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Sustainability, natural and organic cosmetics: consumer, products, efficacy, toxicological and regulatory considerations

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The interest in sustainable products has increased along the years, since the choice of products, packaging and production processes have a great impact on the environment. These products are classified by regulatory agencies in different categories, aggregating advantages to the product and increasing the demand by consumers. However, there is no harmonization in guidelines of these certifying agencies and each cosmetic industry formulates their product and packaging in a more rational way, which causes less damage to the environment. Many cosmetic products have in their formulation natural products that perform a specific biological function, but these products should be evaluated on efficacy and toxicological aspects. The aim of this article is to approach sustainability, natural and organic cosmetics, considering the consumer and the efficacy, toxicological and regulatory aspects.

Uniterms: Organic cosmetics. Natural cosmetics. Natural products/use in cosmetics. Sustainability. Cosmetics/regulatory compliance. Cosmetics/toxicological aspects.

O interesse por produtos sustentáveis tem aumentado ao longo dos anos, desde a escolha dos produtos, embalagens e processos de produção tendo um grande impacto sobre o meio ambiente. Estes produtos são classificados por agências reguladoras em diferentes categorias, agregando vantagens ao produto e aumentando a demanda por parte dos consumidores. No entanto, não existe uma harmonização nas diretrizes destes órgãos de certificação e cada indústria cosmética formula seu produto e embalagem de uma forma mais racional, levando a menos danos ao meio ambiente. Muitos produtos cosméticos têm produtos naturais na formulação que executam uma função biológica específica, porém estes produtos devem ser avaliados quanto a sua eficácia e toxicidade. O objetivo deste artigo é abordar a sustentabilidade, cosméticos naturais e orgânicos, considerando os aspectos regulatórios, do consumidor e os aspectos de eficácia e toxicológicos.

Unitermos: Cosméticos orgânicos. Cosméticos naturais. Produtos naturais/uso em cosméticos. Sustentabilidade. Cosméticos/conformidade regulatória. Cosméticos/toxicidade.

INTRODUCTION

According to the report published by *Worldwide Fund for Nature* (WWF), human demand on the planet ecosystems goes beyond Earth bio capacity since late 80's. In short, people are wasting natural resources at a higher rate than nature can actually regenerate. The report concludes that "(...) we are living further than our possibilities, and the choices we make today will define the chances of our next generation" (WWF, 2008). It is necessary to develop the sustainability, so we can ensure adequate resources for the survival of future generations.

Sustainability, a word that is being more and more used by most of the industries, it has been responsible for the change in the behavior of consumers and companies, leading to new directions for the development of raw material and products, environment, people and waste management, improving the application of energy resources and consumer behavior (Brower, Leon, 1999; Adams, Jeanrenaud, 2008; Kates, 2010).

Based on these facts, in the last decades there was a rising of the interest on natural products and

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biodiversity and there is a consuming market growing especially in the European countries, named as the "green consumer", which has attracted many fans. The products are formulated with natural ingredients and developed by cosmetics industries. Studies show that the international market for personal hygiene products made with natural products has average annual growth estimated in 8-25%. The same studies show that the market for synthetic products has a lower growth, oscillating in 30-10% (Jones, Duerbeck, 2004).

The research, the development and the production of organic and natural cosmetics establishes the exclusion of traditional production methods, the stimulation of the search for natural alternatives and the renewable and sustainable production (Moraes, 2009).

GREEN PRODUCTS AND CHARACTERISTICS OF GREEN CONSUMERS

Green products must be able to replace non green products in the stores, so they must be also useful and affordable products with high quality (Ottman, 1993). The products considered absolute green are those that were developed, from conception to the manufacture, becoming an eco-friendly product. The relative green products are those that were not developed with the primary concern to be greener, but which were later verified as not being aggressive to the environment. The packaging of green products is another important issue. Beside reduction of wrapping, a green packaging should allow the re-use or the recycling without leaving much disposal. Green packaging materials are glass, aluminum or paper (Chick, 1992).

The green consumer is concerned about the environment and the sustainability, and they have certain characteristics and preferences when they buy organic and natural cosmetics (Blair, 1992; Hailes, 2007). These characteristics are:

- The quality of the product goes beyond the intrinsic characteristics. For them, the most important is the environmental impact of production and consumption in accordance with environmental preservation;
- They are willing to pay a higher price for an organic product;
- The package design should be simple, using just a few materials;
- Consumers prefer products with biodegradable, recyclable or returnable packaging;
- They don't like to carry the groceries in plastic packaging;
- They prefer product without synthetic dye;
- They refuse products that contain raw material derived from endangered flora;
- They refuse to consume products derived from animals, whenever it involves their sacrifice;
- They search for organic products;
- The consumer is concerned about safety and they believe that natural products are safer and more effective.
- They are aware of the culture and behavior of the companies;
- They value social and environmental responsibility;
- They do not accept products tested on animals.

