NACHURS® Field Notes
NOTES FROM THE AGRONOMY TEAM

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PROVIDE MAXIMUM NUTRIENT UPTAKE WITH POTASSIUM ACETATE

By Wayne Becker,
Southern Region Sales Agronomist- Texas

Potassium acetate may very well be one of NACHURS fertilizer's best kept secrets. This form of potassium is credited for being an excellent deicer product, especially for airport runways. It is much less corrosive to equipment and will not cause issues to soils from chloride salts, which are found in most of the alternatives. The compound has been used for various other purposes since the late 1700's, the turf and ornamental industry has been using it as a fertilizer source for some time now; so why hasn't there been more interest in this compound for use as an agronomic potassium fertilizer before now?

Currently, NACHURS uses several other quality potassium sources in their NPK fertilizers: potassium carbonate and potassium phosphate. These are excellent choices because of seed safety. However, potassium acetate is also a very seed safe and a low salt fertilizer. Currently, NACHURS sells potassium acetate as NACHURS KA-24 (0-0-24), NACHURS K19-S (0-0-19 + 6%S & 1%Zn) and uses it in NACHURS HKW6 (2-6-16). NACHURS HKW6 is made with two potassium sources: potassium acetate and potassium hydroxide. This formulation is so safe it allows for in-furrow, direct seed placement on soybeans - provided the row spacing, CEC, and soil organic matter are adequate. Other initial indications of seed safety done in greenhouse experiments are such that seed safety from this source of potassium is second to none!

Not only does the seed safety seem to be superior but indications are that the efficiency may be also. A 1986 research study done at Texas A&M University that was reported in the Journal of Plant Nutrition, compared sources of potassium fertilizer for foliar efficiency on soybeans. The results clearly indicated that potassium acetate was superior for percentage of K absorbed when compared to other sources. Efficiency ratios were such that potassium acetate was 1:1; potassium bicarbonate was 1.2:1; potassium thiosulfate was 5:1 and potassium chloride was 11.5:1. Meaning, 5 times more potassium thiosulfate had to be used to get the same amount of K into the plant.

Chemically, potassium acetate has a low molecular weight which would make it more easily moved into the plant. Acetates resemble organic acids which help to release nutrients which may otherwise be unavailable. These characteristics help it to preform superbly as a fertilizer.

Evidence from the field reveals excellent results from using NACHURS HKW6 in-furrow on soybeans and a similar potassium acetate based product in-furrow (using a Y-splitter) with cotton. Cotton field trials conducted this summer in Moultrie, GA by NACHURS proved the highest yields came from using 2 gallons in-furrow. All indications are that NACHURS potassium acetate products are excellent foliar and in-furrow products. Producers may want to consider adding this source of potassium to their arsenal as they prepare to make fertilizer applications to their next crop!

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FERTILITY PLANNING NOW FOR 2014

