

*Statistical analysis*

Hematological parameters, pVAS and FEDESI scores obtained during the study were statistically analyzed using SPSS version 24.0. Comparisons between the 2 groups were performed using the Mann-Whitney U test.

## RESULTS

*Clinical findings*

All 20 cats included in the study, which were presented with dermatological complaints, exhibited clinical signs of pruritus, erythema, and alopecia upon physical examination. At the end of the study, evaluation of clinical signs in both groups revealed a more rapid improvement in the group treated with vitamin C supplementation (Figures 1 & 2).

*Hematological findings*

Eosinophil levels of the 20 cats enrolled in the study were evaluated on days 0, 7, and 14. A gradual decrease in eosinophil counts was observed over time in both groups. However, the decrease was more prominent and occurred earlier in the vitamin C-treated group (Group 2). Statistical analysis revealed a significant difference ($P < 0.005$) between the 2 groups (Figure 3).

*Pruritus visual analog scale findings*

Pruritus severity was recorded using the pVAS scoring system on days 0, 7, and 14. In Group 1, the scores were 7.4, 2.2, and 0.2, respectively, while in Group 2, the scores were 7.7, 0.8, and 0.2. Although a relief in pruritus was observed in both groups throughout the study period, the reduction was more pronounced in the group receiving vitamin C (Group 2). The difference between the 2 groups was statistically significant (Figure 4).

*The feline dermatitis extent and severity index findings*

The FEDESI scores were also evaluated on days 0, 7, and 14. In Group 1, the scores were 12.3, 6.5, and 1.3, respectively, while in Group 2, they were 13.6, 2.5, and 0.4. A progressive decrease in lesion severity was noted in both groups; however, the group treated with vitamin C showed a faster and more marked reduction. Statistically significant differences were observed between the groups (Figure 5).

## DISCUSSION

Feline AD is a chronic pruritic skin disorder typically associated with non-seasonal environmental allergens, particularly house dust mites, and is characterized by positive intradermal skin test reactions. Although the exact pathogenesis remains unclear, it is hypothesized that IgE-like reactive antibodies may play a role in its development [14]. Diagnosis is challenging and requires exclusion of other dermatologic conditions such as flea allergy dermatitis, food hypersensitivity, parasitic infestations, and dermatophytosis [23].

