
SCT
CARBON 375
SYSTEMIC CARBON TECHNOLOGY
TECHNICAL BOOKLET
BY AMP LIQUIDS

Carbon375 is a *unique* nano carbon formula proudly created in the USA. Used in above and below soil-line applications, **Carbon375** has been proven to:

ENHANCE GROWTH

ENHANCE PLANT IMMUNITY

INCREASE NUTRIENT UPTAKE AND EFFICIENCY

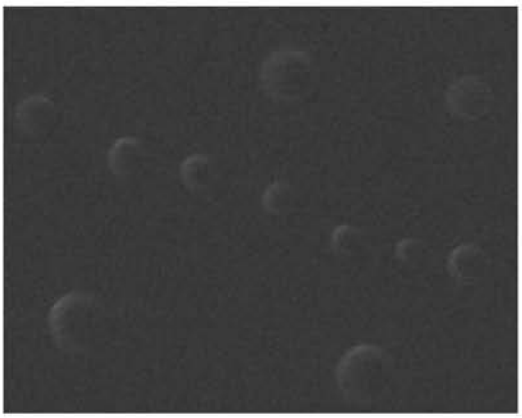
ENHANCE TANK MIX QUALITY

Our base formula is made up of several organic and natural compounds. The manufacturing process breaks these compounds down resulting in a nano carbon liquid made up of pure carbon energy for plants (we've coined the term *Systemic Carbon Technology*, or *SCT*). Within the plant, these tiny carbon fragments convert into carbohydrates, creating:

- An increased uptake of nutrients
- Faster cell division
- Healthier plant cells
- Bigger and stronger root system
- Larger leaves
- Enhanced overall plant growth.

Scanning Electronic Microscope with Energy Dispersive X-ray Spectroscopy Detector (SEM/EDX)

- Imaging up to 300,000X with high resolution of 3nm
- Overview image of micelle structure



Sue Decker - Microbiology Lab - University of Miami

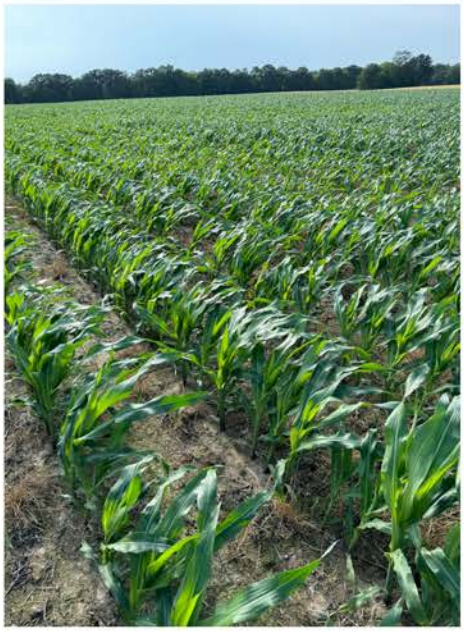
SCT has a *negative charged* carbon particle that offers enhanced up take of soil nutrients. Negative charged nano carbon provides excellent suspension of tank products with up to 30% increased delivery into leaf phloem. Our **SCT** carbon is also pre-synthesized for immediate uptake and root development due to increased microbial activity.

COMPATIBLE WITH ALL SPRAY SYSTEMS

Below, you'll find a compilation of past trials and studies that indicate significant advantages to using Carbon375 and the Systemic Carbon Technology.

TRIAL GALLERY

SCT



Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 11, 2023

Jim Shellenback
Amp Liquids Inc.
400 West Fee Ave.
Melbourne
Florida, 32901
United States

Dear Mr. Shellenback

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as "% Biobased Carbon". This indicates the percentage carbon from "natural" (plant or animal by-product) sources versus "synthetic" (petrochemical) sources . For reference, 100 % Biobased Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biobased Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as "percent modern carbon (pMC)". This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biobased Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions please contact us. We welcome your inquiries.

