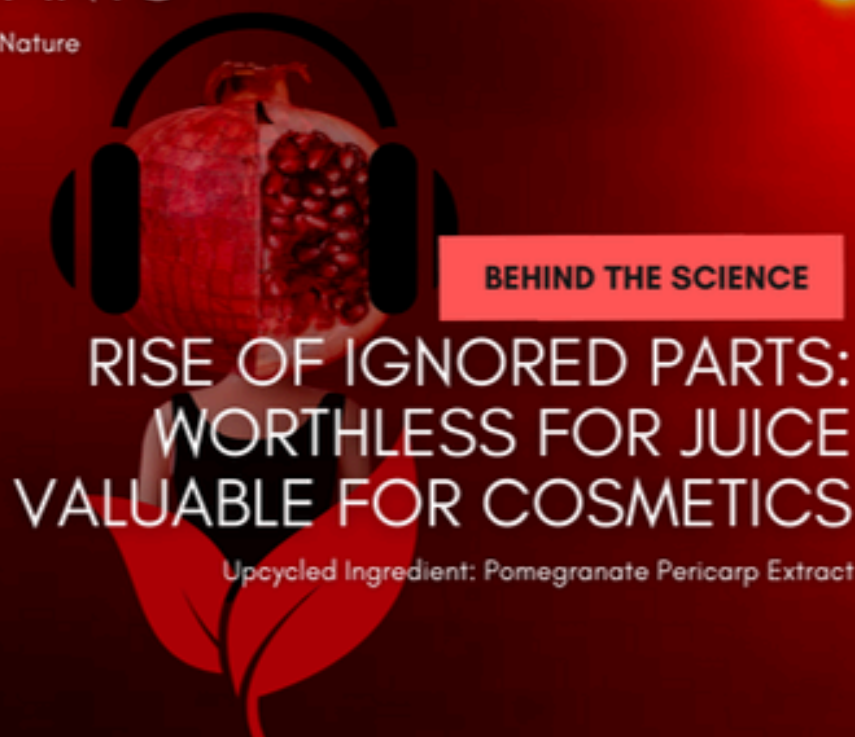


NORMAG

HAIR HEALTH

RO(S)NATCHERS: ANTIOXIDANTS

Protectors As A Gift From Nature



BEHIND THE SCIENCE

RISE OF IGNORED PARTS: WORTHLESS FOR JUICE VALUABLE FOR COSMETICS

Upcycled Ingredient: Pomegranate Pericarp Extract

NEW ERA IN HAIR CARE WITH **CHROMAZONE™**

Long-Lasting Hair Color With Liposome Technology



normactive's note

Hair is the most powerful tool of human to express their identity. Like us, it experienced lots of changes, especially in terms of coloring. People prefer different colors in their hair and they want this color for long term. It is obvious that this coloring process and lots of environmental factors can damage our hair and cause loss of color. In this situation, antioxidants are widely used in order to protect hair structure. However, in addition to the protective effect of antioxidants, it is much more innovative to blend them with a new technology and create a formula that will keep the hair dye on the hair longer. In this issue, we

aimed to explain our novel product called CHROMAZONE™ that is designed for long-lasting color retention in dyed hair, with its standardized extract of *Punica granatum* (Pomegranate) pericarp that is formulated in a liposome-based delivery system. You will meet the role of antioxidants in hair by explaining the processes that damage hair, importance of pomegranate as an antioxidant, the liposome technology that is used in CHROMAZONE™ and its action mechanism with efficacy results.

