EFFECT OF AIR POLLUTION ON SEBUM RATE AND ACNE: HOW TO MANAGE ACNEIC SKIN IN A POLLUTED ENVIRONMENT

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INTRODUCTION

Pollution is a major concern in big cities. Moreover, epidemiological and mechanistic studies suggest that air pollution can also have a negative impact on the integrity of the skin. Indeed, it can result in aggravating skin sensitivity and reactivity. It has been determined that particulate matters can generate reactive oxygen species, leading to lipid and protein oxidation that can induce up-regulation of pro-inflammatory mediators. A harmful synergy between UV (particularly UVA) radiation and pollution was also observed. The objective of this study was to evaluate first the effect of pollution on sebum rate and acne lesions and then, the efficiency of a skin care product routine to reduce the effects of pollution.

METHODS

In the first part of the study, 64 Chinese women and men presenting acne were recruited. Sebum rate and acne lesions numbers were evaluated each week during 8 weeks in a polluted environment (Beijing, China). All subjects used the same mild cleanser and skin care to avoid variability due to different products usage. In the second part of the study, 43 of these subjects used 3 products (a purifying foaming gel, a skin care dedicated to acneic patients, a daily sun care with high UVB and UVA protection level) during 4 weeks to assess the efficacy of this routine to reduce the sebum rate and acne severity in polluted environment. Daily rate of air pollutants was collected from the official Beijing air pollution website.

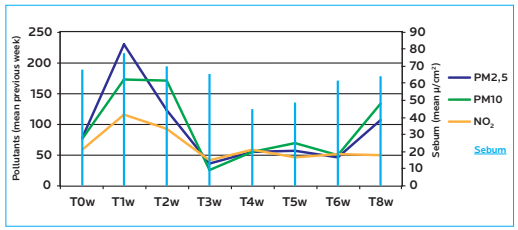
RESULTS

64 patients were included in this study. Among them we had 16% of male and 84% of female with mean age 25.9 years (from 18 to 42 years old).

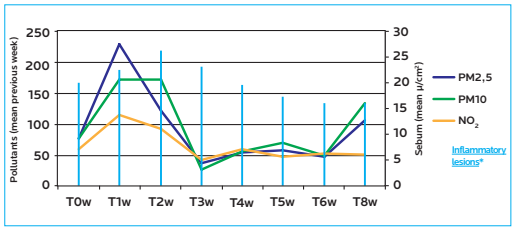
- LINK BETWEEN ACNE AND POLLUTION -

We demonstrated a significant relationship (Variance analysis, Shapiro-Wilk test $p<0.0001$) between air pollutants, sebum rate and acne lesions. The higher the concentration of PM2.5, PM10 and NO_2 was, the higher the sebum rate and the number of inflammatory and retentional lesions were. The best relationship was found between these parameters and the level of pollutants of the previous week.

Relationship between sebum and air pollutants

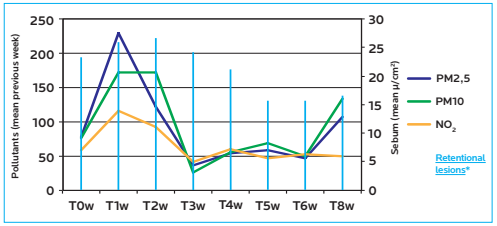


Relationship between inflammatory lesions and air polluants



*Inflammatory lesions = papules and pustules

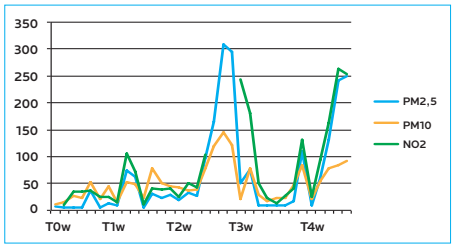
Relationship between retentional lesions and air pollutants



*Retentional lesions = open and closed comedones

- EFFECT OF SKIN CARE PRODUCTS ON ACNE AND SEBUM IN POLLUTED ENVIRONMENT -

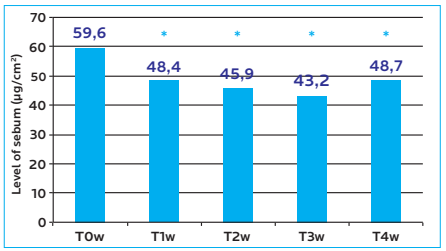
Pollution during the skin care products evaluation



PM2.5, PM10 and NO_2 levels exceeded the OMS guidelines (PM2.5 25µg/m³ 24-hour mean, PM10 50µg/m³ 24-hour mean, NO_2 40µg/m³ annual mean).

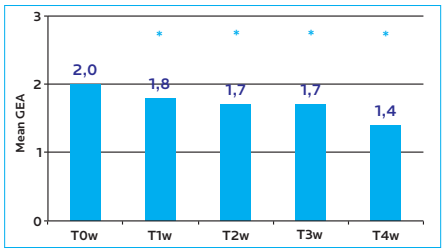
The skin care product routine significantly reduced the sebum rate (-20% in average), the acne severity (-28% at T4w), the number of inflammatory lesions (-34% at T4w) and the number of retentional lesions (-17% at T4w).

Skincare products effect on sebum



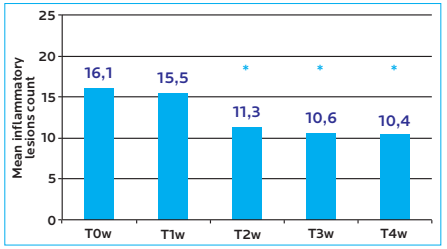
*p≤0.05 compared to T0w

Skincare products effect on the acne severity



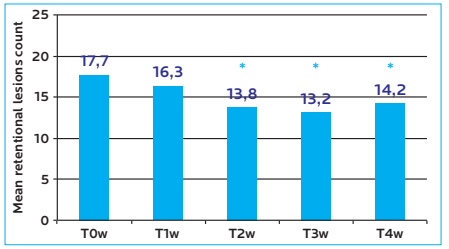
*p≤0.05 compared to T0w
GEA 1: virtually no lesion; GEA 2: mild acne

Skincare products effect on the inflammatory lesions



*p≤0.05 compared to T0w

Skincare products effect on the retentional lesions



*p≤0.05 compared to T0w

CONCLUSION

This study indicates that pollution may aggravate acne vulgaris and demonstrates in a polluted environment the interest of using adapted products to reduce sebum rate and acne severity.

REFERENCE

Krutmann J, Moyal D, Liu W, Kandahari S, Lee GS, Nopadon N, Xiang LF, Seite S. Pollution and acne: is there a link? *Cosmet Invest Dermatol:* 2017, May 19: **10**: 199-204

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