By John Holdsworth,
Northern Region Sales Agronomist- Wisconsin

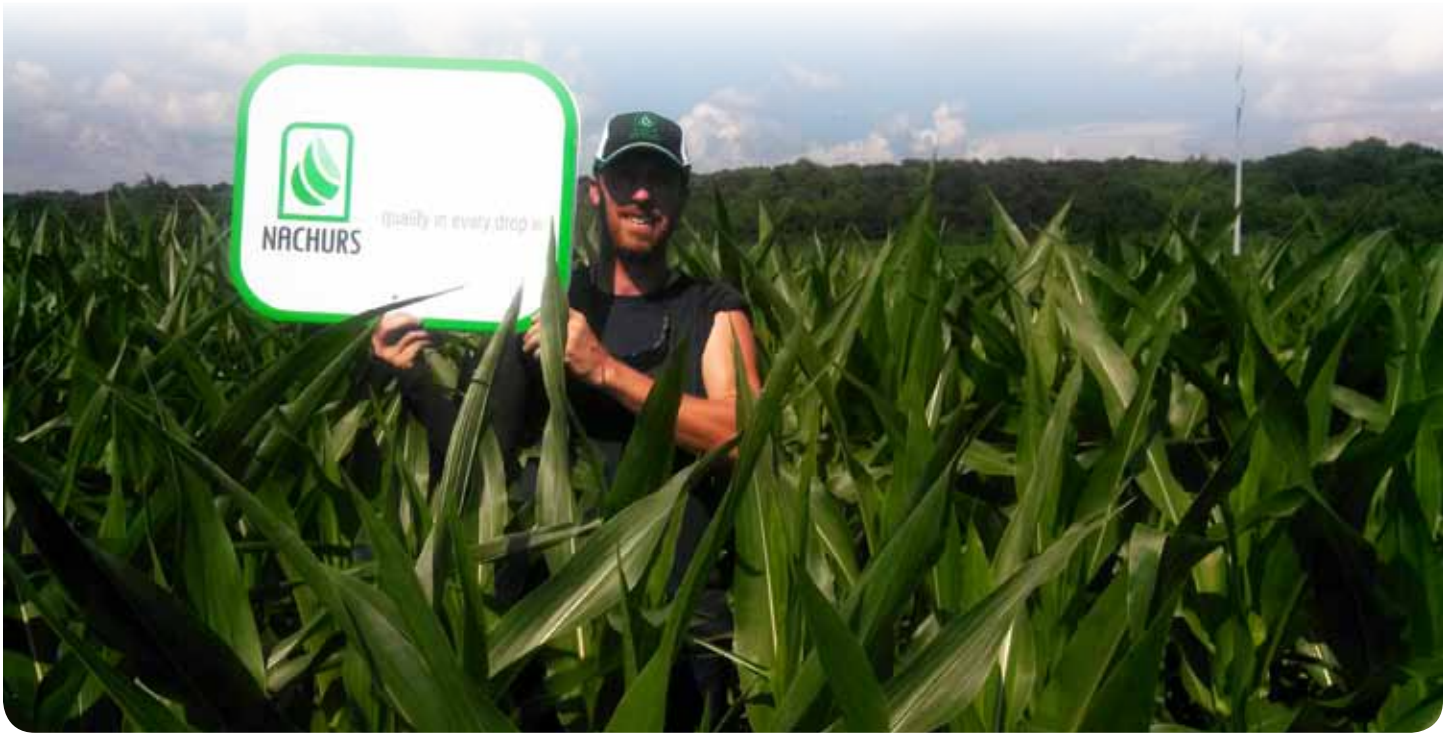
With harvest completed, it's a good time to be thinking of replenishing your field's N-P-K needs for 2014. Having a proactive approach to your fertility program will likely benefit you in the end and we all know this is one of the most important investments made in a crop season. We all know that fall is an important time to be assessing soil fertility and applying soil amendments that will be needed. Soil fertility is one of the foundations for high yield potential and is necessary for maintaining plant health and vigor. Post-harvest is a good time for soil testing and fertilizing for the immobile nutrients phosphorus (P) and potassium (K), calcium (CA), and magnesium (Mg) in soils as well as soil pH. Maintaining appropriate pH levels, as well as adequate P and K are keys to help maximize yield potential for the next growing season.

With knowledge gained from soil tests, you can make more informed crop input decisions to minimize risk and maximize profitability. Nutrient uptake by crop and replenishment by crop residues should be considered when determining the amount of nutrients to apply in the fall. Different crops remove nutrients from the soil at different rates depending on the weather during the growing season, soil conditions, yield, fertilizer rates & differences used. As crop residue decomposes, some nutrients will be returned back to the soil.

Fertility being important for higher yields, a solid foundation of your fertility program should start with NACHURS Liquid Starter Fertilizer. Research has often shown that the primary benefits from the use of a starter fertilizer are increased early crop growth and uniform emergence, especially in conservation-tillage systems (cool-wet soils), sandy low organic soils, on high pH soils to name a few but has benefits in all tillage practices.

Taking a pro-active approach early with NACHURS starter fertilizer is very important to help set the maximum yield potential of your crop. As your seed germinates it will use the nutrients in the seed but start to look for additional sources of nutrients for early season growth. The availability of a highly soluble, high orthophosphate starter for additional nutrients at this stage can have a major impact on achieving your crop's genetic potential.

With today's high or low commodity prices, every bushel of grain in the bin improves the bottom line. Regardless of your tillage system, this simple but effective practice of using NACHURS High-Quality starter fertilizer placed at the right place, right source, right rate and right time can help you get to the next yield level. For additional information please contact your local NACHURS Agronomy Team member.



FORGOTTEN PLANT NUTRIENTS; DON'T BE LEFT BEHIND!

By Tommy Roach,
Specialty Products Manager- Texas

All plants, whether it be corn, soybeans, wheat, cotton, cranberries, canola, or even a household plant such as an ivy or fern, require nutrients for proper growth and development. About 90-95% of plant dry matter is composed of carbon, hydrogen, and/or oxygen. The remaining 5-10% is obtained from the soil and/or from fertilizer supplied by the farmer or homeowner. We all understand the importance of Primary Nutrients (nitrogen, phosphorus, potassium) in achieving production goals that are set each year. However, we often forget the importance of Secondary Nutrients (calcium, magnesium, sulfur) and Micronutrients (boron, copper, iron, manganese, molybdenum, zinc) in the overall process of plant growth and development. Although these nutrients are required in much smaller quantities, they are essential for completion of many physiological cycles and processes within the plant. In many cases, plants cannot fully utilize primary nutrients without adequate supplies of secondary and/or micronutrients supplied at the appropriate time. Below is a listing of functions these nutrients provide within the plant.

