

Silver Strands: A 360° View on Hair Greying

Speaker: Sophia Bull, Marketing Manager - North America – Lucas Meyer Cosmetics

March 27, 2024

The Waters Edge at Giovanni's
2748 Boston Post Road
Darien, CT 06820

Registration: 5:30 – 6:00 pm
Dinner: 6:30 pm
Speaker: 7:00 pm



Registration

Online at www.ctscc.org
Email Cynthia at
cynthia.valovich@henkel.com

Chapter Meeting Cost

SCC members: \$65
Non-members: \$80
Students: \$40

Overview

The color of hair is determined by the amount and type of pigment called melanin present in the hair follicles. Melanin is produced by specialized cells called melanocytes that transfer melanin via organelles called melanosomes to the keratinocytes that form growing hair. There are two types of melanin: eumelanin and pheomelanin. Eumelanin is responsible for black or brown hair, while pheomelanin is responsible for red hair. The ratio of these two pigments in a hair strand determines the tone of the hair.

Gray hair is a natural phenomenon that occurs when the hair follicles stop producing melanin and existing melanin is more prone to oxidation. As we age, this decreased overall content of melanin available to give growing hair its color leads to the appearance of gray hair. The age at which grey hair appears varies between different demographics. Much of the greying process is genetically programmed, however there are also external and internal factors, like stress, that can contribute to hair greying.

In the last 15 years there has been an acceleration of studies focused on understanding the biological mechanism of the hair greying process and what factors contribute to it. Recent insights have also delivered opportunities to investigate ways to combat hair greying. A full overview of the hair pigmentation and greying process will be presented, as well as how internal and external factors can modulate it, and finally various approaches developed to control hair greying will be discussed.

Inside this issue:

- Letter from the Chair
 - 2024 Board
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- Martha Schwarzkopf Award for Women in Science
 - Upcoming Events
- FREE SCC membership for undergrad students & On-Demand Webinars

Letter from the Chair

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CTSCC members & friends,

Wishing you all a happy start to 2024!

I want to first thank each and every one of you for your interest and support throughout 2023. We closed out the year with our second annual CTSCC Oktoberfest Event at Third Place by Half Full Brewery in Stamford, CT, where we enjoyed some traditional German Oktoberfest treats, had a wonderful presentation by Christophe Toumit from Greentech on White Biotechnology: Fermentation and, of course, indulged in some beer! This has become a wonderful event for our chapter that has brought in many new faces and grown membership interest. That being said, we're looking forward to hosting our third annual CTSCC Oktoberfest this coming fall – please stay tuned for details!

Next, I would like to give a brief introduction for those who may not know me. My name is Nina Miotto. I am a Principal Scientist at Henkel and support our Professional Hair Care business. I have been with the company for about six and half years and this is where I was first introduced to the CTSCC Chapter. I got involved right away! By the start of 2018, I held my first volunteer position and then began my three-year Executive Board term as Secretary in 2019. By 2022, I started my two-year Chair-Elect term and am officially the Chair of the CTSCC chapter this year! Having held an Executive Board position for more than five years, I couldn't be more excited and honored to serve this role. It's been an absolute privilege watching the chapter grow over the years and I can't wait to see what's in store for our future!

Continuing to look forward to the rest of 2024, our chapter has a number of exciting technical topics & events in the pipeline. Our first two technical meetings of the year will be focused on the topic of Hair Aging - hair greying, the impact on consumers, the causes of greying, and what are current and future solutions and Epigenetics & Skin.

Additionally, we had the great honor of celebrating our chapter's 40th year anniversary in 2023. We are so proud of the legacy and impact our chapter has had on the industry and our members and hope to celebrate accordingly with a social event this year.

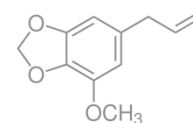
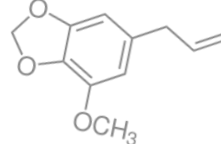
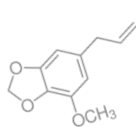
Thank you in advance for the continued support of our chapter! On behalf of our Executive Board, we are so appreciative and grateful for the community we've built and can't wait to see it grow this year.