CONCEPTS AND TERMINOLOGY

Green products are the ones that can be improving or developing according to ecological standards and satisfy the customer expectation, obtaining several advantages such as: reducing the use of raw material and packaging; developing multiple utility products, using recycled materials, reducing the use of natural resources, making products safer for health and less toxic for the environment, increasing the lifetime of the products, developing reusable products or packaging, obtaining products for remanufacture and recycling, recovering products for recycling, designing products that can be buried or incinerated, and also designing products that can be converted into fertilizers (Ottman, 1993; Lambin, 2002).

Green products have the same characteristics and functions as the normal products, however, they cause less damage to the environment considering the life cycle, and they have characteristics that somehow minimize the environment impact, for example we have the biodegradable packaging (Ottman, 1993).

The product that has a "green" attribute can be considered a different product. The term "eco-friendly" means that there is a concern in the production process, the life cycle and other factors, like the use of clean technologies, the rational use of natural resources, product certifications and biodegradable packaging (Blair, 1992).

Organic and natural cosmetics show qualitative similarity into formulations, however they are quantitative different. They may not contain synthetic or semi-synthetic raw materials in the formulations, with some exceptions. They may contain raw material derived from natural products with allowed processes and they need to contain raw materials with organic origin – of which varies in the amount present into natural or organic products (IBD, 2010).

In Brazil, the certification agency to these products "Instituto Biodinâmico de Certificações", IBD (2010) classified them as:

- **Organics**: when at least 95% of the formulation components, less water, are organic raw material with extraction certificate or raw materials that follow strict standards of production, extraction, purification and processing. These raw materials can be obtained through certificated crops and extraction, it's fundamental that they are biodegradable and that they preserve the most natural chemical characteristics. An organic raw material is always natural. The last remaining 5% of the formulation may be composed of water, natural raw materials, coming from agriculture or non-certified allowed extractive for organic formulations.
- **Natural**: a cosmetic can be classified as natural and be certified if the formulation is composed of natural raw materials certified or not. Natural raw materials are vegetable or mineral products, most often produced in a conventional condition and not always adhering to the criteria established for organic production. A natural raw material is not necessarily organic.
- **With raw organic or organic ingredients**, prepared or made with organic raw materials is at least 70% and at most 95% of the formulation components, discounting water, are certified organic. The remainder of the formulation may consist of water, natural raw materials coming from agriculture, extraction or non-certified allowed for organic formulations.

Second, the standards of ECOCERT (2003a, 2003b), a French certification agency, which has subsidiaries in Brazil, India, Canada, Ecuador, Colombia, Portugal, Japan and South Africa, cosmetics are classified into organic and natural. The fraction of plant ingredients from organic agriculture on the total plant ingredients must be 95% and 50% for organic and natural cosmetics, respectively. In order to avoid some specific products that contain very small amount of ingredients from organic agriculture it's required a minimum proportion of these ingredients in the final product, for organic products this portion is a minimum of 10% and for natural products is at least 5%. In this case, water should be added during the manufacture processes on final product.

In Europe occurred a consolidation to create a standard procedure, called the Cosmetics Organic Standard – Cosmo. This certification agency was created jointly by the European certification agencies Bundesverband Deutscher Industrie und Handelsunternehmen – BDIH (Germany), COSMEBIO & ECOCERT (France), Istituto per la Certificazione Etica e Ambientale – ICEA (Italy) and SOIL ASSOCIATION (United Kingdom) (COSMOS-STANDARD, 2011).

According to COSMOS-STANDARD (2011), for a cosmetic to be considered organic there must have at least 95% of organic ingredients produced. At least 20% of the total product must be organic. Exceptionally, the rinse-off products, non-emulsified aqueous products, and products with at least 80% minerals or ingredients of mineral origin, at least 10% of those total products must be organic. For natural cosmetics there is no requirement to use a minimum level of organic ingredients.

In US, the USDA (2008) permits four main labeling categories based on the percentage of organic ingredients in the product: "100% organic," "organic," "made with organic ingredients," and "less than 70% organic". The four terms and their criteria were originally drafted for food products, but now may be used for cosmetics meeting the NOP criteria. The principal guidelines for organic production are to use materials and practices that enhance the ecological balance of natural systems and integrate the parts of the farming system into an ecological whole (Dayan, Kromidas, 2011).