Love,

NORMACTIVE

UPCYCLING



**TURNING
TRASH
INTO
TREASURE**



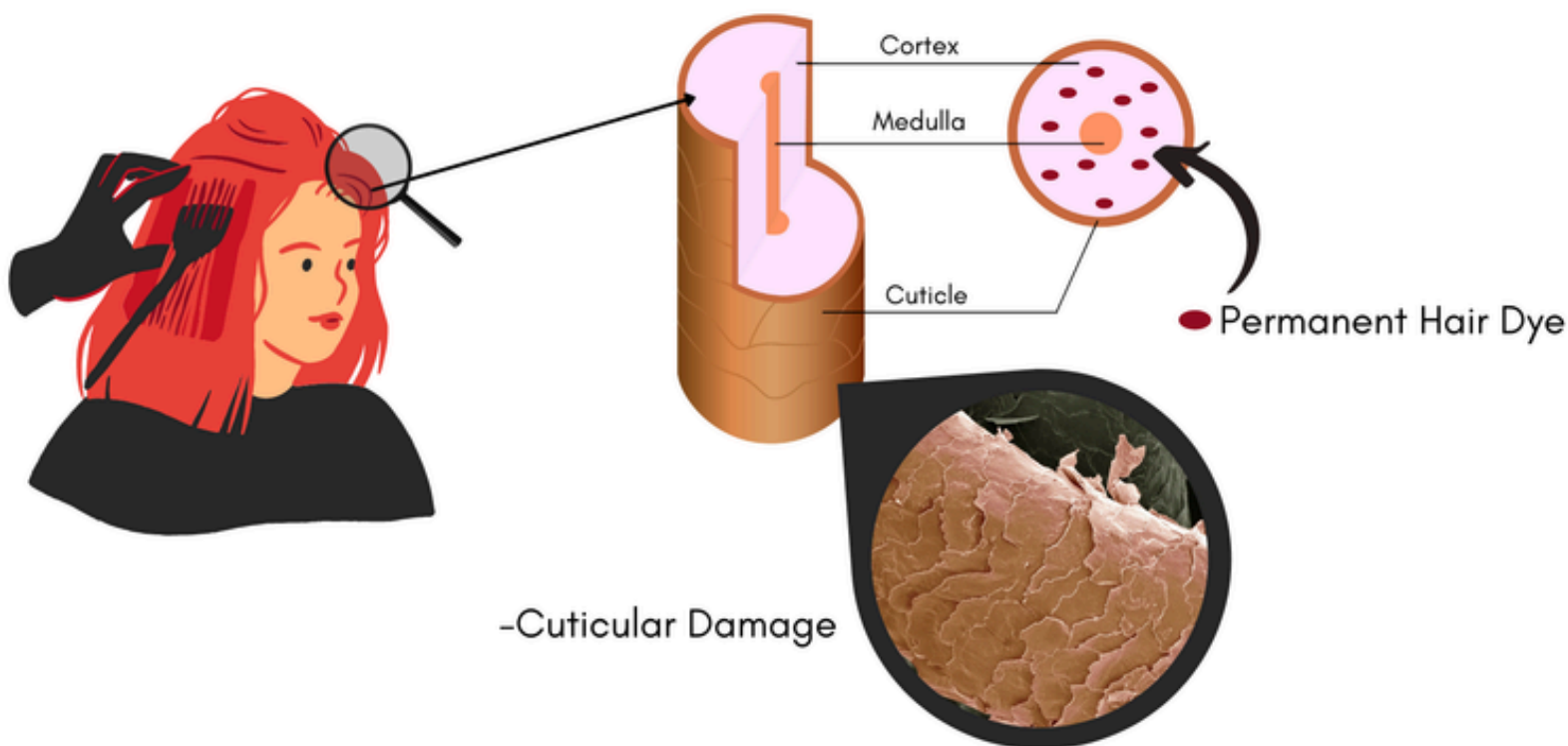


RO(S)NATCHERS: antioxidants

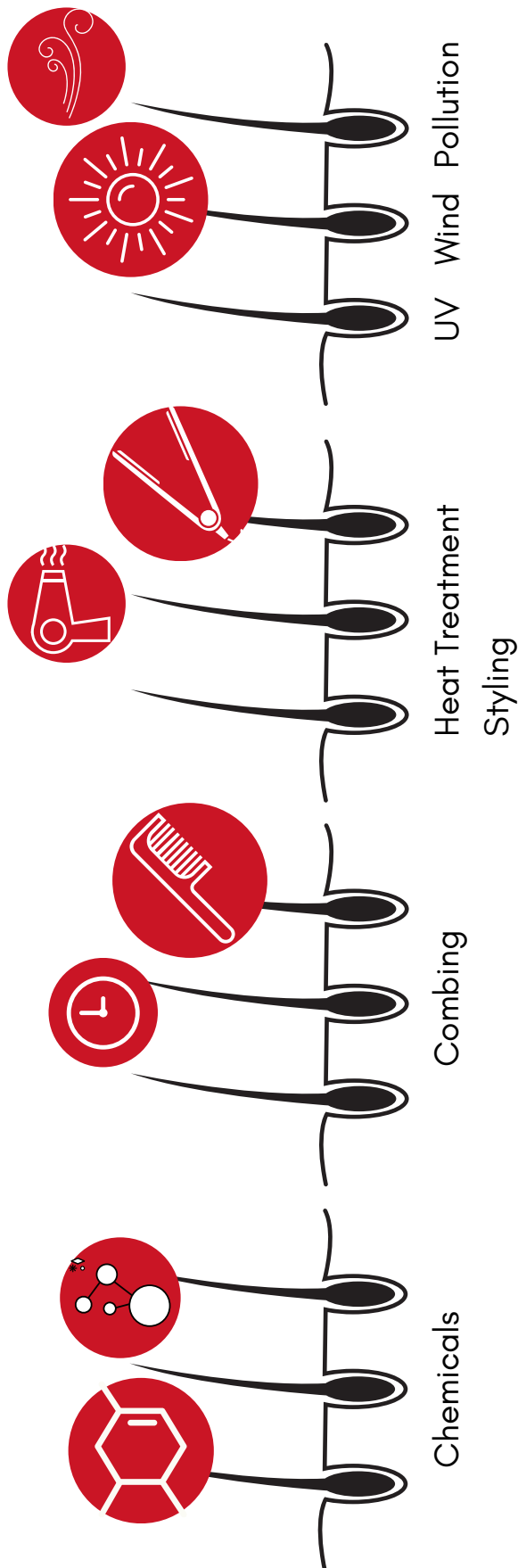
Hair has been the most powerful feature for humans to express identity from the beginning of human civilization. It is important since it has role in beauty, youthfulness and attractiveness. However, hair can be damaged either by trying to make it better or by the pollutants from the environment. In this part of NORMAG, we explained what can damage our hair, details of coloring process, UV-irradiation and the role of antioxidants.

