



In Conjunction with the American Chemical Society
Student Affiliates at the University of Pittsburgh



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November 2, 2007

Some Incredibly Important Dates to Know...

November 16: Deadline for undergraduates to apply for April 2008 graduation in 140 Thackeray Hall

**November 21-
November 25:** Thanksgiving Recess-No Classes!
Have a great Holiday!



November 30: Last day to withdraw from all courses for Fall (2081) through Arts & Sciences Undergraduate Studies.

Happy Thanksgiving! Congratulations!

On Friday, November 16, 2007, the American Chemical Society-Student Affiliates at the University of Pittsburgh will host the annual Fall Term Awards Ceremony. This year's award winners include the following students:

Todd M. Moyle	<i>Freshman Chemistry Achievement Award</i>
Max Osipov	<i>Undergraduate Analytical Award</i>
James P. O'Connor	<i>Silverman Award</i>

Two of our awardees are ACS-SA members and we are very proud to have them in our gang. We extend our sincere congratulations to all of our awardees for a job well done!

Everyone is invited to attend the awards ceremony in Room 132 Chevron Science Center on November 16th. Come join us as we celebrate undergraduate achievements with our awardees!

2007-2008 ACS-SA Officers and Staff

Nora Jameson-Co-President
Max Osipov-Co-President
Brandon Mills-Co-Vice-President
Lauren Smith-Co-Vice-President
Erin Walsh-Secretary
Kevin Romagnoli-Treasurer
Chris Fennig-Outreach Coordinator



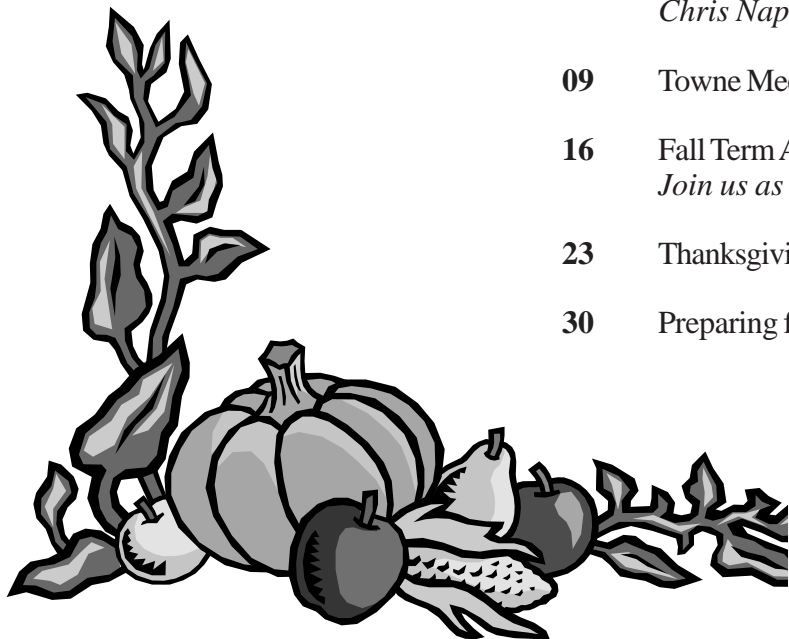
Nathan Mohney-Outreach Coordinator
Katie Hammer-Newsletter Editor
Devin Potts-Newsletter Editor
Lance Mabus-Comics
Leah Fow-Senior Affairs
Jeff McCullough-Senior Affairs

CHEM MAJOR NEWS

Our November Schedule

November

- 02 Automation and the Pharmaceutical Industry
Chris Napolitano, Merck
- 09 Towne Meeting and Fall Term Birthday Celebration
- 16 Fall Term Awards Ceremony
Join us as we celebrate academic excellence!
- 23 Thanksgiving Break--Enjoy!
- 30 Preparing for Saturday Science with Nate and Chris