Please do not hesitate to reach out with any questions or comments for our chapter or if you would like to get more involved with our volunteer opportunities and positions.



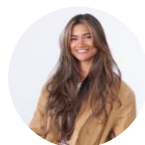
Nina Miotto

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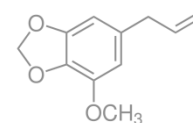
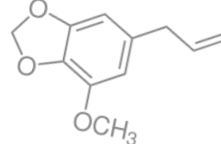
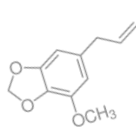


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Interested in volunteering? Reach out to any board member or ctscnews@gmail.com to learn more!



Technical Corner

This article was originally published in the
NYSCC Blog & Cosmetiscope Volume 29 Issue 9

Cosmetic Colorants

Author: Yun Shao



Coloring agents are essential components of certain cosmetic products, especially color cosmetic formulations. Most cosmetic colorants are synthetic and are regulated globally. In the US, they are regulated by FDA with monographs for each and all located in Title 21 of the Code of Federal regulations, Parts 73 and 74. In the EU, allowed cosmetic colorants are listed in Annex IV, Regulation 1223/2009/EC on Cosmetic Products, as corrected by Corrigendum to Commission Regulation (EU) 2021/850, 17 June 2021. Many colorants on that list are also used in food and have corresponding E (Europe) numbers such as E-171 for TiO₂ and E-172 for iron oxides. In such cases, the specifications for food colorants are used for cosmetic application. Therefore, it is common to see a note in technical datasheet for a cosmetic colorant stating it complies with the 21CFR and E number (like E-172 for iron oxides) specifications.

Although many of us formulate with colorants frequently, we seem to need help on gaining complete clarity on certain aspects of them. In this blog, we will go over some fundamentals and a few common confusions about certain pigments. Let's first start with some terms that we often hear.

Dye: It is a material that imparts a color and is soluble in the vehicle or substrate in which it is dispersed.

Pigment: It is a material that is insoluble in the vehicle or substrate in which it is dispersed. True pigments are colorants completely insoluble based on their chemical structure and constituent groups. They typically do not contain the normal substitution groups that promote water solubility, such as sulfonates (-SO₃), carboxylic acid (-COOH) or hydroxyl groups (-OH). Hence, there is no bleeding in hydrous systems. There are only two examples of true pigments used in cosmetics: D&C Red No. 30 and D&C Red No. 36.

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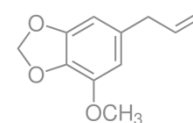
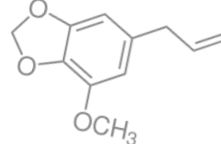
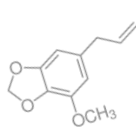
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For leave-on cosmetic applications, pigments instead of dyes are often used because dyes are hard to remove after use, thus, stain the skin. Dyes are more commonly used in rinse-off products such as shampoo and mouth rinse. Now let's go a little further:

Toner: It is a pigment that is produced by precipitating a water-soluble dye as a metal salt. Typical metals used for this precipitation are sodium, calcium, barium and strontium. e.g., D&C Red 7 Ca Salt. (be aware that it is not a lake)

Lake: It is a pigment produced by absorbing a water-soluble dye or a primary toner onto an insoluble substrate. All the lakes are pigments.

F, D and C codes in the names of a colorant stands for its approved use in Food, Drug and Cosmetics. A colorant must meet its purities requirements to ensure its safety. FDA separates color additives into two categories:

1) Colorant Subject to Certification: They are derived primarily from petroleum and are known as coal-tar. Most synthetic, organic Colorants fall into this category. They must be batch certified by the FDA. They are further divided into two categories.