Since the beginning of human civilization, hair has been the most powerful feature for humans to express identity. It has a major role in beauty, youthfulness and attractiveness. It is important to have clean and healthy hair for self-confidence and quality of life. It contains the medulla (innermost layer); the cortex (the middle layer that gives strength to the hair) which is consisting of keratin and melanin that are responsible for the natural dye of hair; the cuticle (outermost layer) which is consisting of thin dense keratin flakes and a lipid coating that protects the inner structure of the hair. Moreover, the natural color of the hair depends on the ratio and quantities of 2 other proteins called eumelanin and pheomelanin. While eumelanin is responsible for anywhere between black hair shades to brown, pheomelanin is for

golden blonde, ginger and red shades. The disappearance of both types of melanin causes graying and whitening of the hair. These certain features of hair could be changed or altered in order to obtain a permanent change, the chemical reaction of coloring, perming, or straightening should happen within the cortex. Hair care and cosmetics as shampooing, combing, heat drying, chemical processes like permanent coloring and bleaching can damage hair. For instance; hair dyeing has become a fashion not only for older people to dye their gray hair, but also for both girls and boys. This permanent coloring process induces cuticular damage that can be clearly shown by ultramicroscopy and is most evident on the first day after coloring since mostly oxidative type of hair dyes are used.



DAMAGE FACTORS



“

Hair care and cosmetics as shampooing, chemical processes like permanent coloring can damage hair.

According to a research, ingredients included in hair dyes are genotoxic and they can penetrate skin which lead to damage in DNA. Furthermore, pollution, UV light, X-irradiation, swimming and washing can also affect hair quality and health. For instance, keratin and melanin pigments of hair are attacked by UV irradiation which leads breaking of disulfide bonds inside the hair fibre and on the surface of the cuticle. Also, it can cause decrease in hydration, increase in permeability, loss of color and produces free radical by interacting with endogenous photosensitizers. These effects are crucial since the lipid and protein fractions that are attacked are important in the structure and integrity of the



