

SUMMARY

ROYAL CANIN Veterinary Diet^{TM/MC} canine SKIN SUPPORT SS 21^{TM/MC} is a complete and balanced diet for adult dogs that has been specifically formatted to aid the management of dogs with allergic skin diseases (atopy, flea bite hypersensitivity, contact allergy), and to help promote recovery from skin disease. SKIN SUPPORT SS 21^{TM/MC} is a selected protein diet supplemented with Aloe Vera gel, curcumin, vitamin C, taurine, and ω -3 fatty acids.

INDICATIONS

- Allergic skin disease
 - Atopy
 - Contact dermatitis
 - Flea bite hypersensitivity
- To help control secondary bacterial skin infections
- To help promote wound healing and skin recovery

CONTRAINDICATIONS

- Growing puppies
- Pregnant or lactating bitches

NUTRITIONAL DIFFERENCES

(as compared to typical commercial pet foods)

- Limited ingredients
 - Menhaden fish meal
 - Single carbohydrate source (rice)
- Enhanced levels of vitamin A, vitamin C, taurine, and zinc
- Enriched with biotin, niacin, pantothenic acid, and linoleic acid
- Enriched with long chain ω -3 fatty acids (eicosapentaenoic and docosahexaenoic acids)
- Curcumin
- Aloe Vera gel



RATIONALE

Allergic skin disease is one of the most common skin problems presented to veterinarians. Causes of allergic skin disease in dogs include atopy, flea-bite hypersensitivity, food hypersensitivity, and contact allergy. The most common manifestation of atopy is a non-seasonal pruritus with erythema and papular eruption. In most cases, secondary lesions and dermatoses such as Malassezia and bacterial pyoderma predominate.

SKIN SUPPORT SS 21^{TM/MC} has been specifically designed to assist the management of allergic skin diseases by controlling inflammation, reducing pruritus, minimizing secondary bacterial infections, optimizing an effective skin barrier, and promoting the recovery of skin.

Atopy refers to a genetic pruritic dermatitis in which the patient becomes sensitized to antigens. Atopy is a type I hypersensitivity reaction in which inhaled, ingested or absorbed allergens present to antigen presenting cells in the skin and provoke allergen-specific IgE, and less commonly, IgG antibody production. The IgE antibodies bind to and sensitize mast cells. Following re-exposure to the offending allergen, the mast cells degranulate and release mediators and cytokines such as histamine, prostaglandins and leukotrienes with the development of pruritus and cutaneous inflammation.

Treatment requires identification of the offending allergen and subsequent immunotherapy. Immunotherapy typically provides relief to 40% of patients. The remaining patients require symptomatic relief to minimize clinical signs.

The skin provides a barrier to protect the body from potentially damaging environmental influences including contact with allergens. The cornified stratum corneum plays the principal role of barrier defense. The stratum corneum consists of protein rich corneocytes held together with a lipid matrix consisting of fatty acids, sterols and ceramides analogous to bricks and mortar.

In terms of barrier function, ceramide-1 is thought to be a key component. Ceramide-1 contains linoleic acid and it is in this respect that linoleic acid is believed to play a crucial role in barrier function of the skin. In addition, Waltham Science has shown that enhancing the diet with a synergistic combination of nicotinamide, pantothenic acid, histidine, choline, and inositol increases the synthesis of ceramides and lipids. When fed to dogs, this combination of nutrients was shown to significantly decrease the trans-epidermal water loss (TEWL) compared to a control diet. TEWL describes the total amount of water lost through the skin, a loss that occurs via passive diffusion through the epidermis. TEWL is commonly used to assess skin barrier function and an elevated TEWL is generally regarded as an indicator of compromised barrier function. The data from this study suggests that inclusion of the supplemental levels of nutrients in the diet resulted in improved barrier function in the dogs.

With respect to skin disease, both long chain ω -3 fatty acids and ω -6 fatty acids are anti-inflammatory. However, the mechanisms of action are different.

The anti-inflammatory effect of the ω -6 fatty acids is related to the synthesis of dihomo- ζ -linolenic acid (DGLA) from dietary GLA (found in high concentrations in borage oil). DGLA can be converted to the less inflammatory PGE₁, and to a potent anti-inflammatory hydroxy fatty acid that blocks the lipoxygenase pathway.