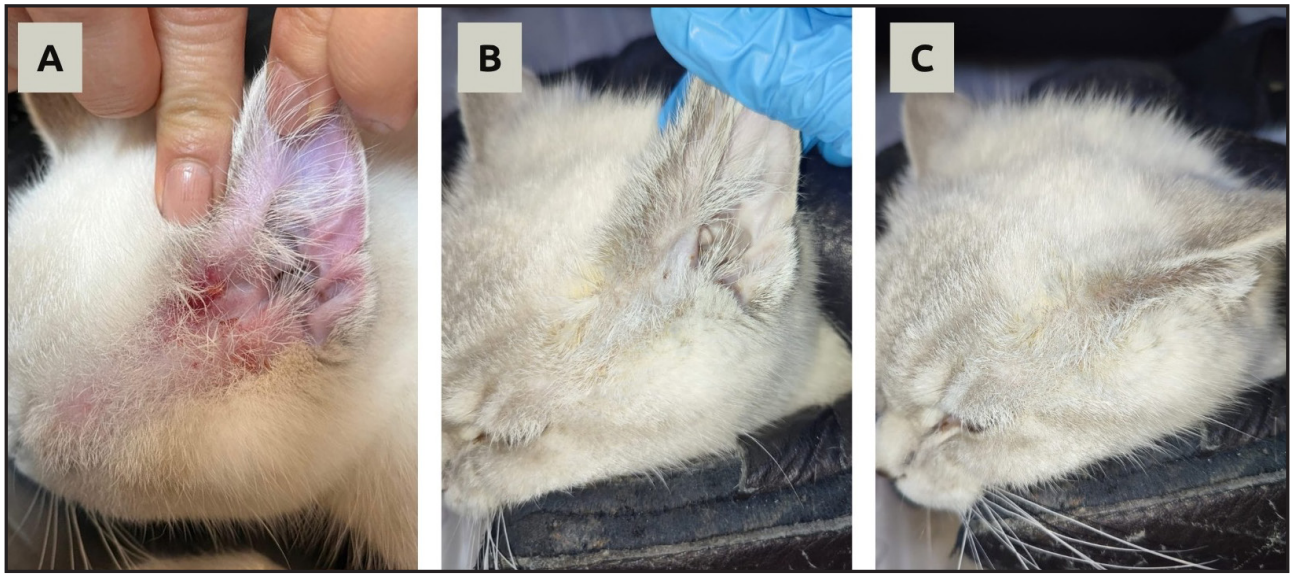


**Figure 1.** Clinical improvement of a cat in Group 1 by days. A- Before treatment (Day 0). B- Day 7. C- Day 14.

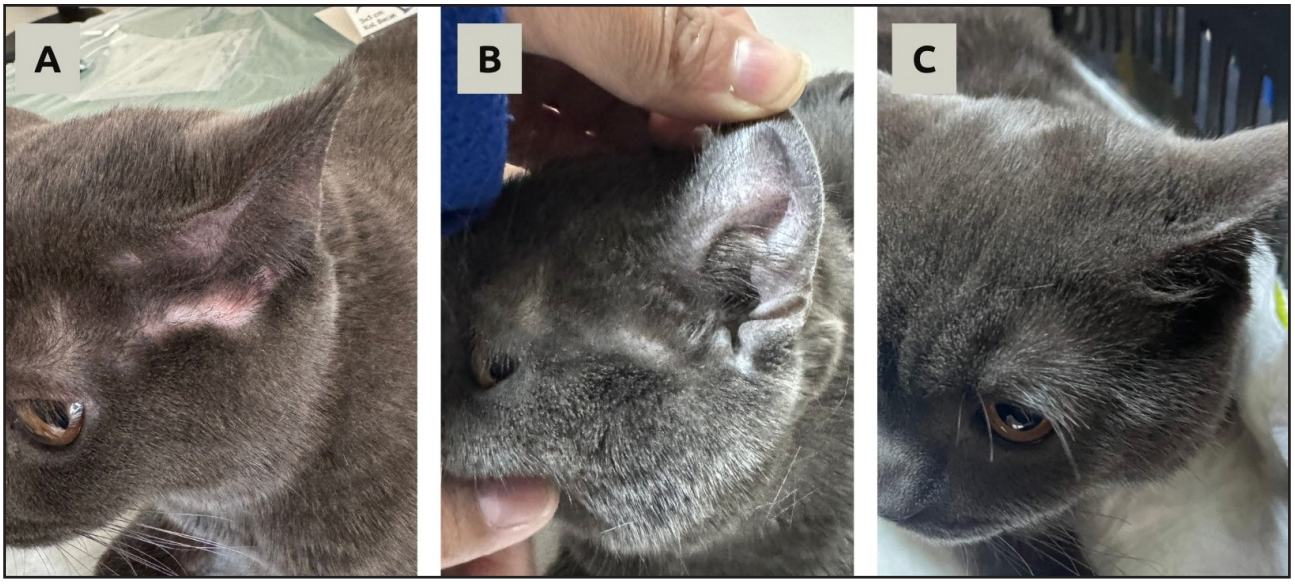


**Figure 2.** Clinical improvement of a cat in Group 1 by days. A- Before treatment (Day 0). B- Day 7. C- Day 14.

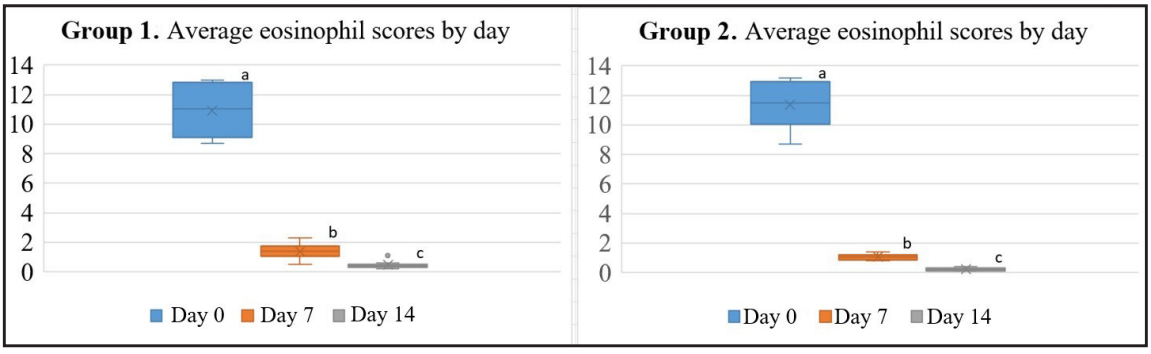


**Figure 3.** Average eosinophil scores by day (the difference between a-b and a-c was found to be significant ($P < 0.001$) In addition, the difference between b-c was found to be significant ($P < 0.005$).