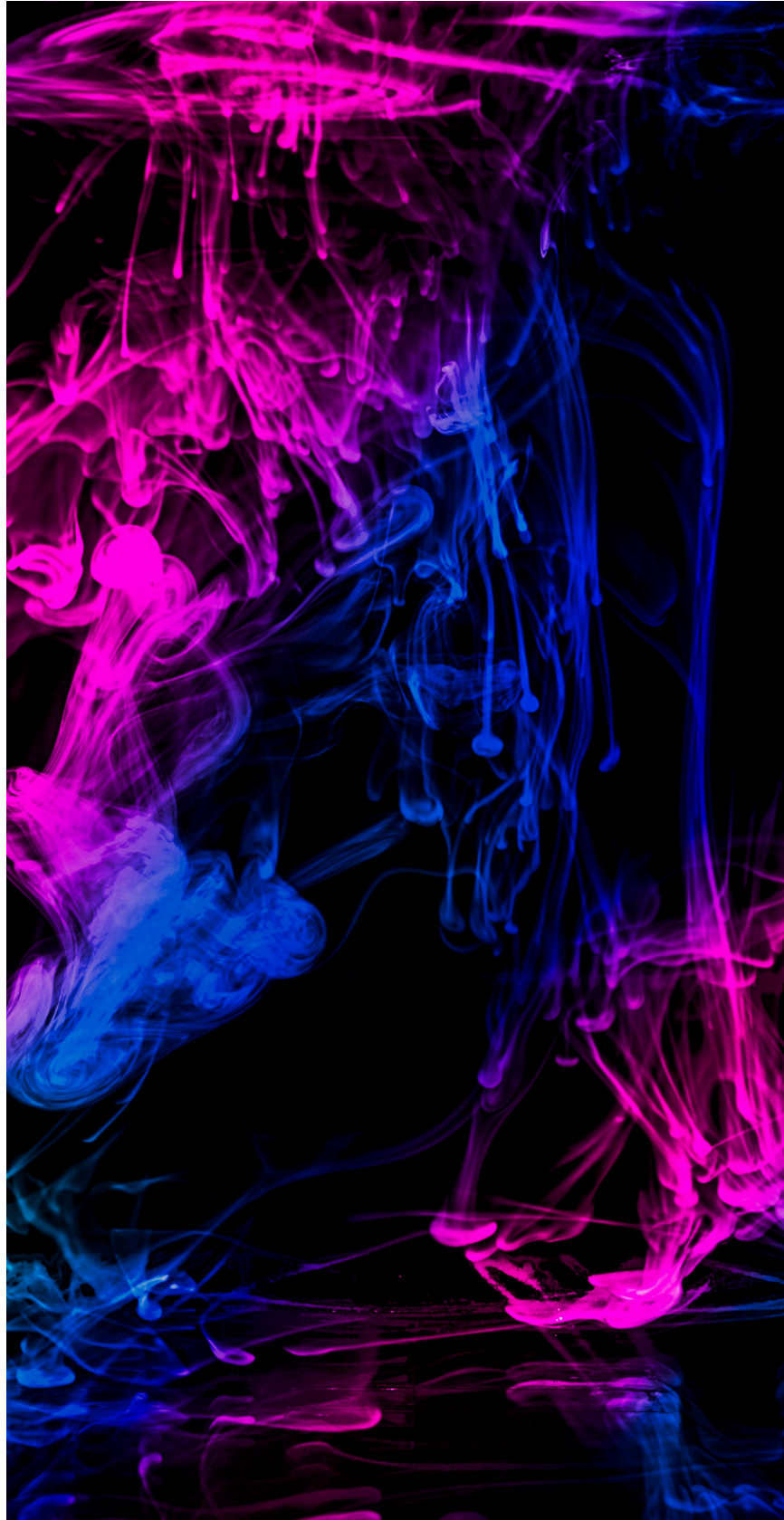
hair fibre in order to protect hair from external factors. As we all know, sun exposure, swimming or washing our hair is inevitable. However, harmful hair dyeing process does not seem to come to an end. On the contrary, according to market values, it is expected that hair color market will reach about 42 billion U.S dollars by 2025. In this situation, in order to reduce or delay the constant color change and effects of UV damage; the use of UV filters (natural or synthetic) and antioxidant additives in cosmetic formulations is necessary. Following the worldwide trend of using natural ingredients, plant extracts, and derivatives in

“
According to market values, it is expected that hair color market reach about 42 billion U.S dollars by 2025.

- Statista Research Department, (2022)

cosmetic formulations, natural antioxidant properties and applications have been extensively studied since they can reduce the adverse effects on hair fibre. An antioxidant is a substance that avoids free radical formations and could be used in dyes as well as subsequent treatments such as hair revitalizer products. Antioxidants can also help to repair hair systems, can provide protection against oxidative damage that is caused by free radicals produced from UV-A irradiation. Our hair is exposed to oxidative stress as much as our skin that's why using antioxidant ingredients is crucial in hair cosmetic products. UV components are in sunlight can cause disruptions in human hair by attacking both melanin pigments and the proteins (keratin) of hair. UV-B irradiation breaks disulfide bonds inside the hair fiber and on the surface of cuticles. On the other hand, UV-A irradiation mainly causes production of free radicals that can cause alteration in mechanical properties of hair, decrease in hydration, increased permeability and loss of color. Generation of ROS is triggered internally during normal metabolism and externally through exposure to various oxidative stresses

from the environment including, smoking, UVR, inflammation from microbial, polluting, or irritant origins and chemical aggressors. Reactive oxygen species (ROS) are highly reactive molecules that can directly damage various cellular structural membranes, lipids, proteins, and DNA. In a research, irradiated hair samples with UV were observed to be damaged chemically and the physical, decrease in shine appearance of hair showed, a decrease in shine and loss of color. Then they suggested that treatments with antioxidants improved the mechanical properties of irradiated hair. Our body possesses its own defense mechanism such as anti-oxidative enzymes and non-enzymatic antioxidative molecules such as Vitamin E, fatty acids and flavonoids protecting it from free radicals by reducing and neutralizing them. Classification of antioxidants can be done according to their source type such as natural or synthetic antioxidants. First of all, natural antioxidants are synthesized in human body because of metabolic processes or by taking other natural sources as a supplement. Natural antioxidants can also be divided into two categories. One of these categories is enzymatic antioxidants. They are produced in the human body and further divided into two groups; primary and secondary antioxidants. Primary antioxidants include superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx). Secondary antioxidants consist of glutathione reductase (GR) and glucose-6-phosphate dehydrogenase (G6PDH). The second group for natural antioxidants is nonenzymatic



