Natural antioxidant in anti-aging skin care



Abstract

It has been shown that natural antioxidants are main ingredient of anti-aging skin care products. More and more people pay more attention on appearance of skin condition, and try to slow down the aging process as late as we can, and avoid the fines and wrinkles. In order to achieve this aim, natural oxidants become much important than any other time, it has been widely apply to anti-aging skin care products.

Antioxidants are a reducing agent which can remove free radical damage and reduce the damage oxidative. This review lists several popular and practicality antioxidants which already have been used for some large cosmetic company. And then reviews the properties of each antioxidant and analyze the activity of antioxidants. The main aim of the report is to introduce how antioxidants work in anti-aging skin care products and the relationship between antioxidants and the free radicals.

Free radicals can attack molecules and result in cell damage, which may consequently cause skin aging. Antioxidants have the ability to neutralize free radicals and prevent such damage. This is the reason why antioxidants are used as a component in anti-aging skin care products.

The list of known common antioxidants includes, lycopene, vitamin E, catechol and lithospermum erythrorhizon, to name a few. A large amount of food and herbs such as ginseng, acai berry, Amaranthus and Chenopodium Quinoa are also known for their antioxidant properties. The antioxidants mentioned above are all effective in combating free radicals, but in furture product design, compound antioxidants are often considered in order to achieve greater effectiveness

Introduction

How skin ages

As we age, there are fine lines and wrinkles appear to our face and any other signs of aging. There are two main reasons for this, first reason is called internal aging which cause by genes, and the other reason is called external aging which cause by the sun damage (UVA & UVB) and environmental pollution. By knowing why skin age can help to understand how anti-aging skin care apply to skin and analyze the ingredient for skin antioxidants.

Skin aging start in mid 20s, the metabolism of skin begins to slow slightly, the dead cells do not replace as fast as before and the production of collagen becomes slower. At this point, the Sun rays (UVA and UVB) are the main reason causing skin aging and skin damage, which they will break sown the collagen and elastin.

At the mid 30s, the first fine lines and premature wrinkles appear under the eyes or across the forehead. The skin starts to lose its elasticity and firmness. And sun damage is still the main reason causing the wrinkles, age spots and rough skin. Actually the dermatologists define the word " photoaging" which describe the particular type of aging caused by the ultraviolet (UV) exposure. The sign of photoaging is usually express fine wrinkles, freckles, spider veins, age spots and blotchiness. At this point, the antioxidant is necessary for the skin to prevent free radicals damage. And anti-aging products start to be needed. At the age of mid 40s and beyond, skin aging and wrinkles are inevitable. Apart from sun damage, there are a number of other elements that may contribute to skin aging. First of all, gravity plays an important role in skin aging and the effect becomes evident at middle-age: eyelids start to drop, tip of the nose show small degrees of falling, earlobe become longer and jowls begin to form [1]. Secondly, facial expressions also forms the fine lines, after years of repetitive facial movements, laugh lines, worry lines, nasolabial folds and crow's feet at the corners of the eyes. Also sleeping positions also brings the wrinkle in the skin, which called sleep lines. Last but not least cigarette smoking causing the biochemistry changes inside the body which it will accelerate the aging process.

Theory of aging – what is a free radical?

As previously discussed, aging is an inescapable process for people. Despite its inevitability, however, what we can do is try to find a way to slow down the aging process. Logically, this rationale first leads us to the theory of aging. In 1954, Dr Denham Harmon brought forward the free radical theory of aging (FRTA), claiming the ubiquitous involvement of free radicals in inherent metabolic reaction [2]. The genetics and environmental is the main points for the aging. The FRTA postulates that the common aging process is the initiation of free radical reactions (FRRs). As the body and organs metabolism, a few oxygen molecules were removed and the reactive molecules called the free radicals. When a normal molecule is attacked a free radical, it will become a free radical itself, which is capable of attacking other molecules. This chain reaction, if not stopped, will lead to accumulating damage and ultimately cause cell destruction. Free radicals are also caused by ultraviolet rays (UVA and UVB) in sunlight. When the free radicals move freely, they are destructive and causing the oxidative stress. The oxidative stress leads the premature aging, such as dry skin and wrinkles.

