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Case Report

Novel Oral Supplement Protects Against Acute Erythema from Cutaneous UV Exposure and Increases Minimal Erythema Dose

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Abstract

Background: Excess Ultraviolet (UV) exposure accelerates photoaging and remains the predominant cause of cutaneous malignancy worldwide. While topical sunscreens are central to photoprotection, their efficacy depends on user adherence and application accuracy. Systemic photoprotection through oral agents such as nicotinamide (vitamin B3 amide) has emerged as a promising adjunctive strategy, enhancing DNA repair and mitigating UV-induced immunosuppression.

Objective: To evaluate the short-term photoprotective effect of a novel drinkable nicotinamide solution in attenuating UV-induced erythema.

Methods: Eleven healthy adults (Fitzpatrick phototypes II-IV, ages 22-67) underwent controlled 308 nm UVB irradiation (250 mJ/cm² and 350 mJ/cm²) to two adjacent sun-protected skin sites (forearm or abdomen). After baseline imaging and assessment, participants ingested a single 4.5 g dose of a proprietary nicotinamide-containing supplement. One hour post-ingestion, two additional adjacent sites were irradiated with identical UVB doses. Erythema was graded at two and eight hours by four blinded dermatologists using a standardized Minimal Erythema Dose (MED) scale.

Results: All participants completed the protocol without adverse events. In every subject, erythema intensity was visibly and measurably reduced at sites irradiated after supplement ingestion compared with baseline exposures, independent of age, sex or phototype. Representative images demonstrated consistent attenuation of UV-induced erythema across both dose levels.

Conclusion: A single oral dose of this skin targeting supplement, taken 1-2 hours prior to UV exposure, can help mitigate the intensity of acute cutaneous erythema from excess UV exposure and, when taken daily over time, can provide additional protection against chronic photodamage. As such, systemic supplementation with this oral supplement represents a novel and synergistic adjunct to conventional photoprotective measures including topics sunblocks, sunscreens and UV protective clothing, offering additional defense against both the immediate effects of ultraviolet exposure and the long-term risk of skin cancer development associated with cumulative sun damage.

Keywords: Ultraviolet (UV) Exposure; Vitamin B3; Erythema; Sunscreens

Introduction

Premature photoaging and photodamage as a result of excess Ultraviolet (UV) exposure is not only a multi-billion-dollar cosmetic concern, but also a leading cause of medical morbidity and mortality, as skin cancer remains the most common cancer worldwide in both incidence and prevalence. While topical sunscreen remains a cornerstone in sun-protective measures, reducing sunburns, skin cancer and premature aging, its efficacy is dependent on correct and consistent application and user adherence. Furthermore, topical methods only protect the skin areas to which they are applied, leaving significant margins of error from missed or under-applied regions.

Recently, interest has blossomed in systemic strategies for photoprotection through supplements and vitamins that may aid in preventing sunburns, photodamage and premature aging. Among these, nicotinamide (Vitamin B3 amide) has gained traction as a safe, well-tolerated oral agent with evidence of reducing actinic keratoses and Non-Melanoma Skin Cancers (NMSCs) in high-risk individuals. Its mechanisms include enhancement of DNA repair and attenuation of UV-induced immunosuppression.

In this study, we present a case series investigating the clinical efficacy of a novel daily drinkable nicotinamide solution in reducing acute erythema after controlled UV exposure, thereby suggesting both short-term photoprotective benefit and potential long-term chemopreventive utility.

Materials and Methods

Participants

Eleven adult volunteers (Fitzpatrick skin phototypes II-IV); age range 22-67 years old were enrolled. All participants provided written informed consent prior to participation.