1) **Certifiable Primary Colors:** They are pure color which contain no extenders or diluents. They have color names and numbers assigned such as FD&C Yellow 5, D&C Red 6, and Ext. D&C Violet 2.

2) **Certifiable Color Lakes:** Lakes follow the same restrictions as the primary colors with the additional rule that they must have the name of the precipitating metal and the word "lake". An example would be FD&C Yellow 5 Al Lake.

2) Colorant Exempt from Certification: These are natural organic colorants and synthetic inorganics obtained largely from mineral, plant, or animal sources. Although batch certification is not required, purity must be tested by the manufacturer to meet FDA specifications. Examples are TiO₂ and iron oxides.

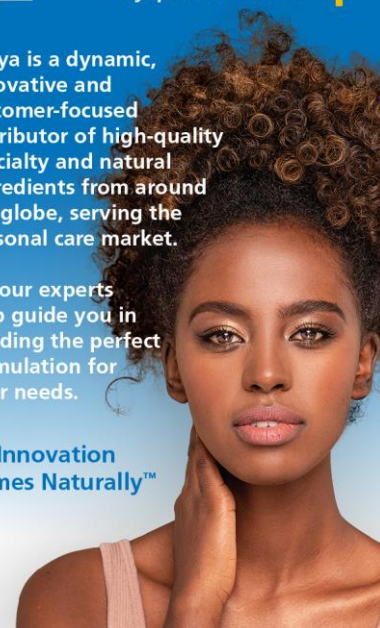


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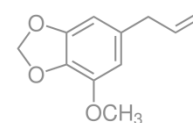
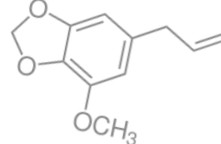
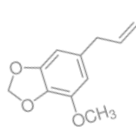


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Now that we have gone over the general terms and regulatory aspects of colorants, let's look at common ambiguities about a few specific pigments:

Rutile and anatase

First, they both are TiO₂, but refer to two crystalline structures. It is like using Coke or Pepsi to represent carbonated soft drinks. Anatase is slightly softer and less abrasive than rutile. This makes little difference to the skin feel but can make a big difference in TiO₂ production process. Rutile is so abrasive that it can wear out the equipment that processes hundred to thousands of tons per campaign. Consequently, rutile is often surface treated with alumina to extend the useful life of the equipment in addition to provide other benefits.

Rutile has a slightly higher refractive index than anatase, and thus, it can scatter light more effectively. So, does it mean that Rutile is more opaque? Not quite. Opacity is the result of scattering which depends as much on the size and size distribution of the pigment particles as on its refractive index. In reality, it is rare to find a rutile and an anatase that have the same particle size, let alone size distribution. Therefore, being rutile or anatase does not necessarily indicate a higher or lower opacity.

Commercial anatase is usually made to have a small primary particle size, in a range of about 140 – 170 nm. That of rutile is often bigger, roughly 170 – 250 nm. Due to its smaller size, anatase scatters blue light slightly more, and thus, imparts a blueish undertone. This is the reason that anatase is often said to be bluer than rutile.

Lastly, the production processes, chloride and sulphate, are often brought into discussion about TiO₂. In Chloride process, TiCl₄ is vaporized and burnt into rutile. In sulphate process, Ti(SO₄)₂ is neutralized with base to generate anatase. If aluminum salt is used as the inducer, rutile TiO₂ can also be made via the sulphate process. TiO₂ made from a Chloride process often has a lower level of contaminants, which translates into high purity and clean color. This had been indeed the case in the past, but not so much anymore since the sulphate process technology has been greatly improved over the years.



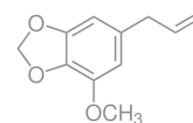
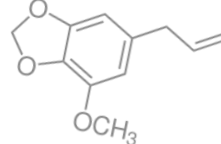
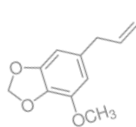
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Carbon black

Carbon black can be made via several processes. In the US, carbon black as a cosmetic color additive is called D&C Black No. 2, a high-purity carbon black prepared by the oil furnace process.¹ It is manufactured by the combustion of aromatic petroleum oil feedstock and consists essentially of pure carbon, formed as aggregated fine particles with a surface area range of 200 to 260 m²/g.