Long chain ω -3 fatty acids, such as eicosapentaenoic and docosahexaenoic acid, directly compete with arachidonic acid for the lipoxygenase and cyclooxygenase enzymes. Subsequent metabolism of eicosapentaenoic acid generates less inflammatory mediators such as LTB₅, and PGE₃ compared to the metabolism of arachidonic acid. In addition, the metabolism of eicosapentaenoic acid produces hydroxy fatty acids that block the production of LTB₄, a potent chemotactic factor, from arachidonic acid.

The skin needs a local and sufficient supply of key nutrients to optimize skin healing. These nutrients are needed to meet the energy demands of cellular proliferation, migration, phagocytes and the production of matrix, connective, endothelial, and epithelial tissues.

The diet for allergic dogs should thus meet the normal requirements for protein, fat, carbohydrate, vitamins, and minerals. In addition, zinc, vitamin A, and vitamin C have been shown to have specific roles in skin healing by stimulating collagen synthesis, improving immune function and promoting tissue recovery after damage. Therefore, SKIN SUPPORT SS 21^{TM/MC} has been enriched with zinc, vitamin A, and vitamin C to promote skin recovery.

It has been suggested that there is a threshold for pruritus and for the development of atopic dermatitis. The concept of a threshold relates to the presence of multiple stimuli that contribute to the development of clinical symptomatology. The theory hypothesizes that the pet is able to tolerate a given stimulus, and only manifests clinical disease once that threshold is exceeded. The threshold may be obtained more rapidly when multiple stimuli are acting in concert. Likewise, it has been suggested that there is an allergen threshold such that there are no clinical signs with a low allergen load. Conversely, a high allergen load will trigger clinical disease. Furthermore, atopic dogs have a greater risk of developing additional hypersensitivities including flea bite hypersensitivity, Staphylococcal hypersensitivity, and food hypersensitivity. Hence, the management of the atopic dog should be designed to minimize the allergen load and to control occult food hypersensitivity.

Studies have shown that feeding a selected protein diet can result in significant clinical improvement in dogs with atopy and reduce their requirements for anti-inflammatory drugs. Control of concurrent food hypersensitivity may cause the pet to better tolerate the offending antigens triggering atopic dermatitis. SKIN SUPPORT SS 21^{TM/MC} has been designed using protein sources of Menhaden fish meal and rice which are rarely associated with food hypersensitivity in dogs.

Antioxidants such as β -Carotene, Vitamin E, taurine and Vitamin C have been reported to improve the immune response in healthy dogs and cats and may have application for the management of the atopic pet. In addition, Vitamin E has been reported to decrease the production and release of inflammatory mediators by mast cells.

Aloe Vera gel contains pharmacologically active ingredients such as carboxypeptidase, salicylic acid, magnesium lactate, and mannose-6-phosphate. These components have been shown to have an anti-inflammatory, anti-pruritic, anti-bacterial, and analgesic effect. Aloe Vera inhibits thromboxane A_2 synthetase (a potent vasoconstrictor). This effect can increase blood flow to injured areas to stimulate wound healing and promote skin recovery.

Curcumin, an extract of tumeric, has been shown to have an anti-inflammatory effect by modulating cytokine and eicosanoid production, decreasing mast cell degranulation and inhibiting the release of oxygen derived free radicals.

A blinded cross-over study was performed to evaluate the effect of SKIN SUPPORT SS 21^{TM/MC} in atopic dogs. Atopy was confirmed in 19 dogs on the basis of history, clinical signs, laboratory tests, positive intradermal skin test, and a negative response to an elimination diet. Dogs were randomized to receive either a control diet or SKIN SUPPORT SS 21^{TM/MC} for 12 weeks, followed by crossover to the alternative diet.

Structured, regional evaluations of erythema, lichenification, excoriation, and alopecia were conducted at baseline and subsequently at four week intervals. Severity was assessed using a



four-point score. Summation of values provided a total clinical score for each dog at each time point. SKIN SUPPORT SS 21^{TM/MC} was associated with a significant improvement in total clinical scores compared to the control diet. The results of this study suggest that SKIN SUPPORT SS 21^{TM/MC} is clinically indicated to aid the management of canine atopy.

