JDP 2022 Journées dermatologiques de Paris
29 NOVEMBRE 03 DÉCEMBRE
PALAIS DES CONGRÈS PORTE MAILLOT - PARIS
ORGANISÉES PAR Société Française de Dermatologie

PO22-371

Innovative non-invasive model for assessing antioxidant sun protection in children

Arnaud Fontbonne[1], Guillaume Lecerf[2], Santana Thach[1], Christelle Graizeau[1], Alain Moga[2], Sandra Trompezinski[1]

[1]NAOS Institute of Life Science, Aix-en-Provence, France; [2]QIMA Synelvia, Labège, France

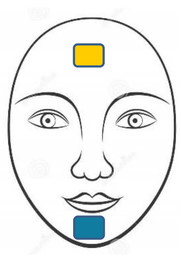
INTRODUCTION

UVA rays cause many changes to the skin, including oxidation, which is limited by the squalene found in sebum, a natural antioxidant protector. Children's skin contains less squalene and is therefore less well protected than adult skin.

This is why we have developed a non-invasive *in vivo* model to assess protection against squalene oxidation and the superficial state of the skin caused by UV rays.

MATERIALS AND METHODS

An open-label, intra-individual clinical study was carried out on 10 children aged 4±0, including 1 with phototype I, 8 with phototype II and 1 with phototype III.



Twice-daily application of a SPF50+ sunscreen for 4 days

↓

Sebum harvested with D-Squam via CuDerm®
(in duplicate) on D0 and D4

↓

UVA 9 J/cm² and UVB 300 mJ/cm² irradiation of D-Squam

↙ ↘

LC/MS extraction and quantification of **oxidised and non-oxidised squalene** > **ratio**

Scanning electron microscopy (SEM) images > **score***

***Skin surface condition score: assessment of the presence of more or less homogeneous aggregates reflecting the differentiation status and the quality of the barrier function (inspired by J.W. Fluhr's research).

DISCUSSION

The originality of the model lies in the irradiation of superficial skin samples without direct irradiation of the child's skin, making it possible to measure squalene and analyse the condition of the skin surface. This model showed significant protection against squalene oxidation and skin surface condition using an SPF50+ suncare product containing lipids and an antioxidant that potentially enhances the skin's natural antioxidant protection, which is reduced in children. **In conclusion, this new model helps assess the antioxidant protection of sunscreen products, particularly in children where UV irradiation is not an option, and provides additional information to traditional SPF measurement, which does not take into account the oxidative effects of UV rays.**

RESULTS

Irradiation significantly increased the amount of oxidised squalene, thus increasing the oxidised to non-oxidised squalene ratio (**Figure 1**). After applying the SPF50+ sunscreen twice a day for 4 days, this ratio decreased significantly by 19.6% compared with D0.

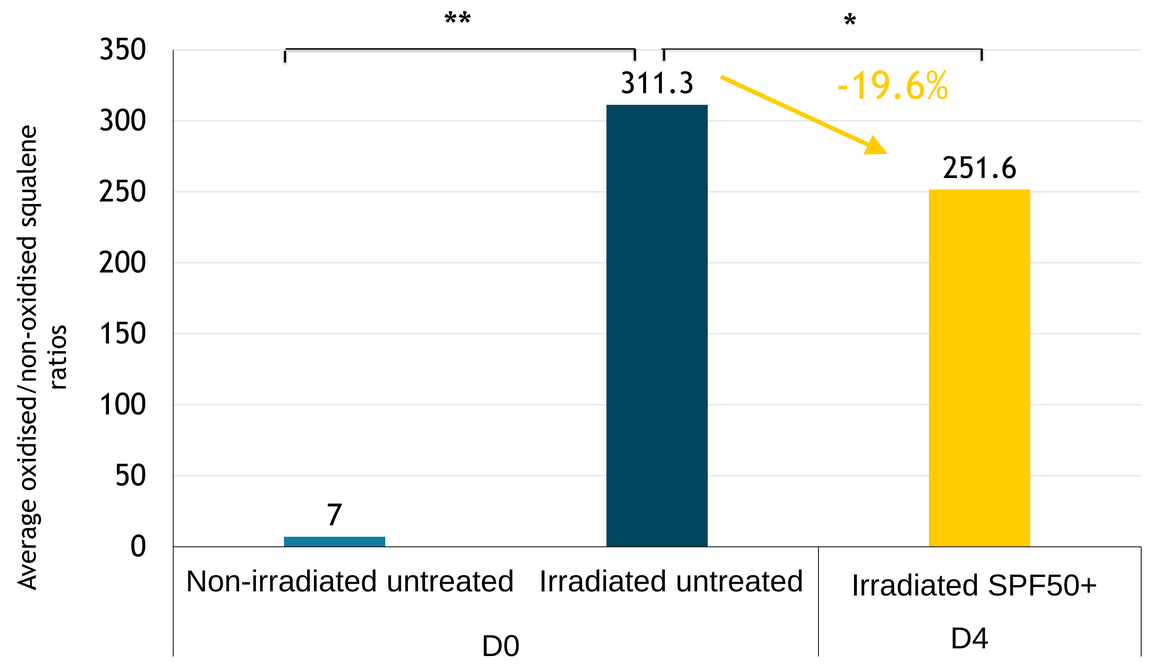


Figure 1: Average oxidised/non-oxidised squalene ratios (**p<0.01, *p<0.05; Wilcoxon test)