JSCI monograph requires Carbon black to be obtained by incomplete combustion of natural gas or liquid hydrocarbon. Such carbon black is often called channel black and is not approved by the FDA. This, unfortunately, adds unnecessary complexity to formulating for the global market.

Chromium oxide and Chromium hydroxide green

Hexavalent Chromium (Cr⁶⁺) is known to be carcinogenic, thus, it should not be present or at a very low level in cosmetics products. However, its presence is unavoidable due to the chemistry and manufacturing process. For both pigments, the FDA set a limit of 2% NaOH extract, not more than 0.1% as Cr₂O₃ (based on sample weight).² This limit is equivalent to 684 or 513 ppm maximum Hexavalent Chromium, respectively. The actual level of Cr⁶⁺ in a commercial grade needs to be tested for calculating the final level in a finished formulation.

Mica and Pearlescent pigments

A common restriction people often talk about is the size limit of 150 nm. Mica is an approved colorant for drug use, and the FDA has imposed a size limit on it. Mica can also be used as a colorant for cosmetic applications for which the FDA does not list any size limit in the monograph. Moreover, mica can be used in cosmetics as filler, a category that the FDA does not regulate with specific requirements.

Efforts have been made to list Mica-based pearlescent pigments as approved colorants for cosmetic purposes, but this has not happened yet. As of now, such pigments have been approved as colorants only for drug use, and the corresponding specifications require that the mica meets the colorant specifications for drug use. This is likely the reason that we hear the 150-nm size limit in our industry. As mentioned above, mica-based pigments are not approved colorants for cosmetic use. Consequently, the composition has to be expressed as a mixture of individual components such as, for instance, mica and titanium dioxide. Each of these ingredients needs to meet the corresponding FDA specification if applicable. The size limit on mica for drug use may not be observed.

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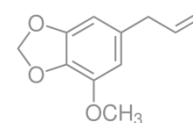
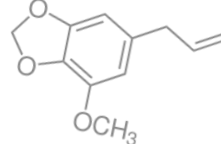
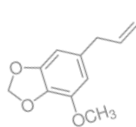
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Zinc oxide

Zinc oxide is a long approved cosmetic colorant, though its use as opacifier in cosmetics is limited. That main reason is that its opacity is much lower than TiO₂ due to its lower refractive index (2 vs. 2.7). Roughly 3 times more ZnO is needed to achieve the same degree of opacity of TiO₂. Moreover, ZnO is slightly soluble in water, resulting in the pH of formulations containing ZnO to be above 7.5.

As of August 7, 2022, the use of TiO₂ as food colorant has been banned in the EU, directly affecting its use in lip and oral products. Respirable TiO₂ is considered carcinogenic, according to Proposition 65 of the state of California, affecting the use of TiO₂ in some powder and spray formulations. TiO₂ is difficult to replace because of its unique performance and inertness. In light of the regulatory restriction, ZnO with the right size and high opacity has gained attention recently, especially for anhydrous formulations.

Red 6 lake and red 7 lake in Japan

Most FDA approved colorants can be used in Japan. Red 6 lake, widely used in lip products, is a notable exception. The reason is that Red 6 lake is Red 6 Barium salt laked on barium sulfate, but Red 6 Barium salt is not an approved colorant in Japan. On the other hand, Red 7 lake is Red 6 Calcium salt laked on barium sulfate but Red 6 Calcium salt is approved in Japan. In the case that the shade cannot be achieved without Red 6, Red 6 sodium salt can be used. However, it must be noted that red 6 sodium salt is water soluble, which is opposite to Red 6 lake.

