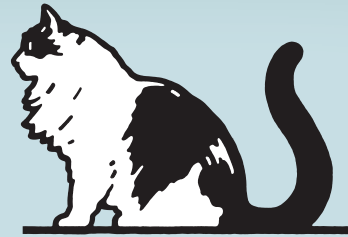


EMPYREAL® 75 UPDATE



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December 2011

Seven billion and counting

Eric Bell, Product Line Manager

It was estimated that on October 31 the earth's population reached 7 billion people. Officially, Danica May Camacho of the Philippines received the symbolic title of the 7 billionth person on earth. A quick scan of the internet revealed others claiming this honor were a child in the UK, India, the U.S. and Russia and, I'm sure, a host of other nations. Statistical information shows it took 125 years to grow the earth's population from 1 billion to 2 billion, but it's only estimated to take us 14 more years to get to 8 billion, and we expect world population to exceed 9 billion by 2050.

Don Shandera is addressing the topic of sustainability in his article this month. The population numbers here point out why this is important. Some of us (knock on wood) will still be around in 2050, and I'm sure what we'll see is an amazing journey of innovation that has provided us the tools to take care of the nutritional needs of the world. I'm sure we'll still have social issues like poverty and world hunger, but I'm convinced that we can, as

a society, tackle the hard issues needed to feed the world. Better utilization of crop land, increasing yields, less waste, shifting diets and sustainable agricultural practices will help. It's hard to say where the sustainable resource limit really is to support human population, but as the world's population grows it's an issue that we will continue to wrestle with.

On a different topic, we continue to make progress toward expanding our business with the addition of a second manufacturing location. We are currently finishing up the last of the engineering and still on track for production of Empyreal 75 at our Dayton, Ohio, facility early in 2012. Dayton will provide us with 60,000 tons of additional production capacity annually, increased flexibility and better access to our current truck customer base in the Eastern U.S. It also provides us direct access to another Class I railroad, the CSX, giving us some new options and flexibility in our supply chain.

Monitoring mycotoxins

Carrie Paper, Quality Assurance Specialist

As we begin processing the new crop of corn, we monitor any changes from the previous year very carefully. This year the main focus has been on mycotoxins. With such varied and extreme growing conditions in 2011— from hail storms and flooding along the Missouri River to droughts across the Southern U.S. — much of the corn experienced high stress. These conditions can lead to the growth of molds that produce mycotoxins. Generally, the growing conditions of a crop year lead to the prevalence of one type of mycotoxin, but due to the range of conditions in this growing year, the nation has seen elevated levels of aflatoxin, DON and fumonisin.

To ensure that our products remain in spec for mycotoxins, Cargill monitors all incoming corn for aflatoxin using a black light, which will make the corn glow if the mold that causes aflatoxin is present. Any corn that is positive in the black light is held and

tested for aflatoxin before being accepted or rejected. In addition, this year, Cargill is testing the DON, fumonisin and zearalenone of incoming corn on a weekly basis. This allows us to evaluate our risk and take the appropriate steps to ensure that all of our products meet our customers' specifications.

In addition to our monitoring program, the process of making Empyreal reduces the risk of aflatoxin and fumonisin — the two main mycotoxins that could be found in corn protein. That's why we also make sure to test both of these mycotoxins on every load of Empyreal we sell prior to it leaving our site and include our results on our Certificate of Analysis. As we wrap up the holiday season, we continue to give the gift of peace of mind with the knowledge that your product will be safe — "Every shipment, every time."

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Market Commentary

Lee Bohling, Sales Manager Protein Ingredients

As I write this article, the flood waters have receded, and the Missouri River is back within its banks. The flooding that started in early June and ended in late September has caused over \$1 billion in destruction and lost revenue from Montana to Missouri. The landscape of the farm ground has changed dramatically and will have more costs associated with it down the road. Most of the fields have a desert-type landscape as fine river sand has been spread across the fields. What you see is generally 2-12 inches of sand with some areas having sand drifts 8-10 feet high and 300 feet long. Other areas in the field have 15-foot deep ravines that are 300 feet across and 1,200 feet long.

Needless to say, some of this ground will be too expensive to reclaim as costs could be as high as \$2,000 per acre in the worst areas, according to some heavy equipment operators. Reclaiming the ground will require leveling, grading and some form of tillage. If the sand is only 2 inches deep, most farmers will use tillage to incorporate the sand into the top soil to get a better soil quality. In areas where the sand is in the 2-8 inch depth, aggressive tillage, such as deep plowing to turn over the sand and bring up the better top soil, will be required. This is usually done at a 15- to 24-inch depth and takes a lot of time, horsepower and money. Greater than an 8-inch depth of sand will require a bull dozer to come in, push the sand off and use one of the previously mentioned tillage methods.