- **"100% Organic"** or **"Organic":** U.S. Department of Agriculture (USDA) products and cosmetics seeking USDA certification, labeled as "100% organic," must contain (excluding water and salt) only organically produced ingredients and be processed using only organically produced processing aids. Products labeled as "organic" must consist of at least 95% organically produced ingredients (excluding water and salt). Each organically produced ingredient must be identified as "organic" in the ingredient statement on the information panel, as part of the name of the ingredient, that is, "organic chamomile" or "chamomile (organic)," or through an asterisk or other reference mark linking to a footnote identifying the ingredient as "organic." Agricultural products labeled "100% organic" and "organic" cannot be produced or composed of components using excluded methods, sewage sludge, or ionizing radiation.
- **"Made with Organic"**: Processed products that contain at least 70% organic ingredients can use the phrase "made with organic…" and then list up to three of the organic ingredients or ingredient categories on the principal display panel. Processed products labeled "made with organic..." cannot be produced using excluded methods, sewage sludge, or ionizing radiation.
- Less than 70% Organic Under the NOP regulations, processed products containing less than 70% USDA

organic ingredients cannot use the term "organic" anywhere on the principal display panel. They may, however, identify the specific ingredients that are USDA certified as being organically produced in the ingredient statement on the information panel. The products in this category may include claims that specific ingredients are certified by USDA, but may not display the USDA Organic seal or include the name, address, or seal of a certifying agent.

Pursuant to the NOP regulations, organic products that fail to meet the requirements for one labeling category may be eligible for a lower labeling category. For example, if a product contains wholly organic ingredients but the product formulation requires a processing aid or less than 5% of a minor ingredient that does not exist in organic form, the product cannot be labeled "100% organic" and must be labeled as "organic." Similarly, if a multi-ingredient product is 95% or more organic but contains a prohibited substance in the remaining 5%, the product cannot be labeled as "organic" because of the presence of the prohibited substance, instead it may be labeled as a "made with organic" product.

However, there are several certifications in the world and each one has its own parameters for cosmetics certification.

PRODUCT CERTIFICATION

The certification aims to check the ingredients, processes, production, storage of raw materials, packaging, labeling, use of energy resources and waste management and the certification of producers to ensure the quality of the final product. Which means, the certification agencies impose standards that should be fulfilled by the production industry to be able to ensure the final product quality (ECOCERT, 2003a, 2003b; IBD, 2010, COSMOS-STANDARD, 2011).

The certified products come from these advantages (ECOCERT, 2003a, 2003b):

- Control and tracking of the supply chain of raw materials;
- Facilitates the recognition of certified products by the consumer;
- Increased reliability of the brand;
- Understanding the consumer with prices between a certified product or not;
- Recognition and differentiation of products on the market.

There are several certification agencies and each one defines its own guidelines for certification and labeling. The major certification agencies for natural and organic products are:

- Bundesverband Deutscher Industrie und Handelsunternehmen (BDIH) in Germany;
- National Association for Sustainable Agriculture, Australia (NASAA) in Australia;
- Soil Association Organic Standard in United Kingdom;
- Instituto Biodinâmico de Certificações (IBD) in Brazil;
- ECOCERT in France;
- Istituto per la Certificazione Etica e Ambientale (ICEA) in Italy;
- Quality Assurance International (QAI) in United States of America;
- Oregon Tilth in United States of America;
- Cosmetics Organic Standard (Cosmos) in European Union (EU);

FORMULATION

Because of the inexistent standard, various groups came out with their own guidelines applied to cosmetics. This section will discuss the use of raw materials and allowed processes or not in organic cosmetics.

In Brazil, the IBD agency lists the processes that do not cause changes in natural component. The process of extraction of allowed raw materials are processes that use cold, pressure, water or steam distillation, percolation and concentration by physical or mechanical methods. Allowed processes that use extractants solvents such as alcohol and glycerin, when obtained in an organic form. The processes that use water, nitrogen and CO_2 are also allowed. Vegetable butters and oils, lanolin, natural dyes, essential oils, plant extracts (glycolic, tinctures and dried extracts), minerals and natural polymers (xanthan, alginates and starches) are, for example, categories of cosmetic raw materials obtained through this extraction methods (IBD, 2010).