antioxidants such as minerals, vitamins, carotenoids, and polyphenols that are not found in the human body but they are taken as a supplement from other natural sources. The other types of antioxidants are synthetic antioxidants that are artificially synthesized by using different techniques. They are generally polyphenolic compounds that scavenge free radicals in order to stop chain reactions. As an example for natural source for natural antioxidants, pomegranate (*Punica granatum L*) can be given since it has

been used as a folk medicine from ancient times. In order to understand CHROMAZONE™ in a better way, it is necessary to examine and understand the properties of this fruit that we use the extract of its pericarp.



**night
is
"pro
longed"**





BEHIND THE SCIENCE

rise of ignored parts: worthless for juice valuable for cosmetics

Pomegranate is a fruit from the Persian region, grown from the Mediterranean to the Middle East, and is a symbol for wellbeing, fertility, knowledge and permanence. Pomegranate leaves and pericarp have a high content of polyphenols at about 21-23% of dry weight which offers potent antioxidant activity. Both leaves and pericarp can be used as a supply of antioxidants. There are lots of phytochemicals that are identified from pomegranate pericarps such as flavonoids, phenolic acids, and ellagitannins.



The most abundant one for phenolic compounds is punicalagin that is a large polyphenol hydrolyzable tannin. It is the main compound that is responsible for antioxidative potential. Moreover, another main active ingredient in pomegranate extract that is responsible for its antioxidant capacity is ellagic acid which has anticancer properties. The phenolic compounds in pomegranate break the free radical chain by donating hydrogen atoms to reducing agents easily and preventing the formation of peroxide events at a relatively small concentration. There are lots of studies about the capabilities of these compounds. In one of the studies from Liu et al, they did an in-vitro study in order to test the antioxidant capacity of punicalagin and ellagic acid and they showed that these two compounds have a role in the inhibition of ROS in human keratinocyte cells depending on the concentration. Another research team investigated the role of non-edible parts of pomegranate in anti-inflammatory concept, by testing the reduction capacity of punicalagin and ellagic acid that is found in pericarp portion of pomegranate, against nitric oxide (NO), prostaglandin E2 (PGE2) (important mediators to upregulate inflammation), inducible nitric oxide synthase (iNOS) and cyclooxygenase 2 (COX-2) (enzymes have a role in promoting inflammation.) They showed that punicalagin and ellagic acid decreased all of these in a concentration-dependent manner. They also showed the same capacity for extracellular-signal-regulated kinase (ERK), Jun N-terminal kinase (JNK) and p38 MAPK expression, which are important inflammation response.

Also, there are other studies that suggest that pericarp phytochemicals can be used to develop prebiotic products for microbiota. Pomegranate extract is also a revitalizer agent, which brings environmentally and chemically stressed hair to its original natural condition, boosts follicular absorption, and stimulates hair growth. Furthermore, pomegranate pericarp is a non-edible portion that constitutes approximately 43% of the fruit. The pericarps are often considered the least valued part of the plant while it is considered as waste after its juice is extracted from the fruit. That's why the usage of pomegranate pericarp for utilizing its antioxidant capacity is valuable since waste utilization occurs. In developed countries, the use of recycled ingredients is no longer a choice but a necessity. Considering the increasing consumption and limitations in raw materials in today's world, it will be inevitable to understand how valuable the waste utilization concept and its implementation is.

In this context, the use of pomegranate pericarp as an antioxidant ingredient is of particular importance due to both its potent content and its recycling value. As a result, the use of pomegranate extract as a good source of antioxidants can be a good alternative. However, the most important point here is which part of the pomegranate extract will be used by making it more effective and by combining it with the right purpose and with the correct technology. In CHROMAZONE™, pomegranate extract is combined with unique liposome technology that is formed by soybean lecithin in order to obtain prolonged antioxidant activity of extract. This liposome technology is also important for the purpose of the CHROMAZONE™ that is ensuring long-lasting color retention in dyed hair. That's why, explaining the liposome technology that we used in CHROMAZONE™ to encapsulate pomegranate pericarp extract, is going to be helpful to understand more deeply the product.