Agronomists say that the flooded ground has been deprived of oxygen and has lost the microbial activity necessary to stimulate crop growth and nutrient/fertilizer utilization. The soil structure has been destroyed by the continuous exposure to water and wave action over the last three months, so tillage and weathering will be required to help bring the soil back into production faster. Tillage, along with increasing the organic matter, will increase the microbial activity. Applying N-P-K fertilizer also will help speed up the process. Just how long it will take nobody knows, but most of this ground will not come back into full production for 2-3 years. Without any tillage and rework it could take 3-5 years

for the soil to start producing at a reduced capacity compared to what it had yielded previously.

The emotions in the grains have been very bearish for the last two months as outside market influences, such as the U.S. economy, the strength/weakness of the dollar, oil prices, the European economies (Greece, Italy, etc.) has everyone nervous and scared. We have seen the funds exit the grain markets as the trade waits for new information and direction. I have been in this business for 25 years and have never seen the kind of volatility and uncertainty that we do



June through September flooding caused more than \$1 billion in destruction and lost revenue from Montana to Missouri, and the landscape of the farm ground has changed dramatically.

today. Corn remains range bound between \$5.75-\$6.60 and Soybean meal between \$280-\$330. I do not expect much out of this market until we get the final USDA report in January. From there we will take our direction as we still have tight carryouts in the grains and will need big acres in corn, beans and wheat to help get us out of this scenario of tight supply. Currently, the market is watching the dry conditions in South America as we have very little margin of error for next year when it comes to crop size. If futures would try to rally, keep in mind that price rationing kicks in around \$7.25 corn futures and \$350 SBM from what we witnessed this summer. I do not look for this to happen unless we get into a weather market here in the U.S., which won't be until May.



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Shipping agricultural exports

Zach Longhini, Export Sales Manager – Protein Ingredients

On a daily basis, headlines have been discussing the United States' trade deficit. Over the years the trade deficit has grown at a rapid pace. In 1960 the U.S. had an import/export surplus of \$3.5 billion; 1971 was the first year that we had a deficit and, with exception of 1973, we've had one ever since. The 2010 import/export deficit was over \$500 billion. The most noteworthy approach to address this issue has been President Obama's creation of the Export Promotion Cabinet, tasked with the ambitious goal of doubling U.S. exports within five years.

Agricultural products have historically played a key role among U.S. exports. Although agriculture only accounts for 1.2% of overall GDP, agricultural products account for 9.2% of the value of all exported U.S. products. Compared to industrialized, manufactured and other goods, agricultural products are of relatively low value, high volume and low margin. As a result, the agricultural product export sector has increasingly focused on supply-chain efficiencies and shipping products in new and novel ways.

Historically, most agricultural products have been shipped via bulk vessels, but in recent years there has been a paradigm shift – especially in the higher value segments of the agricultural products market. The intermodal container was first introduced in its current form in 1955 and has revolutionized the way in which products are handled and shipped. In order to make the shipment of products via containers cost-competitive to bulk shipments, agricultural product shippers take advantage of backhaul opportunities. Given the high volume of finished products shipped into the U.S. from Asia and other geographies and the need to relocate those containers back to those origins for future shipments, U.S. exporters are able to obtain very competitive container freight rates. However, those rates fluctuate along with the numbers of imported containers so container pricing and availability can become expensive and difficult in tough economic times. The variability in transportation costs associated with this type of backhaul model disproportionately affects higher value or value-added agricultural commodities as these are the products that are more often shipped

via intermodal containers. As a result, the ability to ship more concentrated products, such as Empyreal 75 with a minimum of 75% protein on an as-is basis, helps to protect export customers from rate increases by making more efficient use of space in container and bulk shipments.

The other problem with shipping agricultural products in intermodal containers is the relative inability to control the previous product shipped in the container. Previous products could be anything from batteries, to toys, to motor oil. Therefore, the ability to protect a product that has been loaded into a container from



To protect a product that has been loaded into a container from being contaminated by previously loaded products, the Empyreal team performs an inspection and cleanout of all empty containers to be loaded and utilizes container liners into which Empyreal 75 is loaded so the product is never in direct contact with the container itself.

being contaminated by previously loaded products is paramount. We take two approaches to this issue. The first is prevention, by performing an inspection and cleanout of all empty containers to be loaded. The second is through the utilization of container liners into which Empyreal 75 is loaded so that the product is never in direct contact with the container itself.