Nutrient	Function in the plant
Calcium (Ca)	• Necessary for the proper functioning of growing points • Forms compounds which strengthen cell walls • Aids in cell division and elongation • Neutralizes organic acids • Regulates protein synthesis and slows the aging process
Magnesium (Mg)	• Only mineral component of the chlorophyll molecule • Aids in formation of sugars and starches • Plays important part in phosphorus translocation • Aids in proper functioning of plant enzymes
Sulfur (S)	• Mirrors phosphorus requirements in plants • Primary constituent of many amino acids • Aids in activation of enzymes and vitamins • Needed for chlorophyll formation • Used in nitrogen stabilization • Nodulation in legume crops
Boron (B)	• Required for cell division • Plays important part in calcium translocation • Protein synthesis and hormone formation • Carbohydrate metabolism • Pollen viability • Flower formation and fruit set
Copper (Cu)	• Required for chlorophyll production • Aids in photosynthesis and enzyme formation • Involved in oxidation-reduction reactions • Regulates water movement in cells • Needed for seed production
Iron (Fe)	• Necessary for the formation of chlorophyll • Involved in oxidation process that releases energy from starches • Protein formation • Aids conversion of nitrate to ammonia in cells • Plant respiration
Manganese (Mn)	• Essential for chlorophyll production and photosynthesis • Aids in carbohydrate metabolism • Oxidation-reduction reactions • Enzyme activation • Combines with iron, copper, and zinc in hormone balance
Molybdenum (Mo)	• Co-factor in nitrate reductase enzyme • Essential for rhizobia in nitrogen fixation process • Aids in nitrate utilization • Involved in phosphate and iron metabolism
Zinc (Zn)	• Necessary in chlorophyll formation • Involved in enzyme activation and production • Required in hormone (auxin) and nucleic acid synthesis • Aids in uptake and water use efficiency

Most of the Secondary and Micronutrients can be provided to plants in a chelated form with the exception of sulfur, boron, and molybdenum. Chelation allows nutrients to remain available to the plant even if environmental conditions are less than optimal. There are many forms of chelates that can be used, ranging from EDTA, citric acid, amino acids, and organic acids just to name a few. In general, EDTA chelates are by far the most stable and are the only form that can be safely added to true, clear NPK solutions (i.e. NACHURS orthophosphates). NACHURS MicroBolt Micronutrients (9% Zn, 6% Mn, 4.5% Fe, 3% Ca, 2.5% Mg, 7.5% Cu, 10% Boron) offer a wide range of uses under a vast array of growing environments. Ask for NACHURS MicroBolt Micronutrients today from your local NACHURS dealer so YOU don't get left behind!

ORTHOPHOSPHATE VERSUS POLYPHOSPHATE

By Joe Pflum,
Eastern Region Sales Agronomist- Indiana

When we talk about plant available Phosphorus we are talking about Orthophosphate. Orthophosphate is the form of Phosphorus the plant takes in (H_2PO-4 , HP04-2). Too often we focus on the P_2O_5 amount in the fertilizer because this is how Phosphorus is bought and sold. The P_2O_5 in the guaranteed analysis indicates the level of Phosphorus in the fertilizer; this lends nothing to the amount of Orthophosphate or Polyphosphate in the fertilizer. The majority of reputable fertilizer suppliers will indicate the levels of one or the other. All of the rock Phosphate that is used in the production of Phosphorus fertilizer is in the Orthophosphate form. So where does Polyphosphate come from, and what is it used for? Polyphosphate was developed in the mid 60's by the Tennessee Valley Authority (TVA) as a way of driving up the concentration of Phosphorus in a fertilizer analysis. By taking Orthophosphate and driving off the water and displacing hydrogen the Orthophosphates will link together to form chains of varying lengths, thus creating Polyphosphate.