SEM images show the negative impact of UV rays (**Figure 2**). Better cell preservation was associated with a higher score in the area treated with the product compared with the untreated area (p<0.01, Wilcoxon test), and similar to the non-irradiated untreated area on D4.

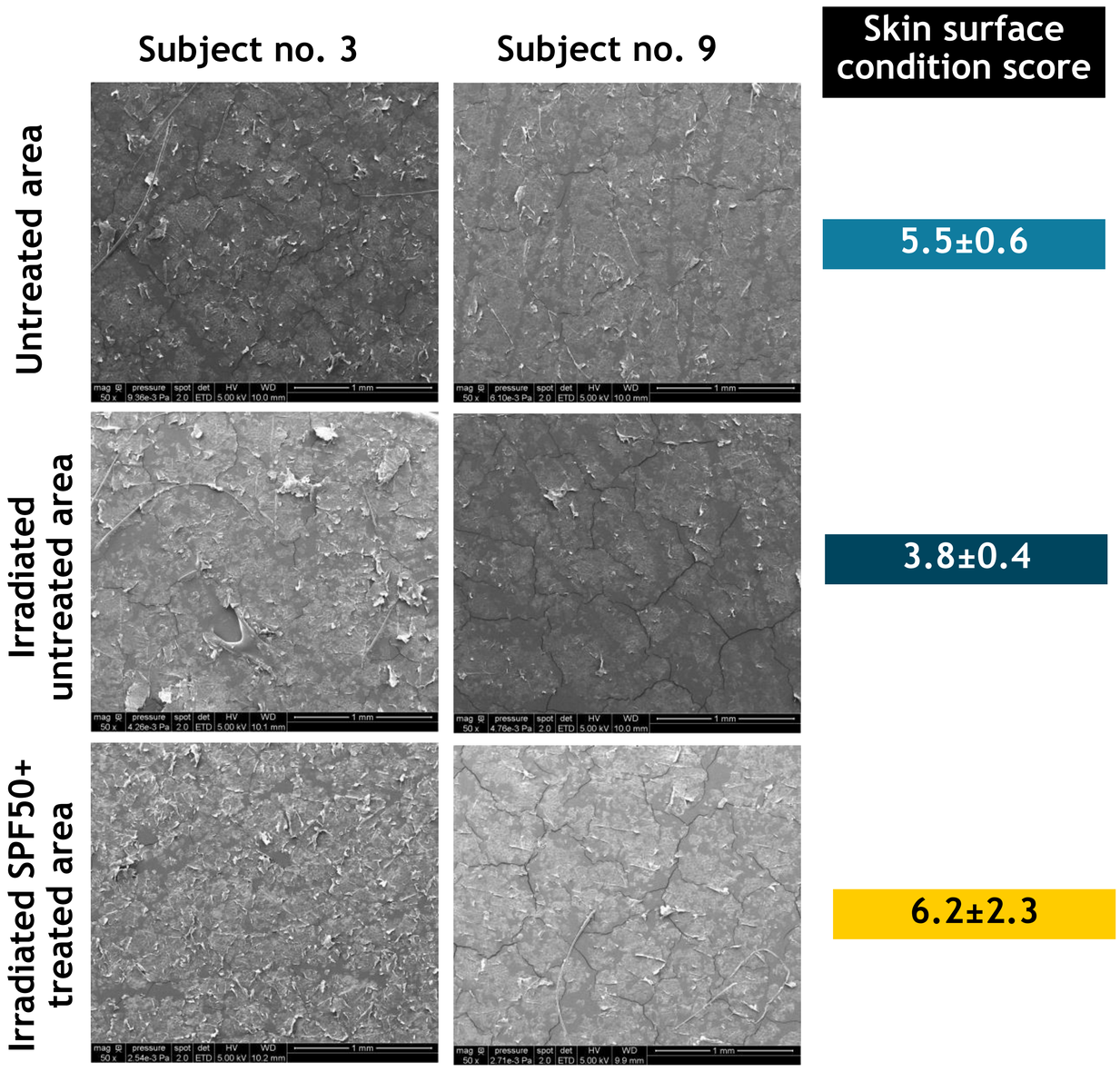


Figure 2: SEM images (x50) on 2 subjects and scores for all 10 subjects

Conflicts of interest: AF, ST, CG and ST are NAOS employees.

QIMA Life Sciences

NAOS