

Novel topical agent containing superoxide dismutase 100 000 IU and 4% of plant extracts as a mono-therapy for atopic dermatitis

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Abstract

Introduction: Corticosteroids are the mainstay of treatment for the acute phase of atopic dermatitis (AD), whereas topical emollients are mainly used for maintenance of remission. A topical agent that combines emollient and anti-inflammatory properties would achieve control of all phases of AD, without the need for chronic corticosteroid use.

Aim: To assess the efficacy of a novel topical agent containing superoxide dismutase (SOD) 100 000 IU and 4% of a combination of plant extracts (blackcurrant seed oil, sunflower oil concentrate, balloon vine extract).

Methods: Twenty patients (age range from 8 months to 72 years old) with mild-to-moderate atopic dermatitis were assessed. The product was used as mono-therapy, applied to the affected skin areas twice daily. Patients were evaluated before and after a 30-day course using the SCORAD and the Visual Analog Scale for assessment of pruritus intensity. Primary endpoint was improvement of AD according to SCORAD and clinical assessment. Secondary endpoint was patient satisfaction and improvement of pruritus.

Results: Mean SCORAD on day 0 was 32.61(range = 16.0-46.9) and decreased to 10.55 (range = 0-17.0) on day 30, reflecting a reduction of 67.6%. On day 30, all patients described significant improvement in pruritus and quality of sleep.

Conclusion: The application of the study product cream resulted in significant improvement of AD, as reflected by the objective SCORAD measurement, and the subjective assessment of pruritus and quality of life. This novel anti-inflammatory emollient product may emerge as a safe and effective therapeutic tool for all phases of AD without the adverse effects of chronic use of corticosteroids.

KEYWORDS

atopic dermatitis, atopic xerosis, dry skin, emollients, pruritus

1 | INTRODUCTION

Atopic dermatitis (AD, eczema) is a chronic, relapsing inflammatory skin disease, presenting with dry skin, rash, and intense pruritus. It affects all age groups from infants to the elderly, being one of the most common skin disorders with a prevalence of 2%-5% in young adults and up to 20% in children.¹ The exact pathogenesis of AD still

remains uncertain. Hereditary factors predisposing to dry skin seem to play a significant role. AD is more frequently seen among families with a tendency toward atopic diseases, such as AD, bronchial asthma, and/or allergic rhinoconjunctivitis. Atopy can be defined as a familial hypersensitivity of the skin and mucosa to environmental substances, associated with increased production of immunoglobulin E (IgE) or altered pharmacologic activity.² Impairment of the skin

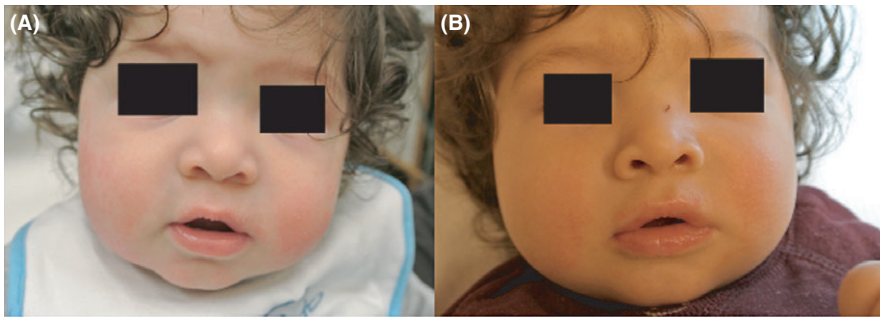


FIGURE 1 A 1-year-old male patient with AD lesions on the face at baseline (A) and on day 30 (B)

barrier and specific mutations in the filaggrin gene seem to play a critical role in AD patients.³

The diagnosis of AD is made clinically, manifesting with erythematous, itchy papules and plaques accompanied with scaling in the acute phase and followed by lichenification, excoriations, and infiltration due to chronic scratching of the atopic skin. Predilection areas of the skin lesions are age-dependent.⁴

Treatment of AD must be seen in a long-term perspective concept due to its chronic and relapsing nature. Exacerbations of AD can be managed with the use of topical or even systemic corticosteroids and other anti-inflammatory drugs in combination with emollients for preserving the skin barrier intact, which is critical for the chronic control of the condition.^{1,5} Emollients are topical preparations that maintain the skin's softness and hydration. Recent development has incorporated in emollient products' ingredients such as physiologic lipids, antioxidants, and several anti-inflammatory agents. All these additions seem to aim at a holistic approach of AD treatment, namely skin hydration, anti-inflammation, antipruritic, and antimicrobial action.⁶

2 | AIM

The aim of this study was to evaluate the efficacy of a novel compound topical agent (cream) in AD skin lesions. Study product's active ingredients contained superoxide dismutase (SOD) 100 000 IU, an antioxidant enzyme, and a combination of plant extracts (blackcurrant seed oil, sunflower oil concentrate, balloon vine extract) rich in lipids ($\omega 3$, $\omega 6$), phytosterols, tocopherol, and other anti-inflammatory molecules.