GENERAL FEEDING RECOMMENDATIONS

- Daily feeding recommendations may be divided into two to four meals.
- Fresh water should be available at all times.
- Individual requirements may vary depending on breed, age, sex, environment, and activity level.
- Curcumin imparts a yellow coloring to ROYAL CANIN Veterinary Diet^{TM/MC} canine SKIN SUPPORT SS 21^{TM/MC}. As this natural color may stain, contact with delicate items should be avoided.

FEEDING GUIDE

FEEDING RECOMMENDATIONS FOR ADULT DOG MAINTENANCE

Body Weight		Suggested Caloric Intake kcal/day	Daily Feeding
lb	kg		Dry Only (8-oz cups/day)
5	2.3	231	3/4
10	4.5	389	1 1/3
20	9.1	653	2 1/4
30	13.6	886	3
40	18.1	1099	3 2/3
50	22.7	1299	4 1/3
60	27.2	1489	5
70	31.8	1672	5 2/3
80	36.3	1848	6 1/4
90	40.8	2019	6 3/4
100	45.4	2185	7 1/3
110	49.9	2347	8
120	54.4	2505	8 1/3
130	59.0	2660	9
140	63.5	2812	9 1/2
150	68.0	2961	10

PRODUCT DESCRIPTION

ROYAL CANIN Veterinary Diet^{TM/MC} canine SKIN SUPPORT SS 21^{TM/MC} is a complete, balanced, highly digestible diet that has been specifically formulated to aid the management of allergic skin diseases in adult dogs. The diet contains limited protein sources (Menhaden fish meal and rice), and is supplemented with ingredients including curcumin, Aloe Vera, and vitamin C to reduce inflammation associated with pruritus, control secondary bacterial infections and to promote wound healing.

NUTRITION STATEMENT

SKIN SUPPORT SS 21^{TM/MC} is formulated to meet the nutritional levels established by the AAFCO Dog Food Nutrient Profiles for adult maintenance.



Very high amounts of biotin, niacin, pantothenic acid, and zinc-linoleic acid complex reduce transepidermal water loss and strengthen the barrier effect of the skin.



Rice and Menhaden fish meal reduce the risk of allergic reactions because they are not commonly used in canine food preparations.



Eicosapentaenoic and docosahexaenoic acids are long chain omega-3 fatty acids that modulate inflammatory reactions.



Naturally preserved with mixed tocopherols, rosemary extract, and citric acid.

GUARANTEED ANALYSIS

Crude Protein, (min)	21%
Crude Fat, (min)	13%
Crude Fiber, (max)	5.4%
Moisture, (max)	10.5%

METABOLIZABLE ENERGY

From Protein	23.4%
From Fat	34.3%
From Carbohydrate	42.3%

Approximately 298 kcal per 8-oz cup, 393 kcal per 100 g, 76 g per 8-oz cup.

INGREDIENTS

MENHADEN FISH MEAL, RICE, BROWN RICE, CHICKEN FAT, NATURAL FLAVORS, CELLULOSE POWDER, DRIED BEET PULP, VEGETABLE OIL, CURCUMIN, L-TYROSINE, CALCIUM CARBONATE, POTASSIUM CHLORIDE, SODIUM CHLORIDE, TAURINE*, CHOLINE CHLORIDE, BORAGE OIL, VITAMINS [DL-ALPHA-TOCOPHEROL ACETATE (SOURCE OF VITAMIN E), INOSITOL, NIACIN, L-ASCORBYL-2-POLYPHOSPHATE (SOURCE OF VITAMIN C*), D-CALCIUM PANTOTHENATE, BIOTIN, PYRIDOXINE HYDROCHLORIDE (VITAMIN B6), RIBOFLAVIN (VITAMIN B2), THIAMINE MONONITRATE (VITAMIN B1), VITAMIN A ACETATE, FOLIC ACID, VITAMIN B12 SUPPLEMENT, VITAMIN D3 SUPPLEMENT], ALOE VERA EXTRACT, TRACE MINERALS [ZINC AMINO ACID CHELATE, ZINC OXIDE, FERROUS SULFATE, MANGANESE AMINO ACID CHELATE, COPPER AMINO ACID CHELATE, COPPER SULFATE, MANGANOUS OXIDE, SODIUM SELENITE, CALCIUM IODATE], MARIGOLD EXTRACT, PRESERVED WITH NATURAL MIXED TOCOPHEROLS, ROSEMARY EXTRACT, AND CITRIC ACID.