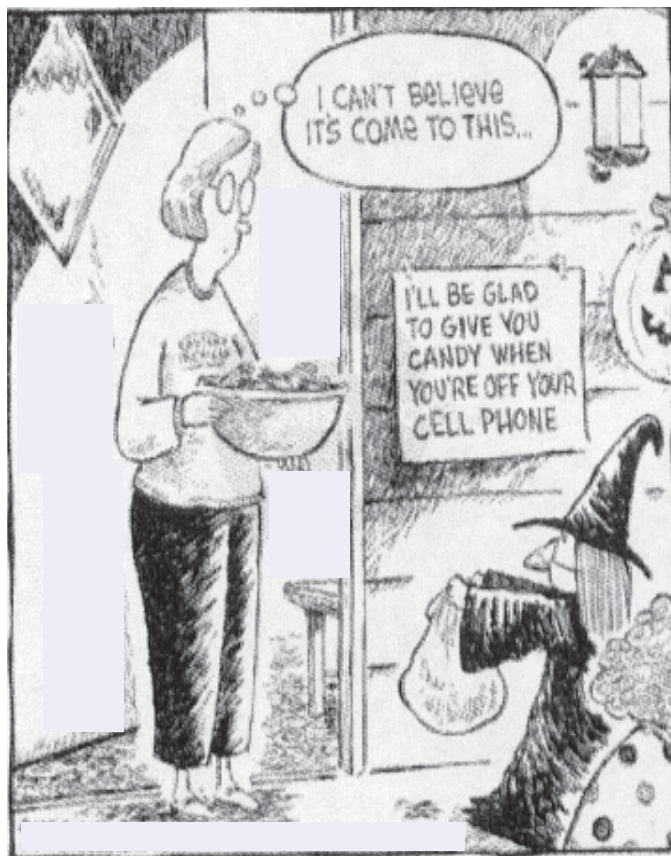


Everyone is welcome to attend our weekly ACS-SA meetings. Every Friday at noon we get together in 132 Chevron Science Center to hear interesting talks, learn more about science and enjoy each other's company. Come join us for all of the above mentioned meetings.

Saturday Science Academy

Looking for something fun to do on December 2nd? Try Saturday Science! It is an opportunity to help ambitious area high school students learn both general and organic chemistry in the lab. With your help, the students get to make crystal gardens, do a simple thin layer chromatography experiment, witness an acid base reaction with dry ice, measure the pH of some favorite soft drinks, and synthesize slime. Volunteers will play the role of a teacher: demonstrating the experiments, helping the students perform them, and finally, answering their questions. Saturday Science is a fun and rewarding volunteer experience in chemistry. So, are you still looking for something fun to do on December 2nd? Join us for the ACS-SA meeting on Friday, December 1, 2006 at NOON in 132 CHVRN to plan for this great day. If you cannot be there on Friday, e-mail Neil, our Outreach Coordinator at nar12@pitt.edu and let him know you're interested in helping out and then join us on Saturday, December 2nd at 9:00 a.m. in the Chevron Lobby.

Comedy Corner...



Molecules of the Month: Zincum Aceticum and Zincum Gluconium

By: Katie Hammer

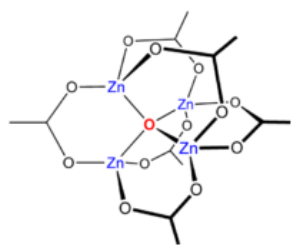


Figure 1: Zinc Gluconate (Wikipedia)

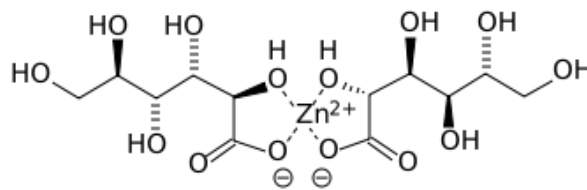


Figure 2: Zinc Acetate (Wikipedia)

Why are these molecules important? Well, they may help to alleviate the symptoms or duration of your next cold. Perhaps you've seen advertisements on television or in magazines for Airborne or Zicam. These medicines claim to treat or prevent symptoms of the common cold (rhinovirus) by taking the medication (in any variety of its forms: tablets to dissolve in water, nasal swabs, nasal sprays, lozenges) at the first sign of your cold symptoms. Zincum aceticum and zincum gluconicum are the two primary active ingredients in these medications. There is a lot of confusion over how they treat colds or whether they effectively treat cold symptoms at all.