Overall, there are several external stress factors, UV radiation, smoke, pollution, urban stress, etc. Dr. Denham Harmon has a clear point that the effect of oxidative stress can be reversed with the antioxidants, and he shows how antioxidants work in laboratory animals. Antioxidants can neutralize the free radicals without become free radicals themselves. By neutralize the free radicals, the cellular damage will be prevented. And the oxidative stress damage can cause biological organisms to age, and the free radicals can also cause damage of collagen in the skin. As we known, collagen is an important structure of the skin.

Natural Antioxidants

Antioxidant is a molecule that can slow and prevent the oxidation of other molecules, which show that it remove free radical damage from skin and help to slow down aging skin. Therefore antioxidants are considered reducing agents and reduce the damage oxidative process in skin cells. Natural antioxidants are a wider variety selection and much safer and healthier than artificial antioxidants, therefore natural antioxidants will be discussed.

There are literally hundreds of brilliant natural antioxidants in the world, but there is no single miracle cure for skin aging. New antioxidants are appearing in the world of skin care every year. Natural antioxidants can decrease inflammation, defend against UVA and UVB, repair DNA damage, restore natural skin's surface barrier remedy environmental pollution, release skin stress from hectic urban life, promote collagen generation, and improve skin damage recovery [3].

As previously pointed out, antioxidants stop the process of oxidation by neutralizing free radicals. Antioxidants work against free radicals in two ways. The first one is called chain-breaking, which means when the free radical free or gain an electron, a second pair of free radical is formed. The antioxidants can stop this process by deoxidizing the electron. The other way is prevention, which means that antioxidants can prevent oxidation by neutralizing the initial free radicals [4].

Therefore by apply antioxidants skin care products can efficiently control and prevent the free radicals damage. Many hyper-cosmetic company product lots of products which contain effectively antioxidants to defend the skin, help reduce fine line and wrinkles. Antioxidants also promote the structure of collagen, it is well known that collagen is an important component for skin organ.

The following review will list a number of natural antioxidants and analyzed their respective antioxidant abilities. A detailed description was given for each antioxidants presented.

Analysis of several natural anti-oxidants

Lycopene

Lycopene is well known one of the most common and potent antioxidants of the carotenoids. The antioxidant activity of lycopene is basing on its purifying the properties of singlet oxygen and peroxyl radicals, which to https://assignbuster.com/natural-antioxidant-in-anti-aging-skin-care/ define induce oxidative damage to nuclear DNA, scavenge free radicals and block visible and UV-light.

The research by Ferreira, A. L. A., Salvadori, D. M. F., Nascimento, M. C. M. O., Rocha, N. S., Correa, C. R., Pereira, E. J., Matsubara, L. S., Matsubara, B. B., Ladeira, M. S. P., "Tomato-oleoresin supplement prevents doxorubicininduced cardiac myocyte oxidative DNA damage in rats" [5], which indicate that lycopene reduced the risk of different cancers, heart diseases and further more protect cells from free radical damage. The journal also showed lycopene especially effective in the tissues with high fat and lipid content. Another study by Centre for Food at Virginia Tech [6] present that it significantly deduces the risk of prostate cancer. Therefore, lycopene is apparently effective in the tissues with high fat and lipid content. The skin is a lipid rich organ, so that in theory it means the high power antioxidant activity of lycopene also apply to skin.

Another function of lycopene is block the UV-light, although the SPF of lycopene is around 3, which is not enough for outdoor activity expose at the direct sun, but it is good enough for the indoor life, especially for some people do not like to use sunscreen. As we discussed before, one of the main reason causing skin aging is exposure the skin under the sun without any protection.