Sincerely,

Chris Patrick
Digital signature on file

Chris Patrick
Vice President of Laboratory Operations

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Summary of Results - % Biobased Carbon Content
ASTM D6866-22 Method B (AMS) TOC

Certificate Number: 540890651542136226

Validation: Chris Patrick

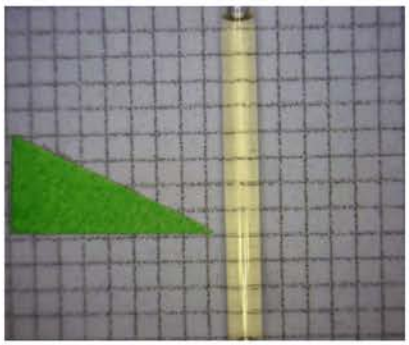
Submitter	Jim Shellenback
Company	Amp Liquids Inc.
Date Received	January 05, 2023
Date Reported	January 11, 2023
Submitter Label	Carbon375 / (USDA Application# 12027)

RESULT: 48 % Biobased Carbon Content (as a fraction of total organic carbon)

Laboratory Number	Beta-651542
Percent modern carbon (pMC)	47.94 +/- 0.17 pMC
Atmospheric adjustment factor (REF)	100.0; = pMC/1.000

Package received - labeling COC


View of content (1mm x 1mm scale)


Representative sample analyzed (1mm x 1mm scale)

Disclosures: All work was done at Beta Analytic in its own chemistry lab and AMSs. No subcontractors were used. Beta's chemistry laboratory and AMS do not react or measure artificial C 14 used in biomedical and environmental AMS studies. Beta is a C14 tracer-free facility. Validating quality assurance is verified with a Quality Assurance report posted separately to the web library containing the PDF downloadable copy of this report.

Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 40,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report

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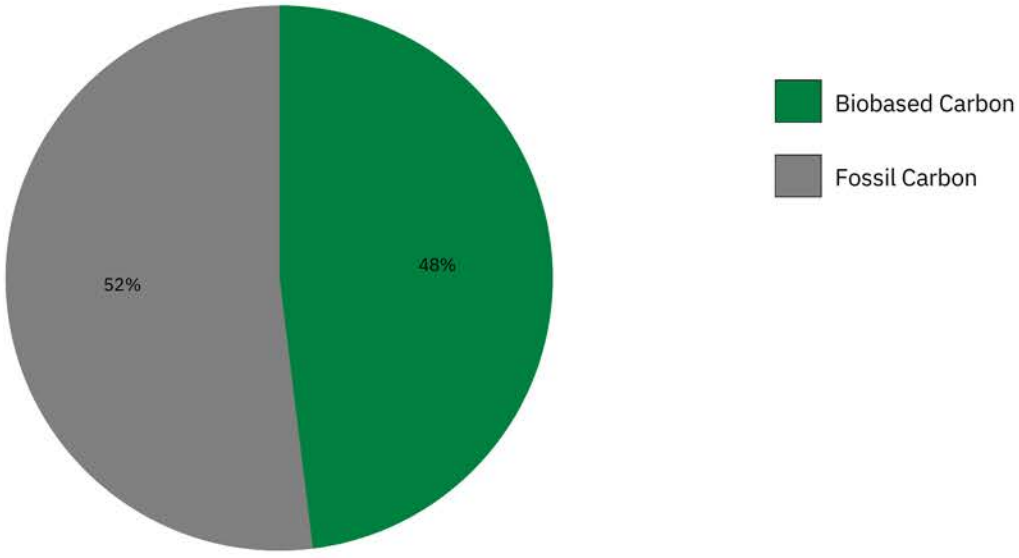

Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 40,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report

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% Biobased Carbon Content ASTM D6866-22 Method B (AMS) TOC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-based). By 2003 there was growing demand for a standardized methodology for applying Carbon-14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

The analytical procedures for measuring radiocarbon content using the different standards are identical. The only difference is the reporting format. Results are usually reported using the standardized terminology "% biobased carbon". Only ASTM D6866 uses the term "% biogenic carbon" when the result represents all carbon present (Total Carbon) rather than just the organic carbon (Total Organic Carbon). The terms "% biobased carbon" and "% biogenic carbon" are now the standard units in regulatory and industrial applications, replacing obscure units of measure historically reported by radiocarbon dating laboratories e.g. disintegrations per minute per gram (dpm/g) or radiocarbon age.