Zincum aceticum is just a fancy, pharmaceutical name for the molecule zinc acetate. Its chemical formula is $\text{Zn}(\text{CH}_3\text{CO}_2)_2$. It is a salt and a colorless solid prepared by reacting acetic acid with zinc carbonate or zinc metal. Several connectivities to the metal ion (Zn^{2+}) are available for the hydrates of zinc acetate. Figure 2 is one potential structure with zinc coordinated to four oxygen atoms in a tetrahedral environment. (1)

Zincum gluconicum, or zinc gluconate, is an ionic compound that consists of two moles of gluconate for each mole of zinc. Its chemical formula is $\text{ZnC}_{12}\text{H}_{22}\text{O}_{24}$ and its structure is shown in Figure 2 above. In its pure form, it is a white to off-white powder. Zinc gluconate is found in nature, but can also be industrially manufactured by fermenting glucose. (2)

One proposed mechanism for zinc's ability to treat cold symptoms is that zinc inhibits *in vitro* viral replication of the proteins present in rhinovirus. Another possible theory is that zinc inhibits viral binding with intracellular molecules, therefore preventing entry of the rhinovirus into the cells. Most of the studies on these zinc compounds have found little to no difference in people's cold symptoms with the use of these medications, though the duration of their cold was reduced. (3)

There has been a recent controversy over whether the zinc gluconate in Zicam intranasal gel reduces a person's senses of smell and taste. The company's tests against this claim have found no such results except at very large dosages of the molecule, much higher and for longer periods of time than recommended. (4)

Zincum aceticum and zincum gluconicum may or may not be effective at treating symptoms of the common cold, but even reducing the length of your suffering may be worth the roughly \$10 spent on a box of Zicam or Airborne. You decide.

(1) http://en.wikipedia.org/wiki/Zinc_acetate

(2) http://en.wikipedia.org/wiki/Zinc_gluconate

(3) "Zinc Acetate for the Treatment of the Common Cold" in American Family Physician, Feb 15, 2001 by Richard Sadovsky

(4) <http://www.integratir.com/newsrelease.asp?news=2130981573&ticker=MTXX&lang=EN&title=null>

ACS Member and Not A Chemistry Major??

By: Bradley Pferdehirt

Most people involved in ACS assume that everyone else in the organization is a chemistry major, even George. But there is a small group of us that sneak under the radar and blend in among the rest. We are... non-chemistry majors. Granted I am a chemistry minor and have been involved in ACS for the past three years, but I will graduate in April with a degree in chemical engineering. As a member of ACS, one of the most rewarding experiences that I have participated in has been the Saturday Science Program, which later prompted me to take on the position of freshman engineering peer advisor.

I remember hearing about Saturday Science my sophomore year and thinking how interesting the program sounded. But like most other people, I thought that I could not get involved because I wasn't a "chemistry major." That's when George Bandik gave me the scoop on ACS. He told me that to be an ACS member, all that is required is a love for chemistry. As a chemical engineer, I knew I was in the club. I've always had a love for teaching and helping others, so I jumped at the opportunity to participate in the Saturday Science Program. I thoroughly enjoy watching the eyes of the high school students (and ACS members) light up when they watch the explosive gases demonstration.

The opportunity to get involved with the Saturday Science Program reignited an interest in me to teach others. That is when I signed up to become a peer advisor for F.E.L.T., or the Freshman Engineering Leadership Team. For those of you who are arts and sciences majors and don't know what a FELT is, it most closely resembles the engineering equivalent to freshman studies, but it is a lot more fun and you don't have to do weird projects. As a peer advisor, I am responsible for a group of roughly twenty freshman engineers, who have yet to pick a concentration within engineering. It is my job to aid them in their transition from high school to college and to assist them in picking their department in the spring term. Just so you know, I'm not the only one in ACS who is also a peer advisor. I have learned many skills facilitating this class for the past three years. I've met a lot of great people, formed rewarding relationships and most of all, have had a blast while doing it.