Lycopene, which delivered from tomato, duo to the difficulty of abstract processing and skin care product which contains lycopene is difficult to find. Based on my research, lycopene is a main ingredient for KIEHL'S lycopene Facial Moisturizing Lotion with Tomatoes, Beta-Carotene and Vitami n E. According to the product description, it can be moisturizing the skin, reduce the level of damage free radicals on skin, help increase the skin elasticity and protect skin from the UV-light [7].

Vitamin E

Several studies demonstrated vitamin E's ability to neutralize lipid peroxidation and unsaturated membrane lipids because of its oxygen scavenging effect [8]. Vitamin E has shown to reduce the aging of skin caused by ultraviolet light radiation (UVA) [9] and prevent cell damage from free radicals. Vitamin E is broadly useful for many occasions, such as sun protection, sun burn treatment, skin diseases treatment, scar treatment, skin cancer, etc. Vitamin E is mainly represented as vegetable oils from sunflower seed, olive, palm, corn, almonds, etc.

Vitamin E protects the skin structures from oxidative damage and preventing the radiation of lipid peroxidation, duo to the powerful antioxidant activity, it plays a protective role in many organs [10].

Actually, Vitamin E has been became an essential part of skin care products. It helps reduce the appearance of fine lines and wrinkles. And the free radicals of vitamin E were played a role in anti-aging and the antioxidant activity is useful for the skin problem [11].

Based on my research from The Body Shop, Vitamin E is the most important ingredient for The Body Shop Vitamin E Eye Cream. According to the product description, this eye cream protects delicate skin around eye area; reduce the appearance of fine lines; puffiness and dark circles [12].

Green Tea

Recently, due to the widely use of polysaccharides and their conjugates in the food industry and in medicine. There are three fractions of water-soluble polysaccharides conjugate purify from low grade green tea, which are TPC-1, TPC-2 and TPC-3, and those are the main bioactive components of green tea. Protein, sugars and uronic acid were found in components of tea polysaccharide. The antioxidant activities were also found in tea polysaccharide. From fig. 1, selected three components of tea polysaccharide conjugates were tested.

The ability of scavenge hydroxyl radicals were found in all three polysaccharide fractions. The fig. 2 and fig. 3 show that the Concentration and the scavenging effects are direct proportion.

The results of molecular weight (MW) and molecular size (MN) from tea polysaccharide conjugates showed in fig. 6. The molecular weights of TPC-1, TPC-2 and TPC-3 were 268. 000, 118. 000 and 42. 000. The MW/MN value of TPC-1 was close to 1, it is more homogeneous.

Natural polysaccharides may not been found directly from plants or animals, but it often comes with protein lipids and nucleic acids. The antioxidant activities of the polysaccharide-protein conjugates are direct proportion to the protein content percentage. The properties and bioactivities of polysaccharides might affected by protein.

Studies on the antioxidant activities of different fractions of green tea polysaccharide conjugates have shown that the protein content and molecular weight of the tea polysaccharide conjugates played an important role in antioxidant activity. Antioxidant activity can be enhanced by lower molecular weight and higher protein content [15].

Based on my research, green tea extract is the major ingredient for H2O+ Green Tea Reviving Eye Cream. According to the product description, this eye cream is able to promote skin recovery, inhibit environmental freeradical damage and reduce the appearance of fine lines and wrinkles [16].

Chinese herbs- lithospermum erythrorhizon

A great number of natural antioxidant medicinal plants have been tested for their antioxidant attributes, the results have shown that raw extracts or isolated pure compounds from them were more effective antioxidants [17].

Lithospermum erythrorhizon Sieb. Et Zucc. (LE) has been used a long time as medicine in China and as a dye for staining fabrics and food colorants [18]. It possesses a wide spectrum of wound healing, anti-tumor, anti-fungus, anti-HIV and contraceptive biological activities [19]. The anti-oxidant activity of the compounds from lithospermum erythrorhizon and compare their antioxidant effect through reducing power, tested with a rancimat and radical scavenging activity.