The result was obtained by measuring the ratio of radiocarbon in the material relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). This ratio was calculated as a percentage and is reported as percent modern carbon (pMC). The value obtained relative to the NIST standard is normalized to the year 1950 AD so an adjustment was required to calculate a carbon source value relative to today. This factor is listed on the report sheet as the terminology "REF".

Interpretation and application of the results is straightforward. A value of 100% biobased or biogenic carbon would indicate that 100% of the carbon came from plants or animal by-products (biomass) living in the natural environment and a value of 0% would mean that all of the carbon was derived from petrochemicals, coal and other fossil sources. A value between 0-100% would indicate a mixture. The higher the value, the greater the proportion of naturally sourced components in the material.

UREA CONDUCTIVITY INCREASES WHEN TREATED WITH *CARBON375*

The test measured change in electrical conductivity of a urea solution. Stock solution was 1 kilo of prilled urea (46-0-0) dissolved in 3.8 liters of distilled water. 30 milliliters of stock solution was used for each test.

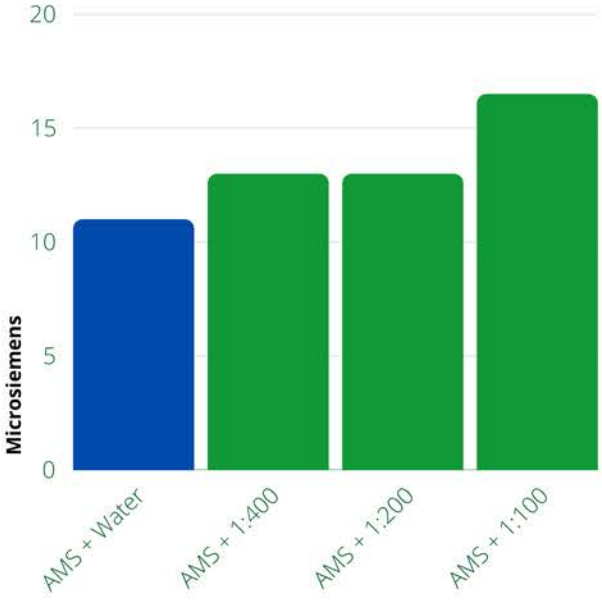
The control was 30 ml. of stock solution plus 30 ml. of distilled water, resulting in a conductivity of 676 microsiemens. Each of the three other tests added 30 ml. of a successively higher concentration of *Carbon375* to 30 ml. of stock AMS solution. Response was successively higher conductivity, with a maximum 28% rise with a 1:100 solution of *Carbon375*.

Test was done with an ECTestr 11+ with stainless probe.

AMMONIUM SULFATE SOIL CONDUCTIVITY INCREASES WHEN TREATED WITH *CARBON375*

The test measured change in electrical conductivity of an ammonium sulfate solution. Stock solution was 1 kilo of bulk ammonium sulfate (21-0-0) dissolved in 3.8 liters of distilled water.

The control was 30 mL of stock solution plus 30 mL of distilled water, resulting in a conductivity of 11.4 microsiemens. Each of the three other tests added 30 mL of a successively higher concentration of *Carbon375* to 30 mL of stock AMS solution. Response was successfully higher conductivity, with a maximum 28% rise with a 1:100 solution of *Carbon375*.



