

American Chemical Society – Kalamazoo Local Section Newsletter

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Fall Leaf Color

John H. Engelmann

Spring has come, given way to summer, and now the fall season is upon us. Leaves which turned so happily green, due to chlorophyll, are now turning brown or red. It is easy to understand why leaves turn green in the spring



John H. Engelmann, Ph.D.
(KACS Chair)

The chlorophyll, which the leaves use to convert carbon dioxide and water into carbohydrates is bright green which accounts for the green color of leaves. In the fall, when chlorophyll is no longer being produced the leaves lose their green color and the background brown or red color shows.

During the growing season chlorophyll is consumed in the production of carbohydrates and accordingly, chlorophyll is produced continuously so that leaves remain green and continue to produce carbohydrates. In the fall, the veins that carry fluids into and out of the leaf are gradually closed off by a layer of cells which form at the base of the leaf. As this layer becomes thicker, the plant provides less water and minerals to the leaf and chlorophyll production decreases and eventually stops.

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KACS website: <http://kalamazooacs.org/>

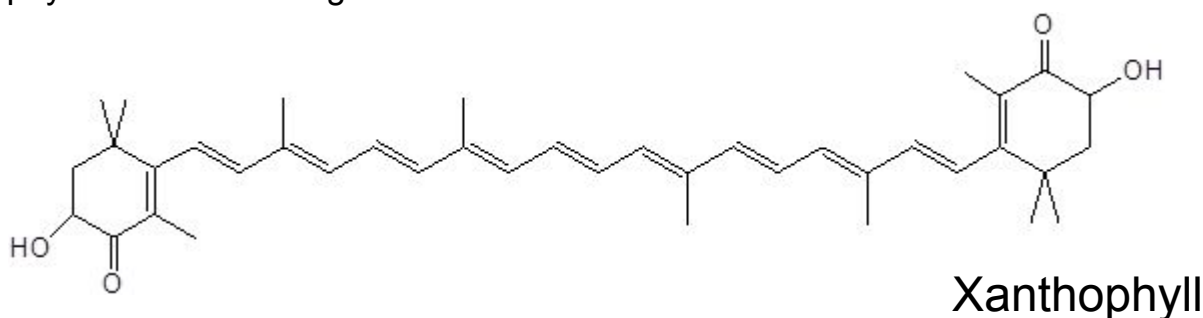
Do you have questions, comments, or would like to contribute to this newsletter?
Send an email to: ACSkzoo@gmail.com

Fall Leaf Color

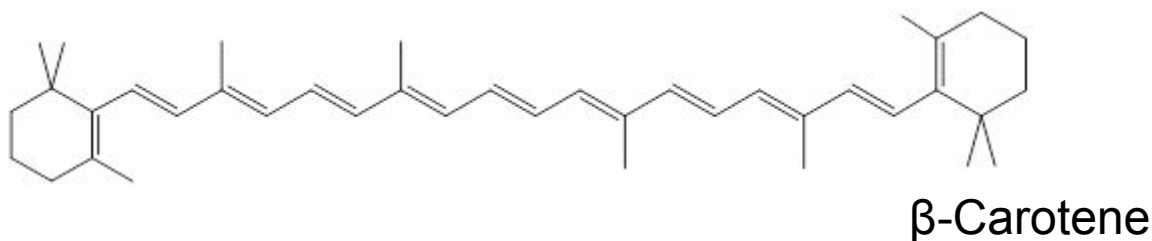
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The chlorophyll and the light harvesting complex of the leaf is degraded into colorless products including amino acids. In annual plants the amino acids are either further degraded or enter the soil. In perennial plants, including trees, the amino acids are stored in the roots, branches, stems, and trunk and are recycled in the spring. The brown and red colors of fall leaves does not come from the degradation products of chlorophyll, but rather from the yellow xanthophylls and orange β -carotene which are present throughout the year, but are concealed by the green chlorophyll. In addition the leaf may synthesize red anthocyanins.

Xanthophyll has the following structure:



β -carotene is similar in structure to Xanthophyll:



Anthocyanins are not present during the growing season but are synthesized by the leaves in fall. Anthocyanins have the following structure:

Where:

R_3 is OH

R_5 is OH or OCH_3

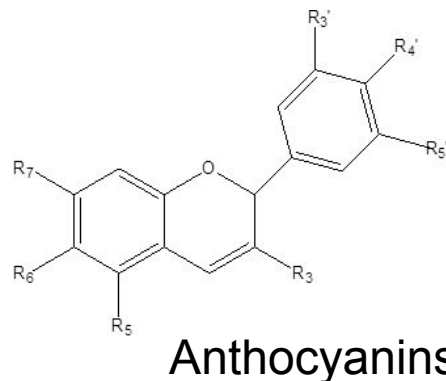
R_6 is H or OH

R_7 is OH or OCH_3

$R_{3'}$ is H, OH, or OCH_3

$R_{4'}$ is OH and

$R_{5'}$ is H, OH, or OCH_3



So when you look at the pretty fall colors on the trees remember it is all about chemistry.

Announcements

GreenUp

By Doug Williams

The 6th Michigan Green Chemistry and Engineering Conference will take place on November 12, 2014 at the Kellogg Center, Michigan State University. This year's theme is "Cultivating Next Generation Solutions." Keynote speakers are Eric Beckman, (Co-director, Mascaro Center for Sustainable Innovation, University of Pittsburgh), Bruce Dale (Professor of Chemical Engineering and Associate Director of Bio-based Technologies, Michigan State University) and Deanna Cullen (chemistry teacher at Whitehall High School). The conference will feature a student poster contest and sessions on pollution prevention, lowering product toxicity, leveraging non-competitive industry partnerships and bio-manufacturing. The event is cohosted by the Michigan Dept. of Environmental Quality and Michigan State University. Major sponsors include Dow Chemical, Ecology Center, Herman Miller, Steelcase and PVS Nolwood Chemicals. Registration is \$100 (\$25 for students). See http://www.michigan.gov/deq/0,4561,7-135-3585_49005-329144--,00.html for more details.