There are seven isolated compounds, deoxyshikonin(compound 1), l², l²dimethylacrylshikonin(compound 2), isobutylshikonin(compound 3), shikonin(compound 4), 5, 8-dihydroxy-2-(1-methoxy-4-methyl-3-pentenyl)-1, 4-naphthalenedione(compound 5), l²-sitosterol(compound 6) and a mixture of two caffeic acid esters(compound 7). The antioxidant activities were compared and evaluated through Rancimat method. This method detects the increase of electrical conductivity caused by the formation of volatile dicarboxylic acids which occurs during lipid oxidation processes [20]. From fig. 7, the isolate compounds from lithospermum erythrorhizon show different effects on oxidation.

Reducing the capacity of a compound may serve as a significant indicator of its potential antioxidant activity [22]. Ro determine the reducing power of the compound is isolated from lithospermum erythrorhizon to estimate the anti-oxidant potentials. And also from fig. 6, the test sample was using the potassium ferricyanide reduction method which shows that the antioxidant activities of the compounds was reduced and also reduce the oxidized intermediates of lipid peroxidation processes.

The study by Chen, H., Zhang, M., Qu, Z., Xie, B., suggests that the traditional Chinese medicinal herb could be considered as reliable natural antioxidants for food, and also apply for anti-aging skin care products.

Ginseng

Ginseng is often used in East Asian counties as a traditional drug. There are three types of ginseng in the world, which are Asian ginseng, America ginseng and Siberian ginseng. Asian ginseng known as Panax ginseng, also called " red ginseng"; America ginseng known as Panax quinquefolius, also called " white ginseng"; and Siberian ginseng is normally considered a herbal medicine rather than ginseng, because of they do not contains the active ingredient of ginsenosides. The root of ginseng is the source of ginseng extract, which is rich in antioxidants.

According to the dermatology researchers from Seoul National University published a study in the Journal of Medicinal Food in 2009 which examined https://assignbuster.com/natural-antioxidant-in-anti-aging-skin-care/ the effect of red ginseng on the facial skin 82 women over 40 years of age. The study presented that red ginseng significantly increased the production of collagen and reduced facial wrinkles [24].

In January 2009, another experiment was performed that in order to determine red ginseng can effectively prevent ultraviolet B on facial skin, loss of elasticity, thickening of the skin and wrinkle formation in the same variety of hairless mice. This experiment also clearly showed that when directly applied to skin, ginseng could improve the collagen production of skin and the inhibition of matrix metalloproteinase expression in dermal fibroblasts [25].

Recently, ginseng is widely used for skin problems, too. Ginseng is considered a natural skin care product for toning and helps improve the skin texture by preventing the formation of wrinkles. Duo to the efficiency on the skin, it can be used in skin care creams, lotions, toners, etc [26].

Based on my research, ginseng root extract is one of the most efficiency ingredients for Sisley Emulsion Ecological Compound [27]. This face lotion is a well- known rewarded product by using ginseng. The detail of ingredient was found in Sisley Shoppe from House of Fraser. According the product description, this compound help skin fight environmental stresses, such as pollution, cigarette smoke, UV rays; restore improved tone and reduce the appearance of fine lines [28].

Acai berry

Acai berry is a rising antioxidant and the most popular one lately. More and more skin Care Company and health care company choose this antioxidant https://assignbuster.com/natural-antioxidant-in-anti-aging-skin-care/ to produce product line. First of all, acai berry was found from the acai palm tree origin from Brazil. But more acai palm tree was plant in Central America and South America.

Acai berry is one of the highest amounts antioxidants of any fruit, which contains at least 33 known antioxidants, it has almost 2 times the antioxidants of blueberries, and also rich in omega 3, 6 & 9, minerals, vitamins, amino acids, phytosterols and phytonutrients.

First of all, the high amount antioxidants which help to prevent the damage to skin caused by UVA and UVB, neutralize damage free radical in order to slow the skin aging process, which is able to smooth face line and wrinkles. The ability to fight free radicals which make acai a potential skin care intergradient, especially use for repairing fine lines and visible wrinkles and skin damage caused by environmental.