As agricultural exports help to lead the way to economic recovery in the U.S. and as the industry searches for better and more efficient ways to ship products, you can be assured that the Empyreal team will be on the cutting edge of new developments, ensuring that we do not compromise the quality and consistency that you've come to expect from our products.

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The wonders of Corn

Betty McPhee, Director of Sales

I picked up an interesting and unusual book the other day and thought it would be a good topic for our newsletter. "The Omnivore's Dilemma," about corn usage in the U.S., may not be fascinating, but the information is surprising and interesting. I was actually taken aback by some of the facts and figures on U.S. corn consumption.

pork we eat come courtesy of corn, and when I eat a piece of chocolate its probably made with high fructose corn syrup. Yet I was surprised to read the statistics in the book, such as 60% of corn grown in the U.S. is fed to livestock. The average person, while consuming their four pounds of corn products a day, might wonder why this information is important. Why should we care

I, like most Americans, take for granted how things are made, where they come from and what happens if a manufacturer does not have an ingredient available to make one of the products we use on a daily basis. With that in mind, I did a search to find a list of products that either use corn in the manufacturing process or in the recipe. I was pleasantly surprised with what came up:

Adhesives (glues, pastes, mucilages, gums, etc.)	Chewing gum	Flour and grits	Paper plates and cups
Aluminum	Chocolate products	Frozen foods	Peanut butter
Antibiotics (penicillin)	Coatings on wood, paper & metal	Fructose	Pharmaceuticals - The life line of hospitals
Aspirin	Color carrier in paper and textile, printing	Fuel ethanol	Potato chips
Automobiles (everything on wheels)	Corn chips	Gypsum wallboard	Rugs, carpets
Cylinder heads	Corn meal	Ink for stamping prices in stores	Salad dressings
Ethanol - fuel and windshield washer fluid	Cosmetics	Instant coffee and tea	Shaving cream and lotions
Spark plugs	C.M.A. (calcium magnesium acetate)	Insulation, fiberglass	Shoe polish
Synthetic rubber finishes	Crayon and chalk	Jams, jellies and preserves	Soaps and cleaners
Tires	Degradable plastics	Ketchup	Soft drinks
Baby food	Dessert powders	Latex paint	Starch and glucose (over 40 types)
Batteries, dry cell	Dextrose (intravenous solutions, icing sugar)	Leather tanning	Syrup
Beer	Disposable diapers	Licorice	Tacos, tortillas
Breakfast cereals	Dog food	Livestock feed	Textiles
Candies	Dyes	Malted products	Toothpaste
Canned vegetables	Edible oil	Margarine	Wallpaper
Cat food	Ethyl and butyl alcohol	Mayonnaise	Wheat bread
Carbonated beverages	Explosives - firecrackers	Mustard, prepared	Whiskey
Cheese spreads	Finished leather	Paper board, (corrugating, laminating, cardboard)	Yogurts
		Paper manufacturing	

The book points out that the U.S. is the number one consumer of corn per capita in the world, and according to the United States Department of Agriculture, Americans consume 1,540 lbs of corn per capita a year. It's amazing to think that the average person in the U.S. consumes more than four pounds of corn products each day. The book also mentions a new test that uses a hair or tissue sample to see what percentage of the food you eat originated from corn. I don't quite understand the process, but it's amazing to know we have the technology to perform such a test.

As a farm girl, I understand things like the beef, chicken and

about one ingredient such as corn? After putting together this list and looking through my house and seeing how many items I use, I was very pleased and again surprised.

When I read this book and thought about putting the information together, my intent wasn't to start a corn lover's group, rather to share a few ideas, opinions or possibly provoke a few thoughts for the next time you're driving down the road and see a field of corn and how that one plant makes such an difference in our daily lives.

Environmental stewardship in a rapidly changing world

Dr. Don Shandera, Research Manager Feed Ingredients

The term sustainability gets thrown around loosely on several hot topics from energy conservation to renewable supplies. Typically, the term is defined as being economically viable, environmentally sound and socially responsible. A majority of the term's use applies to the more proper phrase of environmental stewardship, which includes topics such as lowering greenhouse gases, minimizing energy usage, recycling and other factors focused on the environment. Most of these applications of the term can be distilled to what footprint we leave on the world and the competition of finite resources. We are able to control the size of our footprint, making direct choices and taking advantages of opportunities in efficiencies. Good stewardship opportunities for manufacturers include choosing raw materials with a low net footprint, optimizing our processes and leveraging logistical opportunities. Educating consumers about our choices enables them to embrace our efforts.