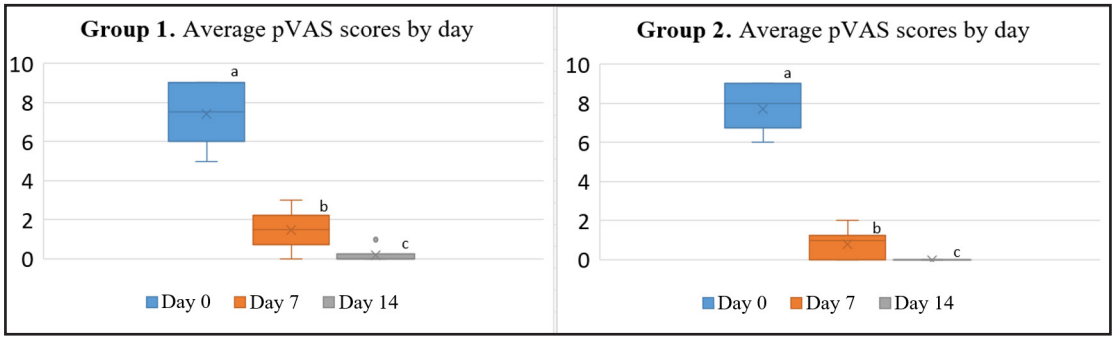


**Figure 4.** Average pVAS scores by day (the difference between a-b and a-c was found to be significant ($P < 0.001$). In addition, the difference between b-c was found to be significant ($P < 0.005$).

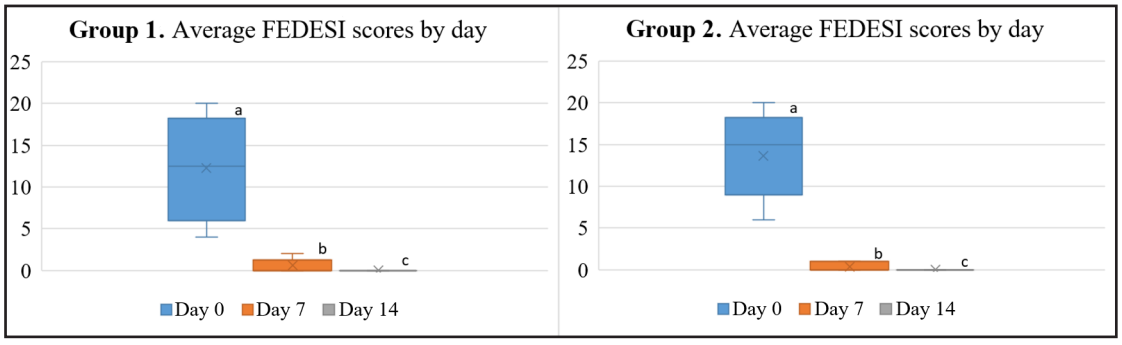


**Figure 5.** Average FEDESI scores by day (the difference between a-b and a-c was found to be significant ($P < 0.001$). In addition, the difference between b-c was found to be significant ($P < 0.005$).

Two scoring systems widely used for the clinical assessment of feline AD are FEDESI and SCORFAD [20]. Common clinical manifestations in cats include intense pruritus localized to the head and neck, miliary dermatitis (characterized by small crusted papules), symmetrical self-induced alopecia, and eosinophilic lesions such as ulcers, granulomas, and plaques [10].

Glucocorticoids and antihistamines are commonly used therapeutic agents; however, their long-term use may lead to undesirable side effects. Due to the inconsistent efficacy and applicability of allergen avoidance and immunotherapy, immunosuppressive agents such as prednisolone and cyclosporine are often employed [7].