*Not recognized as an essential nutrient by the AAFCO Dog Food Nutrient Profiles.



CANINE

TYPICAL ANALYSIS

Nutrient	Unit	Per 100 g as fed	Per 1000 kcal
Moisture	g	9	
Protein	g	23.0	58.5
Fat	g	15.0	38.1
Carbohydrate	g	41.6	105.7
Ash	g	7.0	17.8
Crude Fiber	g	4.4	11.2
Total Dietary Fiber	g	7.0	17.8
Minerals			
Calcium	g	1.20	3.05
Phosphorus	g	1.10	2.80
Sodium	g	0.40	1.02
Chloride	g	0.50	1.27
Potassium	g	0.60	1.53
Magnesium	g	0.10	0.25
Copper	mg	3.2	8.1
Iron	mg	16.0	40.7
Zinc	mg	24.0	61.0
Manganese	mg	7.0	17.8
Iodine	mg	0.46	1.17
Selenium	mg	0.033	0.084
Vitamins			
Vitamin A	IU	3000	7626
Vitamin D3	IU	120	305
Vitamin E	mg	60	153
Thiamine (B1)	mg	2.8	7.1
Riboflavin (B2)	mg	4.8	12.2
Niacin	mg	96.5	245.3
Pyridoxine (B6)	mg	7.8	19.8
Pantothenic Acid	mg	14.5	36.9
Folic Acid	mg	1.5	3.8
Cobalamin (B12)	mg	0.017	0.043
Biotin	mg	0.30	0.76
Choline	mg	300	763
Fatty Acids			
Linoleic acid	g	3.0	7.6
Amino Acids			
Arginine	g	1.3	3.3
Lysine	g	1.3	3.3
Methionine	g	0.7	1.8
Methionine + Cystine	g	0.75	1.9
Taurine	g	0.3	0.8



ORDERING INFORMATION

Bag Size	Weight		Item Code
	lb	kg	
Small	n/a	n/a	n/a
Medium	6	2.72	27706
Large	16.5	7.49	27717
Extra Large	35	15.89	27735

REFERENCES

- Watson A, Fray T, Clarke S, et al. Reliable use of the ServoMed Evaporimeter EP-2TM to assess transepidermal water loss in the canine. *J Nutr* 2002;132:1661S-1664S.
- Watson A, Fray T, Clarke S, et al. The influence of chronological age on barrier function properties of the dog epidermis. *Proceedings of the Waltham International Symposium: 2002*, p27.
- Watson A, Fray T, Clarke S, et al. The use of the Servo Med EP-2 Evaporimeter to measure the transepidermal water loss (TEWL) in canine skin. *Proceedings of the Waltham International Symposium: 2002* p35.
- Watson A, Baker C, Bailey J, et al. Dietary constituents can increase epidermal lipid synthesis by canine keratinocytes in vitro. *Proceedings of the Waltham International Science Symposium, 2003, Bangkok, Thailand* p10.
- Watson A, Baker C, Bailey J, et al. Dietary constituents can improve canine epidermal barrier function in vitro. *Proceedings of the Waltham International Science Symposium, Bangkok, Thailand. 2003*, p11.
- Markwell PJ, Svoboda M, Fray T. Dietary intervention can improve clinical signs in dogs with atopy. *Proceedings of the Waltham International Science Symposium, Bangkok, Thailand. 2003*, p21.
- Watson A, Fray T, and Markwell P. Analysis and characterization of sebaceous and ceramide lipids of canine skin. *Proceedings of the Waltham International Science Symposium, Bangkok, Thailand. 2003*, p31.
- Fray TR, Watson AL, Baker CD, et al. Effects of a novel ingredient blend on canine fibroblast migration and cutaneous barrier function in vitro. *Proceedings of the Waltham International Science Symposium, Bangkok, Thailand. 2003*, p36.