"Oh, I'm sorry. I thought you were one of us [chemistry majors]," George said to me last week. Although George still forgets that I am an engineer and not a chemistry major, he always makes me feel included. I feel at home in the ACS community. We really do have a diverse and amazing group of members. So the next time you are at an ACS meeting or event, look for all of us non-chemistry majors, we are out there.

CHEMISTRY COMEDY...



Imagination...the Best Solution

by: Devin Potts
Co-Editor

Imagine an America where cars ran smoothly, quietly, and were environmentally friendly. Imagine if America ran on home grown fuel, whose only energy input was the light shining on our amber waves of grain...or at least its corn. Quite easily has the American conscience and Congress been romanticized by a simple panacea of corn produced ethanol. Yet one must ask, should our future fuel needs be based on such idyllic imagination and dreaming?

One of the most pressing issues concerning the world centers on finding a renewable fuel source – and fast, especially since many energy experts believe the world's oil supply has peaked or soon will. Compounded by the Iraq war, with all the oil interests hanging delicately overhead, the race for an efficient, renewable fuel source looms as a major obstacle. Corn produced ethanol speeds ahead as the frontrunner, supported by numerous politicians and million dollar government subsidies and tax breaks. Heralded as cheap, renewable, and incredibly green, ethanol garners the public's attention and praise.

Facts do not support such hype, and ethanol is mired in a precarious debate over its impact on the environment, food production, and efficiency. With Congress mandating 36 billion gallons of ethanol production by 2022, America must first carefully consider all the facts and options before a rash judgment is made. Currently, the dispute over ethanol occurs mainly in political and economical spheres, where decisions are based on profits to protect the interests of a few large companies. Additionally, the state of ethanol production faces staggering problems which must be answered before America can champion it as the renewable fuel source of the future.

To understand the problems created by ethanol production, let's consider how ethanol is made from corn. The first step is to grind the corn to free starch molecules, mix with water, and then heat with enzymes. These starch molecules are nothing more than the same carbohydrates that many humans consider their food staple. The added enzymes, derived from a biological source, are used to breakdown the starch into simpler sugars. Then, in a fermentation tank, these sugars are converted into alcohol by yeast. Finally, the ethanol is denatured using chemical additives, which makes it undrinkable while preserving its structure. However, this fairly routine production process raises some complicated questions on a large scale level.

Perhaps the most salient argument for ethanol production centers on its environmentally friendly and renewable character. Current fossil fuels release carbon dioxide into the atmosphere from locked hydrocarbons buried within the earth, creating an imbalance in the carbon scale. Hypothetically, ethanol is described as carbon neutral, since its only carbon source is carbon dioxide captured from the atmosphere by plants. However, the process includes so many other energy inputs, such as the gasoline to run farming equipment and the energy to run the production plants. One proposed idea involves increasing the number of nuclear power plants, which lowers dependency on coal or natural gas plants, to power the production sites for ethanol.

Already, the damaging affects of growing corn strains the environment. The large amounts of herbicide and nitrogen fertilizer (produced using natural gas) required to grow corn create more soil erosion than any other US crop while its run off into the Mississippi River creates a vast dead zone in the Gulf of Mexico every summer. Although growing corn may seem renewable, the search for arable land is exhaustive. This indirectly leads to increased deforestation of the Rain Forest because South American farmers hope to gain money by growing the corn to cover for our ethanol production.

The whole notion of renewable energy must also be put into perspective. Only one growing season exists in a year, meaning only one crop of corn per year. What happens during times of drought when corn production is affected? Agriculture is not a perfect science, and nature affects production. If our economy centers on ethanol fuel, then a reduced supply could create expensive prices at the pump.