3 | MATERIALS AND METHODS

A single-center, open-label, pilot study was conducted on a group of 20 patients (12 males and 8 females) with mild-to-moderate atopic dermatitis. The group included both pediatric and adult patients (age range from 8 months to 72 years old, mean age: 30.05 years) with AD in acute flare-up or in remission and regardless of any previous therapeutic regimens. All patients were assessed by two independent Dermatologists (D.R and D.S) on day 0, day 15, and day 30, and the severity of their condition was evaluated by SCORAD measurement. The SCORAD is a composite score

incorporating both objective signs and subjective symptoms of AD. Mild AD corresponds to scores below 25, moderate AD between 25 and 50, and severe AD above 50.⁷ Although pruritus intensity is incorporated in the SCORAD, a separate assessment of this parameter was also performed using the Visual Analog Scale (VAS), keeping in mind that as pruritus is a subjective symptom, skin lesions of mild atopic disease can be interpreted as severely pruritic by patients.⁸ Study product cream was introduced as mono-therapy and was applied topically to the affected skin areas twice daily. No specific instructions were given for the application of the product before or after bathing. The primary endpoint was improvement of AD by both objective scores (SCORAD) and clinical assessment, following a 30-day course of topical treatment with study product cream. Secondary endpoint was patient satisfaction and improvement of pruritus.

4 | RESULTS

On day 0, 8 patients exhibited mild disease and 12 moderate diseases with a mean SCORAD of 32.61 (range = 16.0-46.9). All patients (100%) described significant improvement of their symptoms, when assessed on day 15. A thorough clinical assessment and comprehensive SCORAD calculation were performed on day 30. All 20 patients (100%) had SCORAD scores below 25, which correspond to mild AD, with mean SCORAD levels at 10.55 (range = 0-17.0)



FIGURE 2 A 7-year-old male patient with dry skin and mild erythema of the left upper arm at baseline (A) and on day 30 (B)

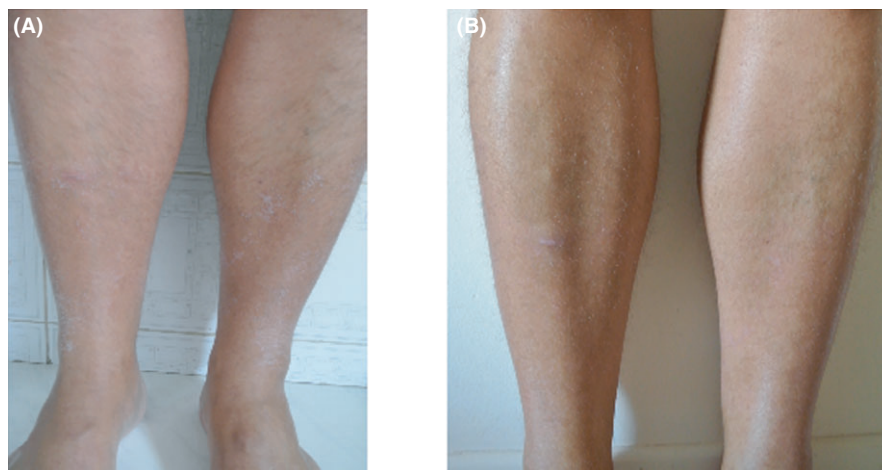


FIGURE 3 A 37-year-old male with erythematous scaly plaques of the anterior aspect of the lower legs and moderate erythema of the calves before treatment (A) and the same areas after 1-month treatment (B)

and an overall decrease in SCORAD by 67.3% on day 30. Regarding pruritus intensity, on day 0, 12 patients (60%) described their skin condition as severely pruritic (VAS score ≥ 7). On day 30, 14 of 20 patients (70%) reported only mild pruritus (VAS score = 1-4) and the remaining 6 (30%) described complete remission of pruritus (VAS score = 0). (Figures 1-3) (Table 1)