Fermentation process are allowed, characterized a biochemical process of transformation of one substance into another with the aid of microorganisms (bacteria or fungi) and nutrients. The fermentation may take place in aerobic or anaerobic environment and as a result of this process can be obtained from various types of cosmetic raw materials (IBD, 2010).

The processes that cause changes in natural component are hydrolysis (applied to proteins and polysaccharides), hydrogenation, esterification, saponification, sulfation, transesterification and alkylation. These processes are allowed (IBD, 2010).

The not allowed processes are ethoxylation, sulfonation, phosphorylation, propoxylation and polymerization. The banned raw materials are synthetic dyes, synthetic fragrances, polyethylene glycols, quaternary ammonium, silicones, synthetic preservatives, diethanolamides and petroleum derivatives (IBD, 2010).

In the European Union, the agency COSMOS allows processes and raw materials in its guideline (COSMOS-STANDARD, 2011). The extractions must use natural materials with any forms of water or with a third solvent of vegetable origin, such as: ethyl alcohol, glycerin, vegetable oils, honey and CO2 supercritical. If the use of other solvents is needed, the solvents have to be recycled and completely removed in the finished product. In any event, there must be no use of aromatic, alkoxylated, halogenated, nitrogen- or sulphur-based solvents. Chemical allowed processes for processing agro-ingredients: amidation, calcination, carbonization, condensation, trans- and esterification, etherfirication, fermentation, hydration, hydrogenation, hydrolysis, neutralization (to obtain sodium, calcium, magnesium and potassium salts) oxidation, saponification and sulphation. Not allowed chemical processes are alkoxylation, bleaching, ionizing radiation, sulphonation, treatments with ethylene oxide or mercurial soda and use of petrochemicals catalysts (COSMOS-STANDARD, 2011).

In Brazil, Brazilian Health Surveillance Agency (ANVISA) has not a guideline or certification to organics cosmetics; however, there isn't a global standard by regulatory agencies yet. In addition, many companies sell their products based on the argument that they are natural cosmetics. In many cases this is not true, because their products are filled of natural active ingredients with traditional chemical formulation, preservatives and chemical additives in their composition (Yamada *et al*., 2013).

The major challenge in the development of organic cosmetic products is the formulation and consequently the product performance and the microbiological or physico-chemical stability. In any case, it is possible to guarantee the time-shelf without the addition of synthetics preservatives, antioxidants and chelating agents (SEBRAE, 2008).

There is no harmonization between the guidelines of the agencies that certify products as organic and natural. Therefore, each industry researcher should follow the guidelines of this agency in their respective country in order to certify their products, like the raw material used, from the process of cultivation to the manufacture.

BOTANICALS AND NATURAL PRODUCTS IN COSMETICS

Many natural products are used in cosmetics and several others have a great potential for the development of new cosmetic and pharmaceutical products. These natural products have chemical ingredients, for example, flavonoids, tannis, phenolics, aminoacids and vitamins, cosmetics for body care and the botanical ingredients influence the biological functions of the skin (Dureja *et al.*, 2005; Lee *et al*., 2013; Binic *et al*., 2013) can play a major role in the treatment of several skin disorders (De Wet, Nciki, Van Vuuren, 2013).

Souza *et al.* (2011) reports a study with *Baccharis dracunculifolia*, native plant from Brazil commonly known as "Alecrim do campo" and "Vassoura". This plant species show the inhibition of lipid peroxidation in biological systems (Hegazi, Abd El-Hady, 2009), the antiseptic agent in the treatment of wounds (Simon *et al.*, 2009) and the enhancement of immune function and antitumor activity (Fukuda *et al.*, 2011). Souza *et al.* (2011) conclude that the cultivation of *B. dracunculifolia* is economically viable, and it can be scaled up for commercial production, from the biomass production, the average income of crude extract and essential oils, as well as phenolic compounds were excellent.

Rawal *et al.* (2011) has studied *Myrica esculenta* fruits, commonly known as "Kaphal". In this study, the authors report that the extract of *M. esculenta* fruit is an important source of natural antioxidants.

Vieira *et al*. (2013) studied the flavonoids extraction of *Ipomoea pes-caprae*, known in Brazil as "salsa-da-praia", "batateira-da-praia" or "pé-de-cabra". These authors evaluated the extraction process, studying the drug concentration plant and extraction time, it was possible to choose the most favorable extraction conditions, intending to achieve greater efficiency in terms of flavonoids concentration.