Currently, the FDA has approved 64 color additives for cosmetic use, each of which has its merits and drawbacks due to their unique chemistry and production process.³ The knowledge is important not only for formulating the right color shade, but also for troubleshooting instability and especially, regulatory compliance. The author hopes that this article will contribute to your learning of cosmetic colorants.

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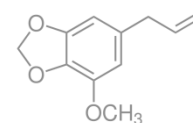
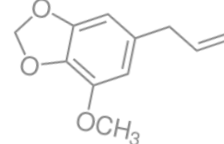
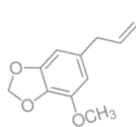
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About the Author

Dr. Yun Shao has been working on raw material innovation for over 25 years and is currently the Vice-President of R&D at Kobo Products, Inc. He has expertise in micro TiO₂ and ZnO innovation and physical sunscreen technology. He is also experienced in pigment surface treatments, pigment grinding, color cosmetics, and global cosmetic ingredient regulations




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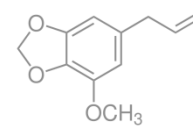
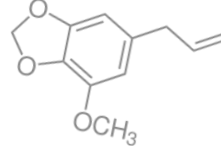
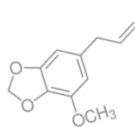
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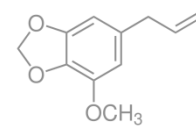
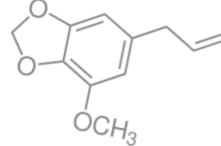
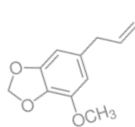


Oktoberfest 2023



Our second annual Oktoberfest Event featured an insightful talk on White Biotechnology: Fermentation by Christophe Toumit from Greentech

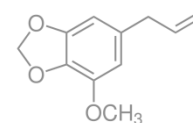
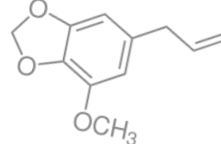
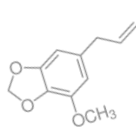




Oktoberfest 2023

The event was a hit! Attendees enjoyed traditional Oktoberfest-themed bites, and beer, of course!





Trivia Question

The first female medal recipient of the Society of Cosmetic Chemists, Florence E. Wall, is recognized for her efforts in fighting scientific inaccuracies to ensure an accurate representation of the cosmetic industry. She was a prolific writer and had published 5 books and over 300 articles throughout her career. She coined the term “canitics”, which was also the title of one of her published texts. What does the term “canitics” describe?

- A. The relationship between beauty and self-confidence
- B. The art and science of hair dyeing
- C. The science behind skin moisturization
- D. Color shade-matching techniques

Check page 13 for the correct answer!



Martha Schwarzkopf Award for Women in Science

Applications are now open for the Martha Schwarzkopf Award for Women in Science, presented by Henkel! This award is to honor the entrepreneurial and innovative spirit of Martha Schwarzkopf. She is one of the first women in Germany to lead a company, and founder of the Institute for Hair Research which operates R&D labs, hair test salons, and academies of hair around the world.

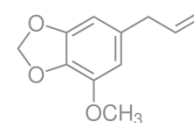
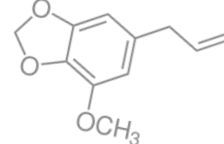
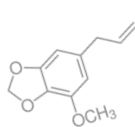
This award is open to female researchers with a doctorate in natural sciences, computer sciences, or medicine who have made contributions to hair research or related fields. Applications will be evaluated by a jury of distinguished female scientists from Henkel’s Consumer Brands R&D division. Applicants’ presented work will be evaluated for relevance in the field of hair research, relevance for consumers and the environment, exemplification of a pioneering spirit, originality, innovation potential, quality of past projects, and overall significance of research to the hair cosmetics sector.

Applications are open from February 11 to June 1, 2024.