And then Omega 3, 6 & 9 can help moisturize skin which is also an important factor to prevent the appearance of fine lines and wrinkles. Furthermore, they also play an important role in various skin structures.

In addition, the phytosterols in acai berries keep skin intact and prevent premature wrinkles. It has also been noted that phytosterols could prevent premature skin cell death [29].

Last but not least, silicon is also an important ingredient of acai, which can help skin improve the content of collagen in the skin. Collagen known as an important component for skin elasticity and strength, the more collagen in the skin, the less fine lines and wrinkles will appear on the skin. That's also an important factor why acai is much better anti-aging ingredient than others.

Based on my research, I found out recently Kiehl's supply a new line which called the Acai Damaging-Repairing Collection, which the main integrant is Acai berries. According to the chemists at Kiehl's tests found that 88% of women felt a natural tightening effect in their skin and 84% of women said their skin appeared brighter. And the product descript that the collection to repair the effects of visible damage to skin's tone, texture and elasticity caused by environmental oxidation, sun exposure and other external skin stressors [30].

Amaranthus and Chenopodium Quinoa

Amaranthus is widely grown in Latin America, Africa, and Asia due to the pseudocereal's resistance to drought, hot climate, pests, and low demand for cultivation inputs [31]. Quinoa (Chenopodium quinoa), another pseudocereal from the Andean origin, is extensively cultivated at mountain altitudes in Peru and Bolivia [32].

To determine the total phenolices content and the antioxidant properties of those two plant materials, the correlation between total phenolic content and antioxidant activities. The research by Nsimba, R. Y., Kikuzaku, H., Konishi, Y., "Antioxidant activity if various extracts and fractions of Chenopodium quinoa and Amaranthus spp. Seed" give a direction for the search of antioxidant compound into the plant materials.

Quinoa and three varieties of Amaranthus seeds are powerful dietary antioxidants. Generally speaking, various extracts and fractions from these https://assignbuster.com/natural-antioxidant-in-anti-aging-skin-care/ plants provided a range of different antioxidants which demonstrated considerable free radical scavenging capabilities. [32].

Based on my research, Amaranthus is an important ingredient found in NUXE Crème Nirvanesque First Expression Lines Cream. According to the product description, this face crème can significantly reduce fine lines and wrinkles [33].

Coenzyme Q10

Coenzyme Q10 is known as a fat-soluble natural antioxidant for treat and speed up the process of recovery of a heart patients, obvious duo to the high amount antioxidant. Coenzyme Q10 can effectively defend free radicals and other damage molecule. Therefore, coenzyme Q10 antioxidants can prevent signs of skin aging.

As previous discussed, photoaging is caused by sunlight and contribute to the appearance of fines lines and wrinkles. Research conducted by Paul Gerson Unna Research Centre, Beiersdorf AG, Hamburg, Germany, have demonstrated Coenzyme 10's beneficial effect of preventing photoaging. Through the measurement of weak photon emission, they proved that Coenzyme Q10 could penetrate the viable layers of the epidermis and reduce the level of oxidation . A reduction in wrinkle depth has also been observed following Coenzyme Q10 applications [34]. The Research Centre determined that Coenzyme Q10 had the ability to effectively defend against UVA and mediated oxidative stress in human keratinocytes in terms of thiol depletion, activation of specific phosphotyrosine kinases and prevention of oxidative DNA damage [35]. Furthermore, Coenzyme Q10 also controls the collagenase in human dermal fibroblasts and prevents the UVA irradiation. To sum up, all the results and data indicate that Coenzyme Q10 can effective prevent the damage of photoaging.

In the following part, Coenzyme Q10 will be analyzed. Coenzyme Q10 has an unpaired electron which is formed with another unpaired electron of free radical, to eliminate the damage of free radicals. Coenzyme Q10 presented as antioxidants and interacted with superoxide dismutase will result in increased protection from free radical damage [36].