In this study, prominent clinical signs including severe pruritus, erythema, and alopecia were observed in all affected cats, consistent with findings reported in previous studies [3,6,8,12,13,18,19,22,25]. Additionally, initial pVAS scores were high but significantly decreased over time, consistent with findings from other studies using various therapeutic protocols [6,9,17,20,21,28]. Noli & Cena [20] indicated that administration of cyclosporine at a dose of 7 mg/kg orally once daily for 1 month led to significant improvements in FEDESI and pVAS scores over a 4-month period. Similarly, Ural *et al.* [28] reported substantial reductions in FEDESI and pVAS scores following a 90-day low-carbohydrate diet in cats diagnosed with feline atopic skin syndrome. Foj *et al.* [9] demonstrated short-term clinical improvement with oclacitinib therapy, while McClintock *et al.* [17] observed a marked decrease in pVAS scores following dexamethasone administration over a 20-day period. Comparison of the effects of oclacitinib and methylprednisolone, showed significant reductions in pVAS scores [21].

In the current study, 20 cats diagnosed with feline AD were divided into 2 groups. Both groups demonstrated significant reductions in pVAS and FEDESI scores. Notably, the group receiving vitamin C (Group 2) exhibited more rapid clinical improvement during the early phase of treatment. However, no statistically significant differences were found between the groups at the end of the 14-day treatment period.

These findings suggest that vitamin C may provide short-term symptomatic relief, though its long-term efficacy requires further investigation.

Overall, the results obtained in this study are consistent with those reported in previous literature. The use of objective scoring systems such as FEDESI and pVAS continues to be of substantial value in monitoring treatment efficacy in feline AD.

## CONCLUSIONS

In conclusion, vitamin C appears to exert therapeutic benefits in feline AD by significantly lowering FEDESI and pVAS scores and mitigating pruritic and dermatologic manifestations. Although early improvements were more pronounced in the group receiving vitamin C, the difference between the groups was not statistically significant by day 14. These results suggest that vitamin C may serve as a supportive treatment in the short term. However, larger-scale and longer-duration studies are needed to fully assess its therapeutic potential in feline AD.

MANUFACTURERS

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***Ethical approval.*** This study was approved from Dicle University Animal Experiments Local Ethics Commitee (Decision no: 26.03.2025/11-03).

***Declaration of interest.*** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

## REFERENCES

1 **Aydın N., İzgür M., Diker K., Yardımcı H., Esendal Ö., Paracıkoğlu J. & Akan M. 2006.** Bacterial Diseases. In: *Veterinary Microbiology*. Ankara: İlke-Emek Matbaacılık ve Yayıncılık, pp.145-163.

2 **Bajwa J. 2018.** Atopic dermatitis in cats. *The Canadian Veterinary Journal*. 59(3): 311-318.

3 **Bajwa J. 2021.** Feline atopic syndrome - An update. *The Canadian Veterinary Journal*. 62(11): 1237-1240.

4 **Baykan A. & Baykan H. 2009.** Evaluation of skin prick test and specific IgE results in atopic dermatitis patients. *Duzce Medical Journal*. 19(1): 19-26.

5 **Bilal T. & Altıner A. 2019.** Effects of nutritient stress factors on immunity. In: *The Relationship Between Nutrition and Immunity in Animals*. Istanbul: Turkiye Klinikleri, pp.68-82.

6 **Brément T., Bensignor E., Drevon-Gaillot E.V., Sanchez M.D., Pariente S. & Viaud S. 2025.** A retrospective, multicentric controlled study of the effect of specific allergen immunotherapy on medication needs in cats with atopic skin syndrome. *Veterinary dermatology*. 36(3): 332-342.

7 **Carpan T., Tendar I., Ozalp T., Erdogan S., Erdoğan H. & Ural K. 2025.** Investigation of the clinical efficacy of quercetin in feline atopic dermatitis syndrome. *Acta Fytotechnica et Zootechnica*. 28(1): 14-20.

8 **Diesel, A. 2020.** Feline Atopic Syndrome: Epidemiology and Clinical Presentation. In: Noli C & Colombo S. (Eds). *Feline Dermatology*. Cham: Springer, pp.451-463.

9 **Foj R., Carrasco I., Clemente F., Scarampella F., Calvet A., Prats A., Vivancos S., Brazís P. & Puigdemont A. 2021.** Clinical efficacy of sublingual allergen-specific immunotherapy in 22 cats with atopic dermatitis. *Veterinary Dermatology*. 32(1): 67-e12.

10 **Gedon N.K.Y. & Mueller R.S. 2018.** Atopic dermatitis in cats and dogs: a difficult disease for animals and owners. *Clinical and Translational Allergy*. 8(41): 1-12.

11 **Gökalp G. & Kırbaş A. 2021.** Kedilerin atopik sendromuna güncel yaklaşım. *Bozok Veterinary Sciences*. 2(2): 34-40.