Protocol

Patients had baseline clinical examination and photography of a region of sun-protected skin (either proximal volar forearm or lateral abdomen). Areas of focus were devoid of any signs of sun damage, lentigines, nevi or other confounding findings. An MED dosing grid was applied to the skin and a 1 cm x 1 cm area of sun-protected skin was then irradiated with 250 mJ/cm^2 of 308 nm UVB ultraviolet light (Xtrac Excimer laser, 308 nm, Model AL10000, Strata Sciences, Inc and Alma Quantel Excimer laser, 308 nm, Model AL308-0386, Alma Lasers, Inc). An immediately adjacent 1 cm x 1 cm area of sun protected skin was subsequently irradiated with 350 mJ/cm^2 of 308nm UVB light. Subjects then received a single oral dose (4.5 g) of a proprietary supplement which contained the following ingredients [Sun Powder, Sol Sciences Inc] 1 hour was allowed to elapse after ingestion. Following this, two 1 cm x 1 cm areas of sun-protected skin immediately adjacent to the previously irradiated sites were irradiated with the same 250 mJ/cm^2 and 35 0mJ/cm^2 of 308 nm UVB ultraviolet light. Baseline clinical assessments and photography were performed immediately prior to ingestion, with repeat evaluation conducted a two-hours and 8 hours post irradiation with clinical examination and photography of sun-protected regions of the skin (proximal volar forearm or lateral abdomen).

Outcome Measures

The primary endpoint was acute erythema response following UV irradiation. Four board-certified dermatologists experienced in minimal erythema dosing and clinical trial evaluation independently assessed erythema using a standardized MED grading scale. Assessments were completed before administration of oral solution and at one-hour post-administration.

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All 11 subjects completed the study. Across participants, acute erythema following UV exposure was evident after irradiation of skin and there was significantly marked attenuation of acute erythema on the regions that were irradiated after one hour post-supplement ingestion compared with baseline. This reduction was observed regardless of age, sex or Fitzpatrick phototype [1,2].

Representative cases are shown in Fig. 1, where a single photo-exposed site is depicted before and after nicotinamide administration, demonstrating visibly diminished erythema. Fig. 2 provides additional examples across two test sites, again highlighting reduced post-exposure erythema following treatment.

No adverse effects were reported during the study period.

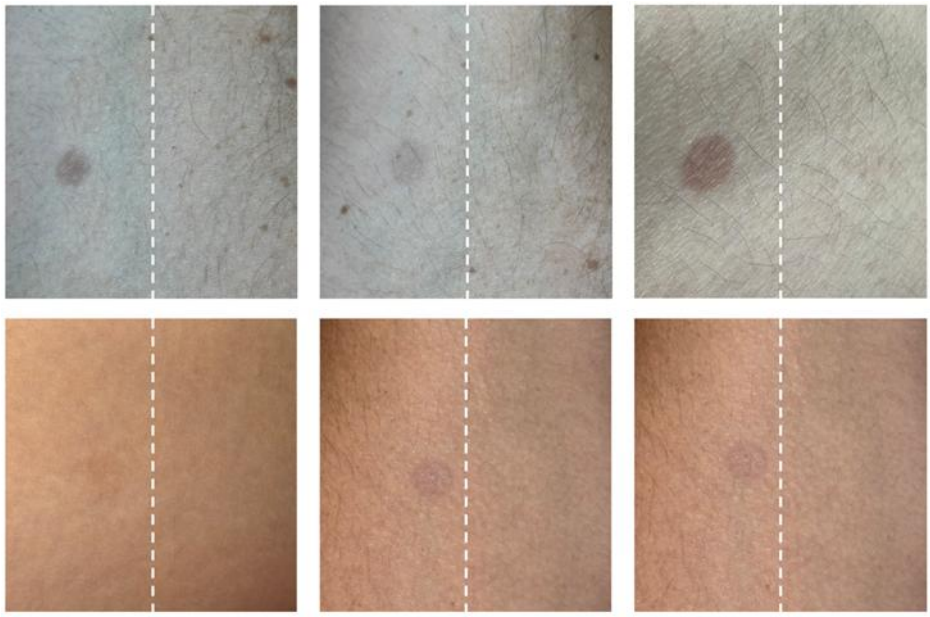

Figure 1: Erythema response pre (left) and 1-hour post (right) oral intake. Images overlayed with white dashed line to separate photo exposed vs non-photo exposed area.