Year of Science – Gull Lake Community Schools

By Doug Williams

The Gull Lake Community Schools Foundation will kick off its 2014-15 Spark Series "Year of Science" with a Science & Engineering Festival on Nov 7-8 at Gull Lake High School (7753 N. 34th St., Richland, MI). The Nov 7 program is for 3000 area middle school students but events on Saturday, Nov 8 are open to the public from 9 am – 4 pm, free of charge. Mind Trekkers, a nationally acclaimed STEM roadshow from Michigan Tech University, will be featured (see <http://mindtrekkers.mtu.edu/>). Our Kalamazoo Section of ACS is a financial sponsor of this event. We encourage you to mark your calendar and check it out.

Join the Executive Committee of your Kalamazoo Local Section

By Lydia Hines

We have an immediate need for candidates for **Kalamazoo Section Chair-Elect** and **Treasurer**.

There is also an urgent need for a **Chair for the KACS Education Committee**, a very important role in our Local Section organization, as Education is a highly valued outreach for us.

Descriptions of the responsibilities for these roles can be found on our website in the section's Operations Manual: www.kalamazooACS.org (look under About Us → [Operations Manual](#))

Upcoming Events

Saturday, October 11

Chemistry Day at the Kalamazoo Valley Museum, October 11, 12-4 pm. This year's theme is "**The Sweet Side of Chemistry – Candy**". Hands-on activities, take-home science fun information for anyone ages 2-102.

Thursday, October 23

We will be having another Science Café, this time on the theme of Art! Mark your calendars for Thursday, October 23 (mole Day), our speaker will be **Mr. James Engelmann**, Exhibition Designer, Cleveland Museum of Art, on "**Art Changes**". Invite any friend or colleague interested in the subject. Location and time: Richmond Center, 2nd Floor, WMU Campus, 6:02 pm.

Wednesday, November 5

Recycle-a-Poster at Bell's Eccentric Café, 5-10 pm. KACS will host **Prof. Timothy F. Jamison** from MIT as the keynote speaker. More details to follow.

Art Science Café

By Lydia Hines

Plan now to attend our Art Science Café on Mole Day, Thursday, October 23, 2014 at 6:02 pm. We will meet at the Richmond Center on the WMU campus on the 2nd floor; there will be refreshments in the lobby.



James Engelmann

Our speaker will be **Mr. James Engelmann**, an Artist, Teacher and Designer. He works as an Exhibition Designer at the Cleveland Museum of Art and teaches Design Principles at Kent State University; he is a son of our current KACS chair and creator of the unique pictures of our Section chair for his column in our newsletters.

The title of his presentation is **Art Changes**. Jim explains: "We live in an age of visual abundance where the tools of art production and distribution are remarkably accessible. Brilliantly colorful and durable imagery, which would have been printmaking feats in the past, are now sent as throw away mailers to our homes. Art innovation, however, is not unique to our time. Material and technical innovations are as old as art itself and they have consistently changed the way images are produced, the nature of those images, and the art experience. In this lecture I will examine some of these developments from the past - from techniques for synthesizing pigments to the development of optics. These innovations and many others have changed what we expect art to be and have gradually made possible the pictorial mania of today".

Miscellaneous

Lab Safety Talk Report

By Brian Eklov

Ken Fivizzani, the retired Manager of Chemical Safety Programs at Odeco Nalco and chair of the ACS Committee on Chemical Safety gave a talk titled, "Who Pays for Safety Failures in the Chemistry Laboratory?" on Sept. 23 at Kalamazoo College. Twenty three members of the section (From K College, WMU, and a variety of industrial groups) attended Dr. Fivizzani's talk, which highlighted a number of recent cases where safety issues were brought to the attention of the broader community and the public. A discussion of the wide-ranging ramifications followed, and continued into the questions after the talk. It is clear that issues of chemical safety have a broad impact - from those who suffer injuries or lose work, to institutions that lose stature, and perhaps even a loss of future funding for research and chemical education.

Joint Great Lakes Central Regional Meeting

By Lydia Hines, co-General Chair

Mark your calendars and offer to assist in the successful implementation of this **ACS Meeting** to be held at the Amway Grand Hotel/DeVos Place in **Grand Rapids** on Wednesday through Saturday, May 27-30, 2015. Participate along with about 1000-1400 other chemist in an affordable venue.

Offer to **chair a symposium** in your area of Chemistry, and/or invite your students and colleagues to **present papers orally or in poster form**, to help with **registration**, with **assisting our visitors** to the area, with **keeping exhibitors happy** with their surroundings, and by **attending technical sessions and social events**, etc.

Dr. Scott Denmark (University of Illinois at Urbana–Champaign), **Dr. Joan Brennecke** (University of Notre Dame) and **Dr. Dustin Mergott** (Eli Lilly) have agreed to be our keynote speakers, and **Dr. Tom Lane** (Past-chair, ACS) will be giving the Award address at the banquet on Friday evening.

Visit our website at www.JGLCRM2015.com for updates on program and other "breaking news"....



Grand Rapids, MI | jglcrm2015.com

Special Event



Chemistry Day at the Museum

Hands-on activities and resources for all ages!

Saturday, Oct. 11 • noon — 4 p.m.

Kalamazoo Valley Museum • 230 N. Rose St., Kalamazoo

Free!

Co-sponsored by the Kalamazoo Section of the American Chemical Society (kalamazooacs.org)

and the Kalamazoo Valley Museum (kalamazoovalleymuseum.org)



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