UPCYCLED INGREDIENT POMEGRANATE PERICARP EXTRACT





natural active ingredient for long-lasting color retention

Formulated in a liposome-based delivery system, CHROMAZONE™ is designed for colored hair for exceptional long-lasting color retention. CHROMAZONE™ is created by liposome technology to protect dyed hair from color fading as well as to repair chemically treated hair. Rich in ellagic acid, Pomegranate Pericarp Extract in liposome spheres provides a powerful antioxidant elixir for hair care applications.



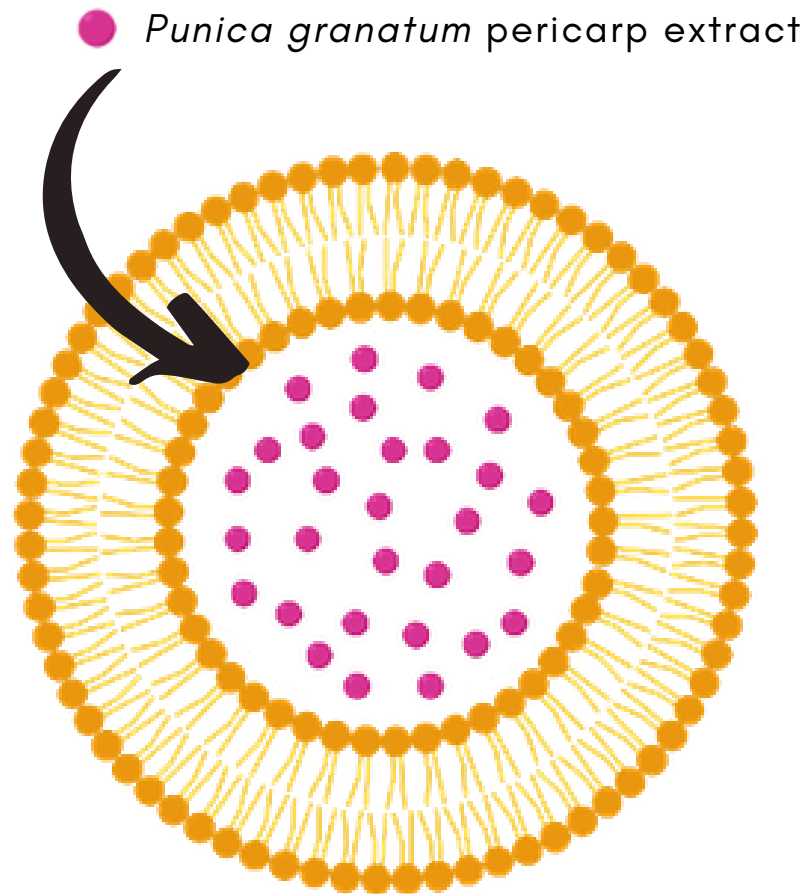


new era in hair care *with* **CHROMAZONE™**

In our product, CHROMAZONE™ which is designed for long-lasting color retention in dyed hair, the standardized extract of *Punica granatum* (Pomegranate) pericarp is used since it contains ellagic acid that reacts with free radicals due to its ability to bind metallic ions. And since it is a powerful antioxidant against lipid peroxide, utilizing the pomegranate pericarp is a great alternative not only for that, which is a good source for active compounds such as flavonoids, complex polysaccharides, minerals, and hydrolyzable tannins such as punicalagin and gallic acid, but it is also good to use a material that is normally considered as “waste”.

By using pomegranate pericarp, we add value to the supply chain by utilizing the "waste" product. Moreover, CHROMAZONE™ is formulated in a liposome-based delivery system to show prolonged antioxidant of pomegranate pericarp with the features of liposome technology. In order to understand action mechanism of CHROMAZONE™, first of all, liposomes must be understood. Liposomes that are small artificial vesicles, are created natural nontoxic phospholipids. Phospholipids are amphipathic molecules that are consisting of hydrophilic polar head group and hydrophobic head. With these components and their size and lipophilic character, liposomes are promising for drug delivery. Their size can be changed from 30 nm to several micrometers. Their properties can change according to their lipid composition, surface charge, size and preparation method. In aqueous solutions, they form closed structures because lipids are amphipathic meaning they have both hydrophobic and hydrophilic structures. With the help of these properties, liposomes are used as a delivery system for numerous molecules in cosmetic and pharmaceutical industries. Liposomes can entrap compounds that are unstable such as antimicrobials or antioxidants. The molecules that are entrapped can be either hydrophobic or hydrophilic. This delivery system is advantageous because of its biocompatibility, biodegradability and low toxicity. Also, it is nonimmunogenic for systemic and non-systemic usage.