Plundrich *et al*. (2013) demonstrated for concentrating and stabilizing skin-beneficial bioactive compounds from muscadine grape and blackcurrant juice or muscadine pomace in the tyrosinase ezyme inibihtion and inhibited microbial proliferation against *Staphylococcus aureus* bacteria. These authors suggestions have potential use for cosmetic topical applications.

Natural products, botanicals or waste materials, derived from agricultural, foods and beverage can be used in cosmetics products. Waste materials can be attractive to use in cosmetics products because of the higher concentration of carbohydrate, proteins and lipids. In this case, a cosmetic product has been developed using spent

coffee grounds by Ribeiro *et al.* (2013). Spent coffee lipid extraction was performed by supercritical fluid extraction obtained a yellow viscous oil extract. These extracts were incorporated into non-ionic O/W creams and they were evaluated to epidermal capacitance, transepidermal water loss (TEWL) and skin surface lipids of the stratum corneum. The results showed that lipid extracts and green coffee oil creams were significantly different ($p<0.01$) from the control area, indicating that there was an effect on epidermal capacitance, TEWL and on the skin sebometry after 28 days. The placebo cream showed the lowest epidermal capacitance and sebum and the highest TEWL when compared to the formulations containing coffee oils. The results obtained from the sensory evaluation done by volunteers showed that both creams met consumers appeal and acceptance required. However, in future research, the odor should be improved as volunteers gave low scores (around 50%) to products tested with coffee oils.

Chiari *et al.* (2014) reported that green coffee oil evaluated attending the application in sunscreens. In this study the authors report a synergistic effect when associated green coffee oil with a conventional synthetic sunscreen, by increasing 20% the SPF *in vitro*. Therefore, these results suggest that green coffee oil is a promising natural product to be used in sunscreens formulations by improving SPF and, consequently, decreasing the concentration of synthetic chemical in such formulations. Studies FPS *in vivo* must be performed.

Wagemaker *et al.* (2013) evaluated the toxicological aspects of green coffee oil. The authors report that there is a paucity of toxicological studies in the literature and this led them to develop a protocol to evaluate the safety. *In vitro* cytotoxic effects were not observed. In the study made in human volunteers, formulations were also applied using an occlusive patch for 2 days, and no adverse reactions were observed. Cosmetic formulations prepared containing high amounts of green coffee oil are safe to be applied in skin care products.

Isaac *et al.* (2012) studied a topical formulation containing *Spondias lutea* extract and they were evaluated for *in vitro* release and stability studies. The release studies showed that e permeation profiles differed among the different membranes used. The skin permeation was lower and the authors suggest that stratum corneum acts a hidrophobic layer. Stability studies showed no difference or alterations in pH, viscosity or organoleptic caracteristics, but in the flavonoids assay could be observed a decreasing rates of concentration at higher temperatures.

Dal Belo, Gaspar, Campos (2011) studied topical formulations containing *Ginkgo biloba* and green tea extracts for photoprotective beneficial. The formulations were applied in dorsal skin of hairless mice prior to irradiation. Skin barrier damage, erythema, histological alterations and sunburn cell formation were evaluated. Formulations containing *G. biloba* provided total protection of the skin barrier function, avoiding radiation damage such as TEWL and erythema and were more effective than those containing green tea extracts. However, it is suggested that formulations containing combined extracts may provide substantial photoprotective sinergistic effects.

Dal Belo *et al.* (2009) studied the penetration of epigallocatechin-3-gallate and quercetin in human skin, as flavonoids, from green tea and *Ginkgo biloba* extracts vehiculated in cosmetic formulations. The results showed that flavonoids under study penetrated into the skin, without reaching the receptor fluid. However, epigallocatechin-3-gallate was quantified in the stratum corneum which was statistically higher than concentrations found in viable epidermis and in the dermis. The concentration of quercetin was quantified in the viable epidermis which was statistically higher than the epigallocatechin-3-gallate concentration found in the stratum corneum layer. The authors concluded that chemicals from green tea and *G. biloba* extracts vehiculated in cosmetic formulations presented good skin penetration and retention, which can favor skin effects.

Gianeti, Mercurio, Campos (2013) developed cosmetic formulations containing green tea and using noninvasive methods evaluated the effects in humans skin volunteers. These formulations were applied to the forearm skin of volunteers, and their effects were evaluated by following parameters stratum corneum water content, TEWL, skin viscoelastic-to-elastic ratio, and microrelief. These formulations increased skin moisture in the long-term study and skin viscoelastic-to-elastic ratio was significantly enhanced after the topical application of the experimental formulation when compared with vehicle and control. Also, skin microrelief was significantly improved due to a reduction in skin roughness. These results corroborated with Dal Belo, Gaspar, Campos (2011).