Test performed by the University of Florida

CARBON375 MOBILIZES FOLIAR NITROGEN, LIFTS CORN YIELD 11.9 BU. PER ACRE

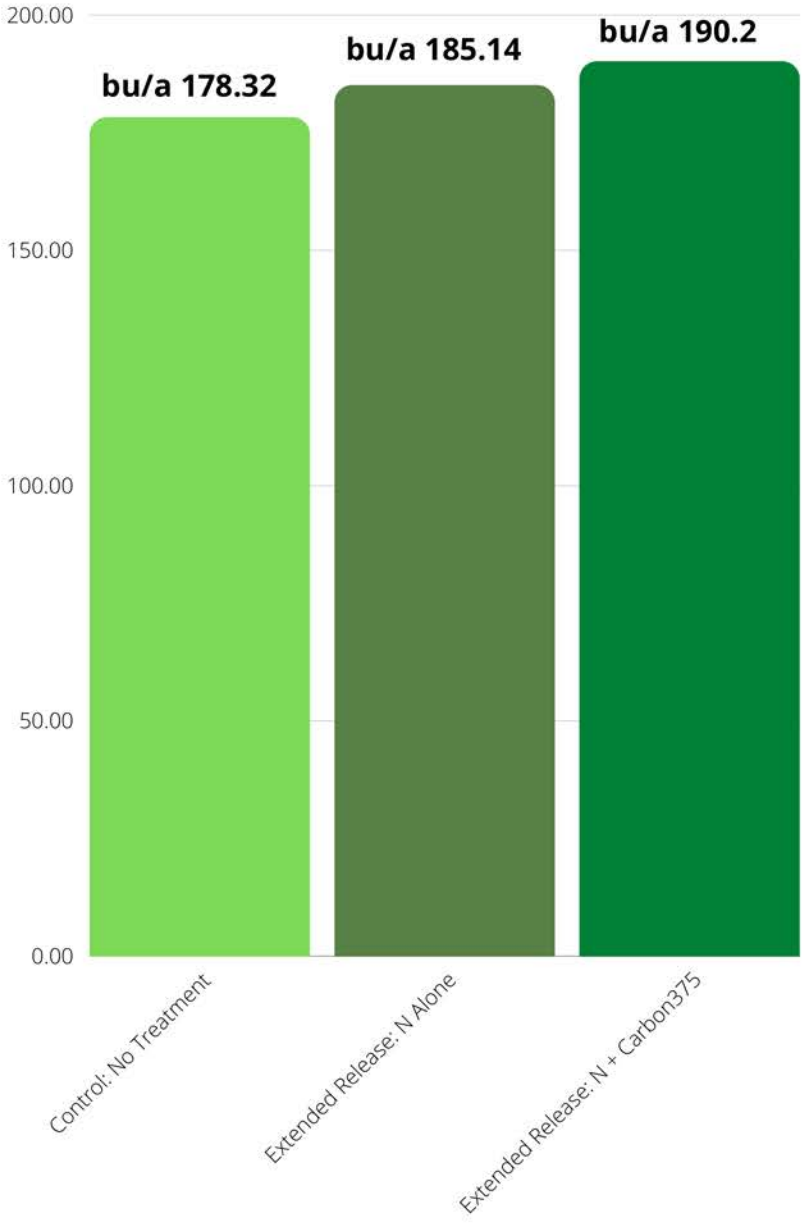
During this season, farmers saw how *CARBON375* "amplifies" yield benefits of foliar sprayed nutrients by:

✓ Greater absorption into the leaf.
✓ Faster translocation into plant cells.

Yields in the chart at right are averages of four 8-row strips, each 2,300 feet long. The two treatments were 1 gal. per acre of extended release 28% nitrogen, with and without *CARBON375*. *Foliar nitrogen alone showed a 6.8 bu. yield increase over the control. Tank-mixing Genisys Mobility with nitrogen added another 5 bu. per acre for a total benefit of 11.9 bushels. Our field tests show that CARBON375* improves leaf coverage, absorption and nutrient translocation in the crop to help achieve consistent yield gains. *CARBON375'S* "nano-sized" micro cells reduce the "stickiness" of water and increase its solubility, so nutrient solutions flow more easily through crop xylem and phloem systems.

This enhances sugar transfer and helps make a good yield several bushels higher.