For more details on the award and how to apply, visit:

<https://www.henkel-northamerica.com/press/press-releases-and-kits/2024-13-02-henkel-presents-the-martha-schwarzkopf-award-for-women-in-science-1930158>





Upcoming Events

**LISCC Hot Topics Concerning Regulatory Issues in
Leave-On Cosmetics and Sunscreens, a Supplier's
Perspective**

March 20th, 2024

**NYSCC Beauty from Within: Next Level Beauty Care
& Wellness**

March 26th, 2024

CTSCC April Dinner Meeting: Epigenetics & Skin

April 9th, 2024

NYSCC Awards Night: The Future of Beauty

May 1st, 2024

**NYSCC Sunscreen Formulations: Misconceptions &
Future Directions for Innovation**

June 3rd, 2024

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Save the Date




Save the Date
SUPPLIERS' DAY 2024

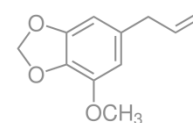
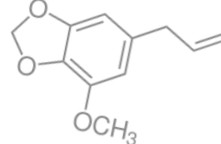
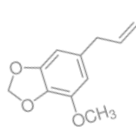
MAY 1-2, 2024

JACOB K. JAVITS CONVENTION CENTER
NEW YORK CITY

SAVE THE DATE

SCC78 TH ANNUAL  SCIENTIFIC MEETING & SHOWCASE

DECEMBER 11-13, 2024. LOS ANGELES, CALIFORNIA



Free Undergraduate Student Membership



SOCIETY OF
COSMETIC
CHEMISTS

Membership in the Society of Cosmetic Chemists is now FREE for undergraduate students!

Member must be a fully matriculated undergraduate student at a recognized college/university. Student membership in the SCC is free throughout a student's undergraduate career.

For more information and to join, visit sconline.org/join

Free On-Demand Webinars

Did you know that SCC members can enjoy free access to many educational on-demand webinars?

Keep up to date with latest important scientific advancements, topics, and trends in the industry with these educational offerings!

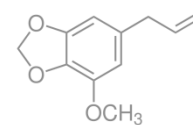
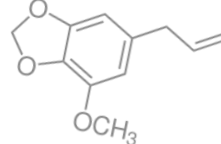
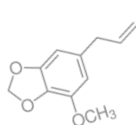
Example topics include natural product formulation, microbiome, professional development, and more!

To browse through current offerings, visit library.sconline.org/webinars

Also check out NYSCC's At Home Live Series 2.0 for other webinar offerings!

Visit nyscc.org/at-home-live-series for more information.





Connect with area professionals through the newsletter!

Do you have an **employment opportunity** in the Connecticut area or beyond?

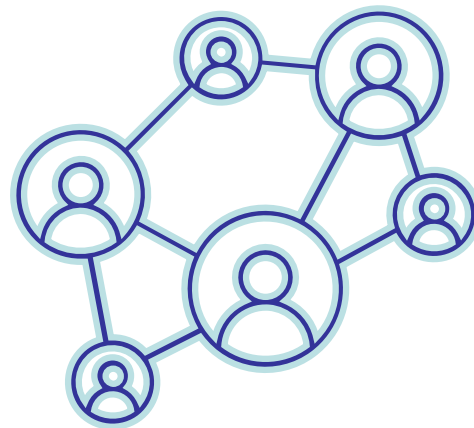
Is there a **technical article**, raw material insight, relevant writing, or other piece you'd like to share with the community?

Have you captured **photos** at CTSCC events?

Please contact Keti Vaso to be featured in the newsletter
(keti.vaso@henkel.com)

Are you interested in supporting CTSCC with a newsletter or dinner meeting **sponsorship**?

Please use the form on our website (ctsc.org/advertising) to inquire.



SOCIETY OF
COSMETIC
CHEMISTS



Photo of Hartford by Ilirjan rrumbullaku (Flickr)

We are a chapter of the National Society of Cosmetic Chemists. The National Organization is dedicated to the advancement of cosmetic science. The Society strives to increase and disseminate scientific information through meetings, continuing education courses and publications. For more information please make sure to visit our website: www.ctsc.org