Orthophosphate is the most import form of fertilizer we use for a foundation fertilizer to be placed with the seed. This is crucial for early plant development and root growth. Polyphosphate must be hydrolyzed by soil moisture before it can be utilized by the plant. This process takes time and is dependent upon many variables including soil moisture, temperature, pH, microbial activity, and the length of the polyphosphate chain. Small amounts of Polyphosphate added to a seed starter can help with compatibly when adding other various plant nutrients in some instances. Polyphosphates are best used in 2x2 application as this will allow enough time for the hydrolysis process to take place. Once the root system reaches the 2x2 application of Polyphosphate there will be enough available Orthophosphate converted for plant use. A 2x2 application of Polyphosphate works best when it is coupled with a seed applied starter with a high level of Orthophosphate to create a rapidly expanding root system throughout the soil and increasing root surface area. Orthophosphates are especially a must when applying phosphate as a foliar application, Polyphosphates will not work because the soil is needed for its conversion process. Lets take a look at the comparisons:

ORTHOPHOSPHATE
Immediately available for crop to use at germination

POLYPHOSPHATE
Needs to convert to Ortho form for plant use
10-34-0 is roughly 25% ortho and 75% poly

Temperature, moisture, pH, microbial activity, and length of poly chains are factors in conversion (10-100 days or longer)

NACHURS offers the seed applied fertilizers you need for optimum early plant and root growth:

NACHURS G24.....	80% Orthophosphate	20% Polyphosphate
NACHURS G20.....	80% Orthophosphate	20% Polyphosphate
NACHURS W18.....	100% Orthophosphate	
NACHURS W18-S.....	100% Orthophosphate	
NACHURS HKW18.....	100% Orthophosphate	
NACHRUS HKW18-S.....	100% Orthophosphate	
NACHURS LKW20.....	100% Orthophosphate	
NACHURS HKW6.....	100% Orthophosphate	
NACHURS W10.....	100% Orthophosphate	
NACHURS W10-S.....	100% Orthophosphate	

A BALANCED APPROACH

By Joe Osterhaus,
Northern Region Sales Agronomist- Nebraska

The key to higher yields needs a balanced approach. What we are trying to do is eliminate stresses to plants that reduce the optimal yield environment. We plant varieties adapted to our areas. We plant varieties that have resistance to herbicides as well as insects that can lower yields and we fertilize the soil to provide nutrients for the crop to be planted. The question is; are we doing this efficiently?
At NACHURS, we are promoting a balanced approach to fertility. We stress the 4-R system: The Right nutrients, in the Right place, applying the Right rate, at the Right time. We promote a solid foundation with the highest quality starter fertilizers in-furrow to get the crop off to a good start and keep the phosphate level at optimal levels in the plants to maximize ear production. A good starter will carry the plant until that root system can begin to reach out into the soil and start using the nutrients that had been soil applied prior to planting.

We promote early season plant tissue testing. It is essential to know what the plant is missing to maximize yield. Our goal is to keep the optimum yield environment. In corn we want to make sure we have all the nutrients available to maximize ear size which is being determined by the V-5 growth stage. For soybeans we are trying to maximize flowering and trying to keep soybean plants from aborting flowers. According to the book "How a Soybean Plant Develops", between the R1 and R5 growth stage a soybean plant can abort 60-75% of all flowers produced. Early season tissue sampling can help us know what we are missing and give us time for foliar applied fertilizers. Foliar applications can be made in conjunction with herbicide applications. Late season tissue samples can show if we need additional foliar fertilizer with fungicide applications for both corn and soybeans. These foliar applications are insurance that we have done everything we can to maximize yields.

We promote a balanced approach to fertility. We stress the importance of placement. We need to look at all delivery systems be it in-furrow, 2x2, sidedress, foliar feeding, or broadcasting. We want to be as efficient as we can to maximize return on investment. We want to recover the nutrients we put on our crops by maximizing yield. In the end; yield comes down to a Balanced nutrient package, Placed where the plant needs it most, and the Recovery of the nutrients applied.

YOUR NACHURS AGRONOMY TEAM For more information, please visit www.nachurs.com

Brian Banks, Midwest Regional Agronomy Manager
402-416-1271 • banksb@nachurs.com

Daryl Clay, Sales Agronomist
804-350-5708 • clayd@nachurs.com

Keith Flaniken, Sales Agronomist
901-484-1575 • flanikenk@nachurs.com

John Holdsworth, Sales Agronomist
715-214-6945 • holdsworthj@nachurs.com

Joe Pflum, Sales Agronomist
765-309-5241 • pflumj@nachurs.com

Rich Recker, Sales Agronomist
989-621-7814 • reckerr@nachurs.com

Joe Osterhaus, Sales Agronomist
402-469-7296 • osterhausj@nachurs.com

Wayne Becker, Sales Agronomist
940-736-7080 • beckerw@nachurs.com

Tommy Roach, Specialty Products Manager
806-787-8839 • roacht@nachurs.com