TABLE 1 Patients' demographics and results

Patient	Age (yrs)	Sex	SCORAD (day 0)	SCORAD (day 30)	VAS (day 0)	VAS (day 30)
#1	12	Male	37.9	15.5	8	3
#2	6	Female	22.9	8.6	7	3
#3	11	Female	26.9	6.8	6	0
#4	11	Male	46.7	16.8	9	2
#5	61	Male	46.9	14.6	8	1
#6	18	Female	43.5	11.0	8	0
#7	69	Male	24.2	7.8	7	0
#8	7	Male	21.4	9.0	5	2
#9	3	Female	21.7	5.7	6	1
#10	1	Male	34.0	9.7	8	3
#11	22	Male	21.7	7.5	8	3
#12	52	Male	40.7	17.0	7	2
#13	37	Male	35.7	5.3	9	2
#14	65	Male	30.5	9.0	5	0
#15	24	Female	21.3	4.2	5	0
#16	71	Male	30.6	9.0	6	2
#17	14	Female	24.1	7.1	6	3
#18	11	Male	26.8	12.8	7	2
#19	72	Female	33.8	16.9	8	3
#20	34	Female	16.0	0	3	0

5 | DISCUSSION

Atopic dermatitis is a chronic, relapsing inflammatory skin disease, of unknown pathogenesis. Long-term management is of essence due to its chronic and relapsing nature. Topical or even systemic corticosteroids and other anti-inflammatory agents are the mainstay of treatment for the acute phase of AD, whereas topical emollients are mainly used for maintenance of remission of the skin inflammation. A topical agent that combines emollient and lenitive properties with anti-inflammatory action would achieve control of both the acute and the chronic phase of AD, without the need for chronic corticosteroid use and therefore represents the goal of treatment of atopic dermatitis.

The aim of our study was to assess the efficacy of a novel topical agent, which incorporates emollient and anti-inflammatory properties in the treatment of mild-to-moderate AD. Study product cream contains superoxide dismutase 100 000 IU (SOD), an antioxidant enzyme, and a combination of plant products (blackcurrant seed oil, sunflower oil concentrate, balloon vine extract) rich in lipids (omega 3, omega 6), phytosterols, tocopherol, and other anti-inflammatory molecules.

All the patients in our study reported a significant improvement of their skin condition, following a 30-day mono-therapy regimen with the study product cream. This absolute patients' satisfaction was also reflected on their objective SCORAD scores, as these were assessed before and after treatment.

In addition, the application of the study product cream resulted in rapid improvement of pruritus, which is of great importance. Pruritus can be a very disturbing symptom of AD, affecting everyday activities, quality of sleep, and ultimately, quality of life. In our study, all patients exhibited substantial improvement in pruritus and one-third of them even reported complete remission.

What is also interesting about this study is the fact that it included patients from all age groups, from children to elderly. The product was safely applied on all patients without any side effects, including stinging, burning, or deterioration of the skin lesions. Moreover, all patients and carers described the study product cream as

cosmetically appropriate and well absorbed by the irritated atopic skin, without any oily residue.

In conclusion, the study product cream appeared to have achieved a significant overall improvement of AD signs and symptoms. This can be attributed to its active ingredients which exhibit a comprehensive therapeutic effect combining the complete range of AD treatment; moisturization, anti-inflammatory, antipruritic, and antimicrobial.⁶

Specifically, superoxide dismutase (SOD) is an active antioxidant enzyme that has been shown to reduce the oxidative stress and inflammation that contribute to the AD pathogenesis.^{9,10} In addition, SOD enhances antipruritic action by reducing the production of nitrogen oxide (NO) and the secretion of several cytokines (TNF- α , IL-1, IL-6 etc.) that participate in pruritus pathogenesis.¹¹

This product also maintains skin hydration by restoring the skin barrier function through the active plant extract ingredients that it contains (blackcurrant seed oil, sunflower oil concentrate, balloon vine extract). The moisturizing action is attributed to their high levels of (omega-3, omega-6) lipids and phytosterols. In addition, tocopherol and linoleic acid, also included in the specific plant extracts, offer an anti-inflammatory action by blocking the action of COX-2, which is an important cytokine for the inflammation cascade of AD.¹²⁻¹⁴

6 | CONCLUSION

The study product cream is a novel topical agent, which consists of superoxide dismutase 100 000 IU and 4% of a combination of natural extracts (blackcurrant seed oil, sunflower oil concentrate, balloon vine extract). This unique compilation of ingredients has been shown to achieve significant improvement in every aspect of mild-to-moderate AD, as exhibited by both SCORAD scores and patients' satisfaction. Its documented efficacy combined with its excellent safety profile and cosmetically appropriate texture may render this product a suitable mono-therapy option for patients of all age groups with mild-to-moderate AD.

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