Although Coenzyme Q10 is powerful antioxidants and prevents the free radical oxidation, it is not a panacea. Recently the scientists' discovery that Coenzyme Q10 can slow down the process of skin aging. After a long time Coenzyme Q10 was used as nutritional supplement, a new ingredient for anti-aging skin care product, in 1998 Paul Gerson Unna of the skin research center has showed that the potential of Coenzyme Q10 was a multiple applications ingredient and confirmed that it could slow down tissue damage by neutralize the free radical damage.

The report from Briersdorf Lab for Nivea (first cosmetic company to well anti-aging skin care products with Coenzyme Q10), they indicated that after six weeks of daily treatment of Coenzyme Q10 on crow's feet, wrinkle depth both reduced by 27%; after ten weeks, fine lines and wrinkles reduced 43%.

Based on my research from Boots, Eucerin has a almost all major cosmetic company from Japan have a product line for Coenzyme Q10.

Conclusion

In conclusion, this review has shown that many natural antioxidants apply to some popular anti-aging skin care products in the market. It was shown that natural antioxidants are effective ingredients for anti-aging skin care products since antioxidants can nullify the damage of free radicals. The neutralization of free radicals can prevent the skin aging process, which proves that skin care product contains antioxidants can actually prevent and slow down the process of skin aging.

Several antioxidants and antioxidant plants have been chosen for analysis, namely lycopene, vitamin E, green tea, lithospermum erythrorhizon, ginseng, acai berry, Amaranthus and Chenopodium Quinoa. These antioxidants are highly effectiveaccording to previously established experimental data.

Nowadays, Vitamin E has been became an essential part of skin care products. Vitamin E protects the skin structures from oxidative damage and preventing the radiation of lipid peroxidation, it also helps reduce the appearance of fine lines and wrinkles. It has great potential in anti-aging and treatment for skin problem with antioxidant activity.

In previous studies, it was found that the protein content and molecular weight of tea polysaccharide conjugates are important factors that affects antioxidant activity.

Chinese herbs in widely used in East Asain medicine, The anti-oxidant activity of the compounds from lithospermum erythrorhizon and compare their antioxidant effect through reducing power, tested with a rancimat and radical scavenging activity. It showed that the traditional Chinese medicinal https://assignbuster.com/natural-antioxidant-in-anti-aging-skin-care/ herb could be considered as reliable natural antioxidants for food, which also could apply for anti-aging skin care.

Ginseng is often used in East Asian counties as a traditional drug, the root of ginseng is the source of ginseng extract, which is rich in antioxidants. A study from Seoul National University showed the red ginseng significantly reduced facial wrinkles, it also considered as a natural skin care products for toning and helps improve the skin texture

Acai berry as a antioxidant, it has the highest amounts of antioxidant than any other fruits, it help to prevent the damage to skin caused by UVA and UVB, the Omega 3, 6 & 9 from acai berry can help moisturize skin which also an important factor to prevent the appearance of fine lines and wrinkle.

Finally, the antioxidant properties of aforementioned plants showed that they could have great applications in anti-aging and skin care. With further research, it is highly possible to even better utilize these antioxidant properties in the formulation of more advanced anti-aging products.

Self assessment

I believe that I have done quite a good work. I have always interested in skin care region and very enjoyed doing research and learning more about the natural antioxidants. I have done a lot research in store or online, so that I have learned some basic intergradient of the skin care products. At the beginning, it is very hard to choose variety natural antioxidant duos to there are too many natural antioxidants in the world. After some research in the store and Shoppe, I picked some ingredient from popular anti-aging products. I am pleased with the structure and the whole report. I listed and https://assignbuster.com/natural-antioxidant-in-anti-aging-skin-care/ analyzed the integrants I chose. Natural antioxidant was a broad subject which can apply in many areas. I finished early so that I could check with my spelling and grammars which I considered this might be my weakness. And I could also proof read and make some more effort during the final week. And my most weaknesses which is there are not a lot journals directly link to the anti-aging skin care area, so that I had to do some research online, which it might not be enough. But it has been draw out that how anti-oxidant applies to anti-aging skin care area.