The world's population tallied 7 billion as of October. The prediction for the year 2050 is an additional 2 billion people around the globe that will be competing for water, food, energy and a space to live. Great strides have been made over the past few decades toward increasing productivity of our food and feed systems, but the limitations of future capabilities are and will be on the forefront of sustainability and stewardship movement. Our roles as producers, manufacturers and consumers will be scrutinized more closely as the pressures of competition for existing resources continue. Conscientious choices in resource application also will be a hot topic for the foreseeable future. The challenge to move from luxuries and inefficiencies (that we may take for granted or not yet recognize) will become a larger driver in how we live on a daily basis, operate our businesses and market our products.

Developing nations are, and will be, demanding more quality protein. By 2050, the Food and Agriculture Organization of the United Nations predicts that the demand for global protein will increase by 70% or more. As a strain is put on limited land, water and energy, a shift in meeting that demand is very probable. Types and amounts of animal proteins are likely to become more finite as there is likely to be a shift to the source of protein supply, grains and oilseeds, and away from animal proteins that have inherent inefficiencies in converting the plant-based protein to meat and milk. Some examples that

exemplify this include the feed conversion ratios (the mass of feed to produce a mass of meat) for fish at 1.2-1.8, chicken at 2, pork at 3 and lamb/cattle at about 7-9, depending on feeding methods. Although grain and oilseeds production efficiencies/yields have increased some 150% per unit of land in the past three decades, this has occurred primarily through optimizing the easier production limitations of varieties, fertilizer intensity, drought resistance, disease resistance and pest control. As the global infrastructure becomes more networked and complex, there will be additional criticalities in controlling upsets to the balance and meeting demand.



Corn is a productive crop, unparalleled in the amount of quality protein, starch and oil that can be produced per unit of land.

The pet food industry has been very reliant on a good supply of quality protein, primarily from animal meals. The global production of animal meals is estimated to be about 13 million metric tons, with the United States, South America and Europe producing about 4 million metric tons each, respectively. As the world population grows and develops, the estimated 70% growth in protein demand will compete for these supplies. Aquaculture growth will be on the forefront of meeting that demand, at least partially driven by the efficiency of feed conversion ratios. The industry is already under pressure to reduce fishmeal as a feed ingredient while meeting projections to double or even possibly quadruple growth in the coming decade. This inherently creates increased competition among

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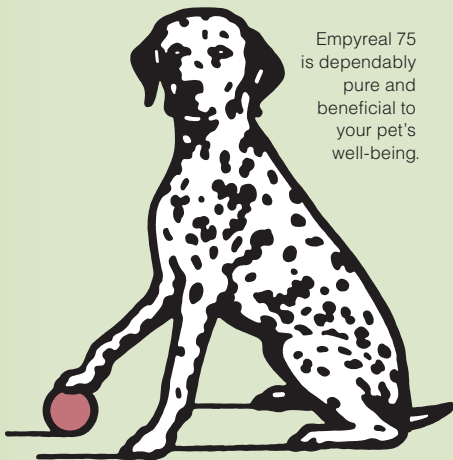
aquafeed, terrestrial animal feed and pet food applications of protein. As meat and animal meals are leveraged further in supply and demand, ultimately and immediately, the demand for quality vegetable proteins is rapidly increasing.

Today is a good time to develop a strategy on how your company can meet the demands of a rapidly growing and developing world.

Quality vegetable-based proteins, such as Empyreal 75, have a good opportunity to support manufacturers' and consumers' desires and needs to be more sustainable in a rapidly changing world. Corn is a very productive crop that is unparalleled in the amount of quality protein, starch and oil that can be produced per unit of land. Using quality vegetable

proteins from a productive crop has a multi-fold reduction of net energy and resources input, rather than using animal-based protein, thus giving your products the opportunity to be much more environmentally responsible than using meat, milk or egg protein sources. Leveraging the technology of manufacturers that focuses on meeting your needs will allow good substitutions in your formulated diets to meet an animal's nutritional, well being and gut health needs. Quality proteins such as Empyreal 75 are successfully being used in animal diets ranging from salmon and tuna for dogs and cats to tradition applications such as chicken and pork.

Today is a good time to develop a strategy on how your company can meet the demands of a rapidly growing and developing world. Integration of a sustainability and environmental stewardship focus in that strategy should include use of raw materials that have a lower overall footprint and are more renewable. Vegetable proteins are a marketing opportunity that supports that strategy.



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Going.



Going.



Gone.



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