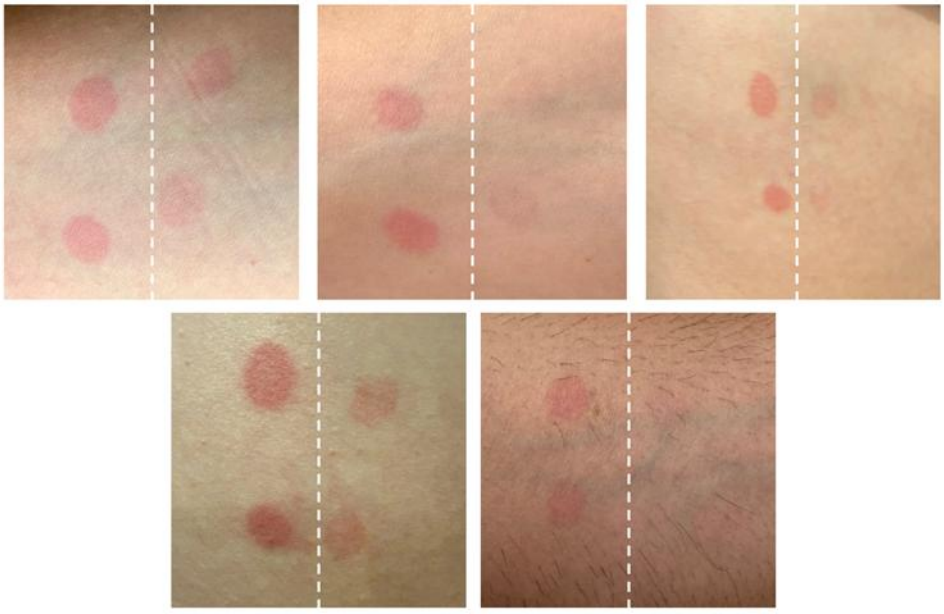

Figure 2: Erythema response pre (left) and 1-hour post (right) oral intake; vertical series duplicates. Images overlayed with white dashed line to separate photo exposed vs non-photo exposed area.

Discussion

This case series highlights the findings that cutaneous photoprotection may be optimized and enhanced with oral supplementation using ingredients that confer cutaneous photoprotective effects. We highlight our findings alongside existing literature demonstrating the cutaneous photoprotective benefits of Polypodium leucotomos, nicotinamide, astaxanthin, vitamin C and glutathione, each of which has been shown to mitigate ultraviolet-induced oxidative stress and support skin barrier defense. Critically, these results must be interpreted within the broader sociocultural context of declining public confidence in traditional sun protection practices. In recent years, misinformation and fear-mongering propagated through social media and various media platforms have led to a notable erosion of trust in the efficacy and safety of topical sunscreens among segments of the population in the United States and abroad. This shift is particularly concerning given the continued year-over-year rise in skin cancer incidence, suggesting a widening gap between scientific consensus and public behavior. Against this backdrop, our work aims to explore and validate alternative and adjunctive forms of photoprotection that can function synergistically with

sunscreen use or serve as an alternative mode of protection for individuals who remain skeptical of conventional methods thereby contributing to a more comprehensive and inclusive approach to skin cancer prevention [1-5].

Limitations

This study has several important limitations. Erythema grading relied on subjective visual assessments by dermatologists, introducing possible observer bias. The non-visual assessments by dermatologists, introducing possible observer bias. The non-=blinded design may have further influenced assessments. Additionally, the small sample size and restriction to Fitzpatrick skin phototypes II-IV limit generalizability. Finally, standardized objective measures (e.g., minimal erythema dose testing, spectrophotometry) were not incorporated but should be considered in future trials.

Conclusion

Our findings demonstrate that a single oral dose of this oral solution can measurably blunt the earliest and most visible consequence of excess UV exposure: erythema. This rapid effect suggests that this combination is not only a promising long-term chemopreventive agent against non-melanoma skin cancers, but also an acute shield against photodamage. By complementing the limitations of topical sunscreen and extending protection systemically, this solution positions itself as a compelling dual-purpose intervention, addressing both cosmetic concerns of photoaging and then substantial medical burden of skin cancer. These results provide strong impetus for larger, controlled studies to validate this combinatorial role as a daily, accessible and effective strategy for comprehensive sun protection.

Conflicts of Interest

The authors declare no conflict of interest in this paper.

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None

Authors' Contributions

All authors contributed to conceptualization, treatment execution, manuscript writing and final approval.

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