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The corn that America uses for ethanol replaces an edible crop, thus lessening food security and driving prices up not only in America, but throughout the world. Obviously, decreased corn for food supplies causes the price of corn to rise, doubling within recent years. Everything depending on corn suffers, inducing a rippling effect which drives the price of livestock feed higher. Consequently, the price of beef, pork, and poultry also increase. Considering that the United States accounts for over half of the world's total export of corn, our actions and ethanol production negatively affect the starving world.

One defense in using corn for ethanol centers on the idea that food production is at an all time high (where there exists roughly 1.4 times more food than necessary to feed the world), and starving people are victims of economic principles. Call it capitalism, call it free market competition, inequality definitely exists. However, can America justify using corn as a fuel source without considering the very realistic threat of furthering starvation throughout the world? The facts are scary: Twenty five thousand people die of hunger everyday, the cost of a bushel of corn cost \$4.38 in March 2007 while 2.7 billion people live on less than the equivalent of \$2 a day, and the world's poorest people spend 50-80% their entire household income on food. An impossible situation for undeveloped countries to feed their hungry worsens since most of the 82 poorest countries with food deficits are net oil importers. We can not ignore the global ramifications of ethanol production.

One visible example can be seen in nearby Mexico where 107 million people living in poverty rely on tortilla, derived from corn, as their main source of calories. From US corn prices rising from \$2.40 to \$4.20 per bushel, the cost of tortillas grew by 60% over a several month span. Even in a developed country such as Mexico, the price surge caused fear and anxiety among the public, especially the poor, which led to several riots. Eventually, the Mexican government set a price ceiling on corn. Extrapolating this affect into Sub-Saharan Africa, where no stable economic or political control exists, the result could cripple a country and starve millions.

The efficiency of ethanol as a fuel source remains under intense speculation. One must question whether or not ethanol can realistically sustain our fuel needs gallon for gallon while remaining effective. The energy density of ethanol is one third the amount of gasoline, meaning you have burn a larger volume of ethanol to produce the same power as gasoline. To do this, more ethanol is required, and more carbon dioxide ultimately is released. If our entire corn and soybean crop produced ethanol, only 12% of our gasoline and 6% of our diesel needs would be supported which would further strain food supplies. Again, considering the carbon balance argument, most scientists agree that the current methods of production burns more carbon emitting fuel than is replaced, suggesting a losing battle. Additionally, the present ratio of output versus input energy for ethanol hovers around 1.3:1 while gasoline is 5:1.

Even if ethanol production could cover our fuel requirements, transporting it throughout the country is yet another concern. When ethanol is produced, around 95% is pure, with the rest being water. A proposed distribution of ethanol through existing natural gas or petroleum lines would fail since water can destroy these metal pipelines. Construction of new, ethanol pipelines could cost as much as \$2 million dollars per mile. No party, including current companies owning ethanol production plants or the government, favors such a hefty fee.

More importantly than the current ethanol situation, with its multifaceted sides and raging debates, is the state of America concerning its fuel consumption. The existing technology and logistics involving ethanol production proves insufficient, but America should not condemn its future so easily. Inevitably, a renewable fuel source must be found. The importance lies in considering all facts, creating a discourse between the arguing sides, and finding the best possible solution. After all, imagination certainly is renewable, and, coupled with effort, sometimes that is the best solution.

Chem News Quiz

Do you think you have what it takes to pass the Chem News Quiz? Bring your answer to the following question into the chemistry office to find out:

Are you planning on attending classes the two days before Thanksgiving break?

- a. I'm a freshman. There's no way I'll miss class.
- b. I'm a sophomore. I'll go to the Monday classes.
- c. I'm a junior. You'll see me if the class has a test.
- d. I'm a senior. Depends on how much the test is worth.
- e. I'm on my victory lap. We have a test in that class?

This is a tough one, and to make it worth your while, three lucky winners will be selected to get free pizza at the next ACS meeting that has free pizza. Submit your answer with your email address and we'll let you know when you can have Papa John's on us.



$$\hat{H}\Psi = E\Psi .$$

Happy Thanksgiving Pitt



Happy Thanksgiving!