12 **Gunawan M., Putra A.H. & Widyaputri T. 2023.** Feline atopic skin syndrome: an introduction to recently proposed terminology and how to work up the case. *Acta Veterinaria Indonesiana*. 11(1): 79-86.

13 **Halliwell R., Banovic F., Mueller R.S. & Olivry T. 2021.** Immunopathogenesis of the feline atopic syndrome. *Veterinary Dermatology*. 32(1): 13-e14.

14 **Koutinas A. & Saridomichelakis M. 1997.** Feline atopic dermatitis. *Journal of the Hellenic Veterinary Medical Society*. 48(1): 17-23.

15 **Marsella R. 2021.** Atopic dermatitis in domestic animals: What our current understanding is and how this applies to clinical practice. *Veterinary Sciences*. 8(7): 124-142.

**16 Martiniuc M. 2023.** Investigation of interobserver reliability of feline dermatitis prevalence and severity index (fedesi) and visual analog scoring in cats with head and neck dermatitis. 87f. Aydin. Tese (Maestría en Ciencias Veterinarias) - Programa de Pós-Graduação em Ciências Veterinárias, Universidade Aydin Adnan Menderes

**17 McClintock D., Austel M., Gogal Jr. R.M. & Banovic F. 2021.** Oral dexamethasone sodium phosphate solution significantly reduces pruritus and clinical lesions in feline hypersensitivity dermatitis: an open-label study. *Veterinary Dermatology*. 32(5): 497-e137.

**18 Mueller R.S. 2023.** A systematic review of allergen immunotherapy, a successful therapy for canine atopic dermatitis and feline atopic skin syndrome. *Journal of the American Veterinary Medical Association*. 261(1): 30-35.

**19 Mueller R.S., Nuttall T., Prost C., Schulz B. & Bizikova P. 2021.** Treatment of the feline atopic syndrome–a systematic review. *Veterinary Dermatology*. 32(1): 43-e48.

**20 Noli C. & Cena T. 2015.** Comparison of FEDESI and SCORFAD scoring systems for the evaluation of skin lesions in allergic cats. *Veterinary Dermatology*. 26(6): 481-e113.

**21 Noli C., Matricoti I. & Schievano C. 2019.** A double-blinded, randomized, methylprednisolone-controlled study on the efficacy of oclacitinib in the management of pruritus in cats with nonflea nonfood-induced hypersensitivity dermatitis. *Veterinary Dermatology*. 30(2): 110-e130.

**22 Older C.E., Diesel A.B., Heseltine J.C., Friedeck A., Hedke C., Pardike S., Breitreiter K., Rossi M.A., Messamore J. & Bammert G. 2021.** Cytokine expression in feline allergic dermatitis and feline asthma. *Veterinary Dermatology*. 32(6): 613-e163.

**23 Prost C. 2009.** Feline atopic dermatitis: Clinical signs and diagnosis. *European Journal of Companion Animal Practice*. 19(3): 223-229.

**24 Ravens P.A., Xu B.J. & Vogelnest L.J. 2014.** Feline atopic dermatitis: a retrospective study of 45 cases (2001–2012). *Veterinary Dermatology*. 25(2): 95-e28.

**25 Szczepanik M.P., Wilkołek P.M., Adamek Ł.R., Zając M., Gołyński M., Sitkowski W. & Taszkun I. 2018.** Evaluation of the correlation between Scoring Feline Allergic Dermatitis and Feline Extent and Severity Index and skin hydration in atopic cats. *Veterinary Dermatology*. 29(1): 34-e16.

**26 Türköz Y. 2011.** Biochemistry of pruritus. *Turkiye Klinikleri Dermatology-Special Topics*. 4(3): 7-11.

**27 Uğur H., Eker S., Çatak J. & Yaman M. 2020.** Vitamin C and effect on diseases. *European Journal of Science and Technology*. 19(1): 746-756.

**28 Ural K., Erdoğan H., Erdoğan S. & Balıkçı C. 2023.** Unenriched skin microbiota transplantation for cats: new road story for treating feline atopic skin syndrome. *Brazilian Journal of Veterinary Medicine*. 45e002823. DOI: 10.29374/2527-2179.bjvm002823

**29 Wang K., Jiang H., Li W., Qiang M., Dong T. & Li H. 2018.** Role of vitamin C in skin diseases. *Frontiers in Physiology*. 9378515.