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SECRET AND LATENT DANGERS HIDDEN UNDERNEATH THE GLAZED COVER OF THE MODERN ORGANIC COSMETIC

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Abstract
Amongst the principal targets the New Organic Cosmetic (and peculiarly the modern "Juice Beauty Care" based on the use of juices from fruits and polychrome herbs) heralds, there is the fact that it is advisable that the extraction must be done "naturally" from all vegetables, randomly collected and these vegetables may contain degraded chlorophyll and its derivative phylloeritrin, that is a very important photosensitizing agent, since the ripening of most fruits and some vegetables is characterized by rapid decrease of chlorophyll levels coupled with rapid increase of pigments.
This involves the presence of extreme severe photosensitising agents in natural cosmetics belonging to the category of the "make up and decorative" ones, as eye-shadows, foundations, pencils, fards aux paupiers, coloured creams and pastes.
Aims of my study is to determine how much the presence of these photosensitising agents in Organic cosmetics may damage human skin, when covered by natural maquillage products and then exposed to sun. For this purpose I have recruited 20 women in a government prison that decided voluntarily to undergo my experiments, based on the simple application of natural make up cosmetics before to have their out of cell time, during summer days at noon. Final evaluations of photosensitization have been carried out along with the clinical scoring scale drawn up by the International Contact Dermatitis Research Group (ICDRG).

Key words: photosensitization; phylloeritrin; organic cosmetic; ICDRG score

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Introduction

Photosensitization occurs when skin (especially areas exposed to light and lacking significant protective hair, wool, or pigmentation) becomes more susceptible to ultraviolet light due to the presence of photodynamic agents. Photosensitization differs from sunburn and photodermatitis, as both of these conditions result in pathologic skin changes without the presence of a photodynamic agent. The trend of the new Organic cosmetic (and peculiarly the modern "Juice Beauty Care") need to use manifold plants for extracting the most ample selection of natural juices that are useful as pigments in order to display eye-shadows, foundations, pencils, fards aux paupiers, coloured creams and pastes, but even for yielding biological colorants to render more attractive and delicate many kinds of cosmetics to apply onto safe skin.
The simplest and most common natural colorants allowed by the International Procedural Guidelines are Annatto (orange derived from a shrub that grows in a number of places in the southern hemisphere) beta-Carotene (yellow to orange, that can be used for cosmetics around the world), Caramel (brown that comes from the burning of sugars like sucrose, dextrose, malt syrup, molasses; highly stable, can be used for formulating products around the world) Carmine (bright, red colorant which has a bluish shade, derived from female cochineal beetles that are collected primarily in Peru and can be used in cosmetic products around the world). Chlorophyll and Chlorophyll Cu Complexes (green colorant obtained from several evergreen plants.
Moreover, approved throughout the world, are numbered Henna(a brown dye derived from the Henna plant. It primarily comes from India and is allowed in the US for all kinds of cosmetics, in China and EU only for hair treatment, since it is specifically prohibited for use in colouring eyelashes and eyebrows due to its known ability to cause irritation.

The primary photosensitization occurs when the photodynamic agent is absorbed through the skin. The agent enters thus the systemic circulation in its native form where it results in skin cell membrane damage after the subject is exposed to ultraviolet light. We have to stress though that too many others are the photosensitizing agents that can be retrieved in cosmetics, in addition to the aforesaid colorants, and include hypericin (from Hypericum perforatum [St. John's wort]), active substances from certain Umbelliferae and Rutaceae, as furocoumarins (psoralens), but several other principles from species of Trifolium (pratense and repens, both admitted in INCI) Medicago (clovers and alfalfa), species of Polygonum (aviculare, bistorta, fagopyrum, filiforme, falcatum, hydropiper, multiflorum, odoratum, persicaria, punctatum, tataricum, tinctorium that are all included in INCI, COLIPA and CTFA), apium graveolens, petroselinum crispum, species of Brassica (alba, campestris, juncea, napus and nigra). Bermudagrass (Cynodon dactylon) (CAS 84649-95-6) generally used as skin conditioning contains a very dangerous photosensitizing toxin.
The Organic Cosmetic prescribes that the extraction must be done "naturally" from fruits and vegetables that have been "organically and biologically" cultivated and many botanizers, naturopaths and herbalists agree upon the fact that the most part of fruits, randomly collected, that are used for yielding juices for cosmetics, contain degraded chlorophyll and its derivative phylloeritrin, that is a very important photosensitizing agent, since the ripening of most fruits and some vegetables is characterized by rapid decrease of chlorophyll levels coupled with rapid increase of pigments. I have to add that the same European procedural guidelines for Organic Cosmetics forecast the possibility of employ of xanthophyllines as natural colours and it is well known that these are yellow derivatives of carotenes, extremely photosensitizing and the most commonly used are:
Criptoxanthine (extracted from papaya, paprika, corn, orange), zeaxanthine (from marigold and corn), Violaxanthine (from viola tricolour, ranunculus ficaria, tulipa darwin or genseniana) canthaxanthine (from mushrooms and corynebacterium), astacin (from lobsters), astaxanthin (from green algae).
Errera [1] referred that all the photosensitizing substances (in our specific case, biologic substances) can behave as protein-photo-oxidizing and/or photo-hemolyzing agents.
The A. asserted that substances that are able to photo-oxidize and photo-hemolyze, may provoke erythemas after 6 days of exposure to light, visible or invisible (among these substances furocoumarins are to be numbered).
Besides, the same A. asserted that all the substances that do not photo-oxidize but are able to photo-hemolyze, do not provoke erythemats or hyperpigmentations, or sometimes reveal very light but reversible erythemas.
Finally, all the substances that are able to photo-oxidize, but are not able to photo-hemolyze, evoke erythemas and hyperpigmentations absolutely irreversible.
Here follows a research I have conducted, that intends to demonstrate how the inappropriate use of natural colours for make up products, may be extremely risky for human skin and organism.
Aims of our study is to demonstrate that too many are the cosmetics for maquillage (especially natural based eye-shadows, foundations and nail lacquers) are extremely perilous to human health, that are strenuously declared safe and non toxic.
I have recruited 20 women in a government prison that decided voluntarily to undergo our experiments, based on the simple application of natural make up cosmetics before to have their out of cell time, during summer days at noon.
Finally, evaluations of photosensitization have been carried out along with the clinical scoring scale drawn up by the International Contact Dermatitis Research Group (ICDRG).