CHROMAZONE™



LIPOSOMES

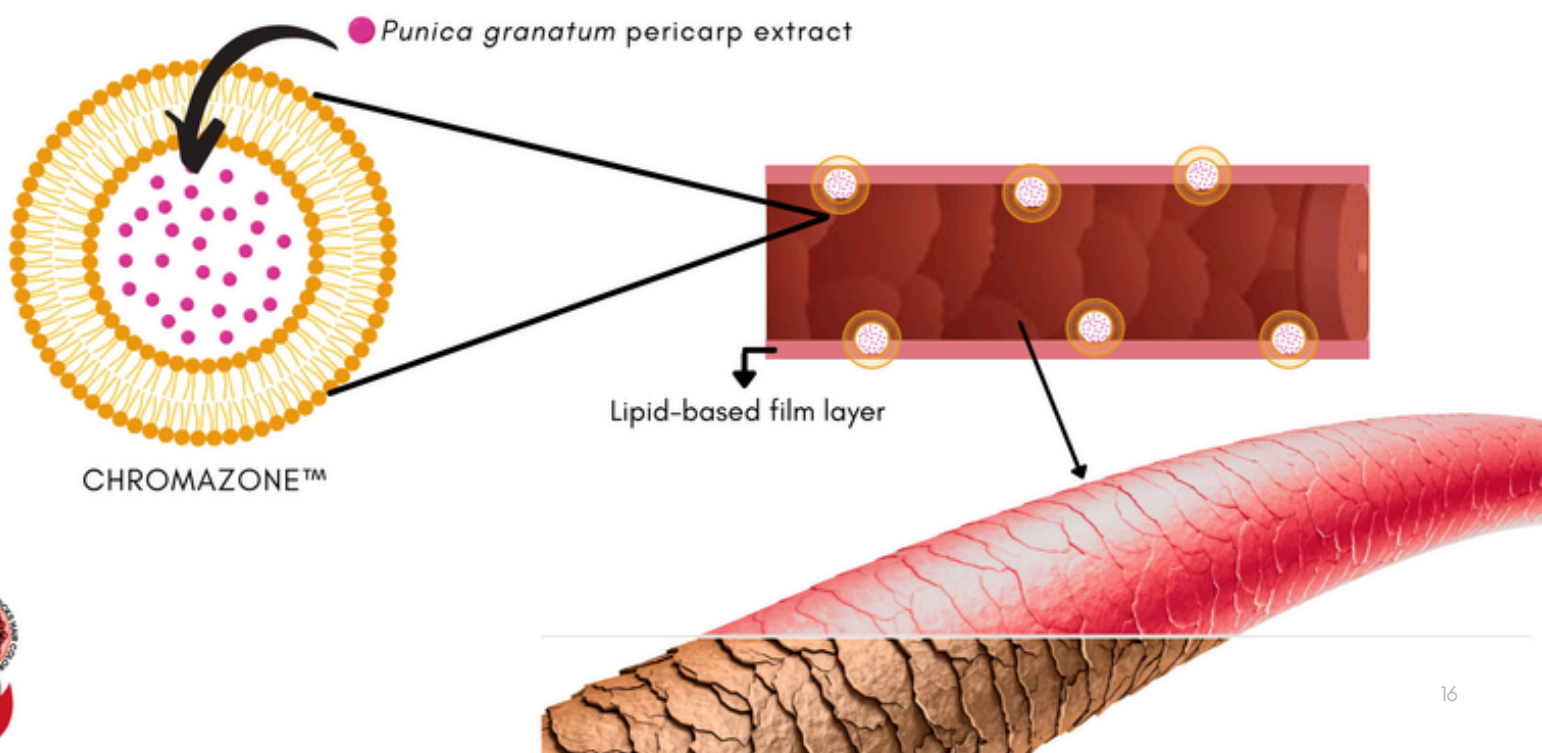
PENETRATE ON & INTO HAIR SHAFT
FOR POWERFUL PROTECTION

In CHROMAZONE™, pomegranate pericarp extract is encapsulated in the center of liposome due to the high affinity of phospholipids to hair keratin. This affinity is important for the physical mechanism of CHROMAZONE™ in order to form film structure around hair fibre to prevent escape of hair dye molecules from the hair. Also, in our technology, the lecithin used for the liposome is a derivative from soybean. This is important because when choosing a dye or a post-color treatment product, consumers care about long-lasting quality formulas that are less damaging and more natural. CHROMAZONE™ is a product that is designed for long-lasting color retention in dyed hair and it does this with the help of two different action mechanisms. Firstly, liposomes consist of a high content of phospholipids that can bond to keratin easily, and due to CHROMAZONE™'s