Gaspar *et al.* (2008) evaluated dermatological effects in humans volunteers of cosmetic formulations containing *Saccharomyces cerevisiae* extract and vitamins. For effective studies, formulations were applied on volunteers and skin moisture, skin microrelief and free radicals protection were analyzed. The results showed that formulations containing *S. cerevisiae* extract with or without vitamins presented long term effects on skin microrelief and showed higher texture values. Formulation with *S. cerevisiae* extract and vitamins A, C and E

provoked a slight erythema in one volunteer. In the end of the treatment, when the volunteers compared the cosmetic qualities of the formulations under study, the values related to skin moisture, smoothness and well being perception values were statistically equivalent and higher than the vehicle ($p < 0.05$).

Aloe vera extracts (*Aloe barbadensis*) is a polysaccharide extract often used in cosmetic formulations, may impart moisturizing properties to the product. Dal Belo et al. (2006) investigated the moisturizing effect of cosmetic formulations containing *Aloe vera* extract in different concentrations assessed by skin bioengineering techniques. Formulations containing different concentrations of freeze-dried *Aloe vera* extract showed efficacy in improving skin moisture by a humectant mechanism, when evaluated in short and long-term application studies. The authors concluded *A. barbadensis* freeze-dried extracts can be used in moisturizing cosmetic formulations and also to complement the treatment of dry skin.

Dario *et al.* (2013) developed a hair care formulation containing *Punica granatum* hidroalcoohlic extracts which contains polyphenols and tannins. Hair care formulations containing pomegranate extract were applied to red dyed hair tresses, and these were exposed to UVA radiation. The results showed that the extract at 5.0% and 10.0% w/w was effective in preventing the hair color fading in 37.6 and 60.8%. Mechanical properties were not affected by UVA radiation, since significant differences in breaking strength were not observed.

A study, performed by Faria *et al.* (2013), has studied hair protective of Argan oil (*Argania spinosa*) and Cupuassu Butter (*Theobroma grandiflorum*) post treatment with hair dye. In this research we analyzed the hair protective effect by *A. spinosa* kernel oil or *T. grandiflorum* seed butter in hair care on Caucasian hair post treatment with hair dye. The hairs were submitted by quantifying protein loss and the incorporation of conditioners agents in hair care formulation applied in Caucasian hair post treatment with hair dye decreased the damage caused to hair by the coloring process.

Furthermore, despite the popular belief in the harmlessness of natural ingredients, several cases of adverse reactions to plant extracts have been reported, in particular cutaneous side-effects such as allergic contact dermatitis, irritant contact dermatitis, phototoxic reactions, and contact urticaria (Ernst, 2000; Simpson, Law, Storrs, 2004; Corazza *et al.*, 2014).

Corazza *et al.* (2014) reported the use of products contanting botanical extracts in 1274 patients (48%)in topical administration; 139 patients (11%) commented on adverse cutaneous reactions; 75 (54%) showed positive reactions with the Italian baseline series. Among the 122 patients tested with the botanical series, 19 (16%) showed positive reactions, in many cases with relevant positivity concomitant with at least one allergen of the Italian series connected with cosmetics. The commonest botanically derived allergens were propolis, *Compositae* extracts, and *Melaleuca alternifolia* (tea tree) oil. Contact allergy is a possible adverse effect of natural products and it should be tested by *in vitro* and *in vivo* skin toxicological tests.

The choice of plant extracts or compounds should be based on the confirmation of their biological activity and toxicological assessment, and their stability and synergistic effects in cosmetic products are the important factors for the formulation of an effective product.

CONCLUSION

Increasingly, consumers are looking for products which have less impact on the environment. Today, the cosmetics are more “eco-friendly”. Certain processes on the raw materials used in the formulation of the test and the use of the test to evaluate the effectiveness and toxicology creating a larger impact on cosmetic product, and this causes the search for this type of product by the consumers. For products to be categorized by natural or organic these guidelines and standards established by the regulatory agencies should be followed, but there isn’t an harmonization between them. These standards are designed to establish the allowed packaging processes and propose a sustainable extraction and allowed processes. Formulating natural or organic cosmetics is the challenge to guarantee stability, safety and efficiency. On the other hand, there is no harmonization of these guides. Many natural products can be used in cosmetic products which perform a biological function and toxicological assessment. The use of plants and herbs tends to increase on the market of cosmetic products with more sustainable, so the companies can acquire more market share.

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