Material and Methods

We have selected two samples of cosmetics publicised and merchandised as "pure Juice beauty care products" (Organic and natural Cosmetics); the first (one) was a juice foundation (the following is the CTFA-ingredients:peach, apricot, cucumber, carrot, pomegranate, goj berry, tomato, white tea, aloe juice.
The latter (two) was an organic eye-shadow (the following is the INCI names: rosa damascena buds, jasminum officinale buds, chamomilla recutita flower, aloe barbadensis powder, equisetum arvense (horsetail) extract, urtica dioica (nettle) leaf extract (simmondsia chinensis (jojoba) seed oil, magnesium stearate, alpha tocopherol. ascorbyl palmitate, caprylic/capric triglycerides). The ingredients in italic are merely excipients and do not contribute to the phenomenon of the photosensitization at all.
Ten of the 20 volunteers were gently requested to spread the eye-shadow before to walk around under the summer sun for the out-of-cell-time (one hour) for seven days, everyday at midday, meanwhile the other 10 were requested to spread the foundation on cheek and décolleté and to do all the same of the first panel group's volunteers
I have had to exclude several volunteers that presented the typical jail dermatological illnesses, that may be, along with Roodsari et al. [2] and Hall [3] sycosis vulgaris, dermatitis papillaris, follicular hyperkeratotic papules, follicular pustules, acneform facial eruptions, intracutaneous hemorrhages and xerosis (surely produced by hypovitaminosis), facial scabies, facial pyoderma, melasma, frictional melanosis, neurodermatitis and urticaria; notwithstanding the group was well assorted (age and race).
Besides, women with couperose, rosacea, teleangectasiae on the face, breastfeeding accoucchées and subjects taking hormones, FANS and antipsychotic drugs have been excluded.
An informed consent was rigorously required and gently obtained from each volunteer prior to participate to the experiment.
The evaluation of the effects of the photosensitization onto face skin and eyelids after during the entire week of periodical walks under the sun rays, was carried out by scrupulous examinations effectuated using magnifying glass under the same lamp light in the same period of time, during daylight every afternoon at 2.00 p.m. and have been carried out along with the clinical scoring scale drawn up by the International Contact Dermatitis Research Group (ICDRG).

Results

Score	Appearance	Diagnosis
0	Negative	Negative
0.5	Macular erythema	Barely perceptible macular erythema
1	Weak (non-vesicular) reaction, induration, possible papules	Mild erythema
2	Strong (edematous or vesicular) reaction, erythema, induration, papules, vesicles	Moderate-intense uniform erythema
3	Extreme (spreading, bullous or ulcerative) reaction	Intense erythema and edema, vesiculation or erosion

Table I. The Plot of Photosensitization (by ICDRG).

Case	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01e	0	0	0.5	0.5	0.5	1	1
02e	0	0.5	0	0.5	1	0.5	1
03e	0.5	1	1	1	0.5	2	1
04e	0	0.5	0.5	0.5	0	0.5	0.5
05e	0.5	0.5	0.5	0	0.5	1	1
06e	0	0.5	0	0.5	0.5	1	0.5
07e	0	0	0	0	0	0	0.5
08e	0	0	0.5	0.5	0.5	0.5	1
09e	0	0.5	0.5	0	0.5	1	1
10e	0	0	0	0.5	0	1	1
11F	0.5	0.5	0	0.5	0.5	0.5	1
12F	0.5	0.5	0.5	0.5	0.5	1	0.5
13F	0.5	0.5	0	0.5	0	1	0.5
14F	0	0.5	0.5	0	0	1	0.5
15F	0	0.5	0	0.5	0.5	0.5	1
16F	0.5	0	0.5	0	0.5	0.5	1
17F	0.5	0.5	0.5	1	1	2	2
18F	0	0.5	0	0.5	0	1	1
19F	0.5	0	0	0	0.5	0.5	1
20F	0	0.5	0.5	0.5	0	1	0.5

Table II. Scores of Photosensitization recorded during a week of experiments on volunteers.

Legenda: "e" corresponds to the volunteers using the eye-shadow, "F" the ones using the foundation).

Conclusion

It is suggestive to stress that the theory referred first by Errera in 1954 is amply confirmed: objectively an increase in photosensitization effect is always noticeable at the or after the 6th day.

Only appropriate chemical investigations on the final make up product could provide the entire list of pigments and the percentages of phylloeritrines, chlorophylls and antocyanins included, in order to predict a photo-toxicological profile, albeit it is important to demonstrate that make up products based on fruit juices, when exposed to sun rays for prolonged and reiterated times, evokes always progressive manifestations of adverse skin reactions and hyperpigmentations.

Case 4e and Case 7e were coloured-skin individuals, and it is noteworthy that even if Case 7e appears more resistant than the other white skin individuals, the final rash at the 6th day is always evident.

Surely Case 4e presents a more thin and delicate skin than Case 7e, anyway the final rash at the 6th day is less severe than all the others.

This may induce to deem that black coloured-skin subject are less prone to photosensitization by fruit juices in make up products.

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