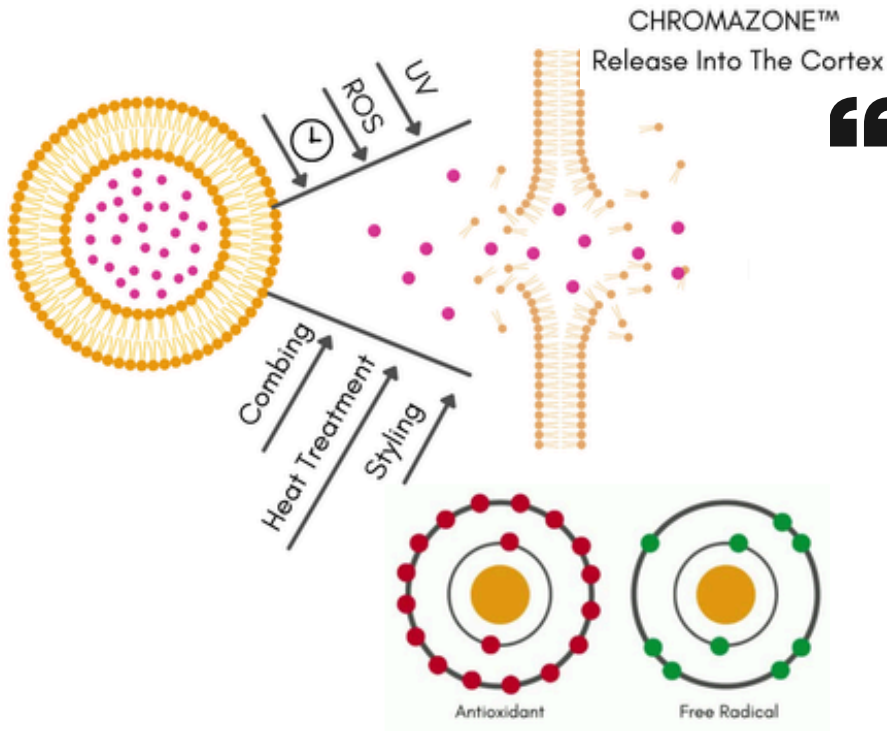
liposome formulation that has a high affinity to keratin it forms lipid-based film layer around hair fibers. This feature creates a structure surrounding the hair fiber that will prevent small dye pigments from escaping from the damaged hair cuticle, and since lipids are insoluble in water, this feature prevents the colors from fading, bleeding during washing, styling, or swimming. Either by applying rinse off or leave on, it cannot be easily solved by water. CHROMAZONE™ locks hair color by its film structure until liposome formulation is disturbed since it makes difficult the connection between water and hair fibre and also it protects hair from extrinsic factors. When CHROMAZONE™ applied to the hair, this process results in preventing the hair color to escape during a water involved treatment.

NORM▲CTIVE

1- PHYSICAL MECHANISM



2- CHEMICAL MECHANISM



“ This liposome technology is important for the purpose of the CHROMAZONE™ that is ensuring long-lasting color retention in dyed hair.

Secondly, it can also pass through the cuticle layer and enters the cortex layer since it has submicron size. After that, standardized extract of Punica granatum pericarp extract used in CHROMAZONE™, is released gradually from liposome structure, and shows its prolonged antioxidant activity on the hair, since it has ellagic acid which reacts with free radicals due to its ability to bind metallic ions. That's why; CHROMAZONE™ locks hair color thanks to its action on and inside the hair and ensures that the antioxidant activity of the extract will not be consumed at once. Liposome-encapsulated hair color treatment products improve hair moisture

balance while improving hair softness, and strength. Also, to reduce or delay the color change from the dyed hair fibers, the use of antioxidant additives like pomegranate pericarp extract in our product/in cosmetic formulations is important. According to the tests that were obtained in our in house laboratory, CHROMAZONE™ has 3 times more antioxidant capacity compared to Vitamin E and pomegranate pericarp extract itself which means it neutralizes free radicals both in a robust and quick manner; 50% more color protection improvement; cause 25% less color bleeding were observed.

**invite
anti
oxidants
to
your
party**



Subscribe Us.
Follow Us.
Discover Us.
Contact Us.



[NORMACTIVE](#)



[@normactivecosmetics](#)



[normactive.com](#)



[normag@normactive.com](#)

DISCLAIMER

NORMAG is a digital mini magazine that is released by NORMACTIVE Cosmetics Inc. It is strictly forbidden for any third party to reproduce or use it without permission in any other forms such as printed matter and/or online content.

NORMACTIVE