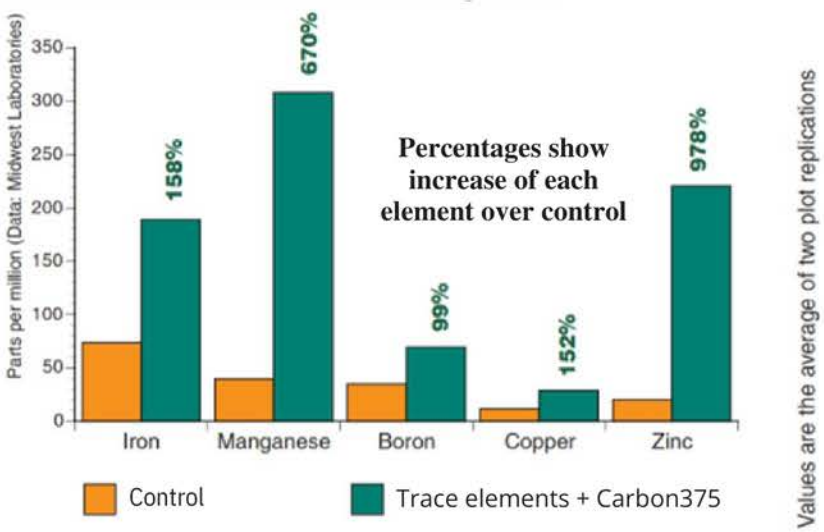
CARBON375 MAKES FOLIAR NUTRIENTS MORE EFFECTIVE!



Corn, 2010
Grundy County, IA

Trace Element Content of Alfalfa Multiplied with Single Foliar Application of Micronutrients Plus *Carbon375*

Trace element content of new alfalfa growth 11 days after foliar sparay with Defender G tank-mixed with Carbon375.



We think this tissue analysis fairly represents what's "in" the leaves and stems, rather than measuring exterior residue. We clipped new growth, and the plots had over two inches of rain between spraying and sampling.

On Sept. 16, 2010, we sprayed two 12 ft. x 12 ft. plots of alfalfa with a trace element blend in a tank mix of 1:256 *Carbon375* and water. This was intended not as a statistical test, only a screening for effect. The alfalfa was about eight inches high, recovering from a third cutting, and growing vigorously. In the next 10 days, 2.08 in. of rain fell in three storms, so the alfalfa was thoroughly washed down and most external residual would have been re- moved. On Sept. 27, we snipped leaf and stem samples of new top growth from the two treated plots and two untreated controls adjacent to the treated plots on comparable soil. Samples were sent to Midwest Laboratories, and the averages are shown at right. We can fax the original lab re- ports to anyone interested. In this trial, we didn't apply the trace element pack alone. We've seen previous trials where *Carbon375* amplifies the trace-element analysis, and simply wanted to check out alfalfa's response to *Carbon375* together with traces. We've learned with repeated field trials this summer and fall that *Carbon375* enhances absorption and translocation of foliar-applied trace elements. This could make foliar application an even more effective management tool for balancing micronutrients in growing crops.

Our next phases of research will focus on optimum levels of traces for cost-effective improvement in test weight, crop health and yield. In spring 2011 we intend to begin test-ing several formulations of micronutrients, including those chelated with humic acid and not EDTA or phosphites.

If glyphosate-resistant alfalfa is approved for general use, monitoring of micronutrients will become more essential because glyphosate chelates or ties up essential nutrients.

Previous tests of *Carbon375* on alfalfa in Montana have shown an in- crease in alfalfa tonnage and relative feed value.

Also, we had a 2009 experiment with unintended consequences in 2010. We had rented a small test area on a local farmer's new seeding of oats and alfalfa. We sprayed *Carbon375* by itself on the oats and alfalfa, and saw an 8% yield increase in the oats in 2009.
then in the spring, we noticed a taller, higher regrowth of alfalfa where we had sprayed those test strips in 2009. Apparently the alfalfa seeded with the oats had responded to *Carbon375* by developing deeper roots, which reflect ed in faster emergence and regrowth this spring. Alfalfa on treated strips bloomed earlier. The test strips had to be cut and baled separately from the rest of the field. The farmer put up with that, because he had more yield!

FOLIAR NUTRIENT ABSORPTION TEST

CARBON375
SYSTEMIC CARBON TECHNOLOGY

Translocating foliar nutrients and crop protection products *effectively* into crop leaves requires more than a "surfactant" to wet the leaves.

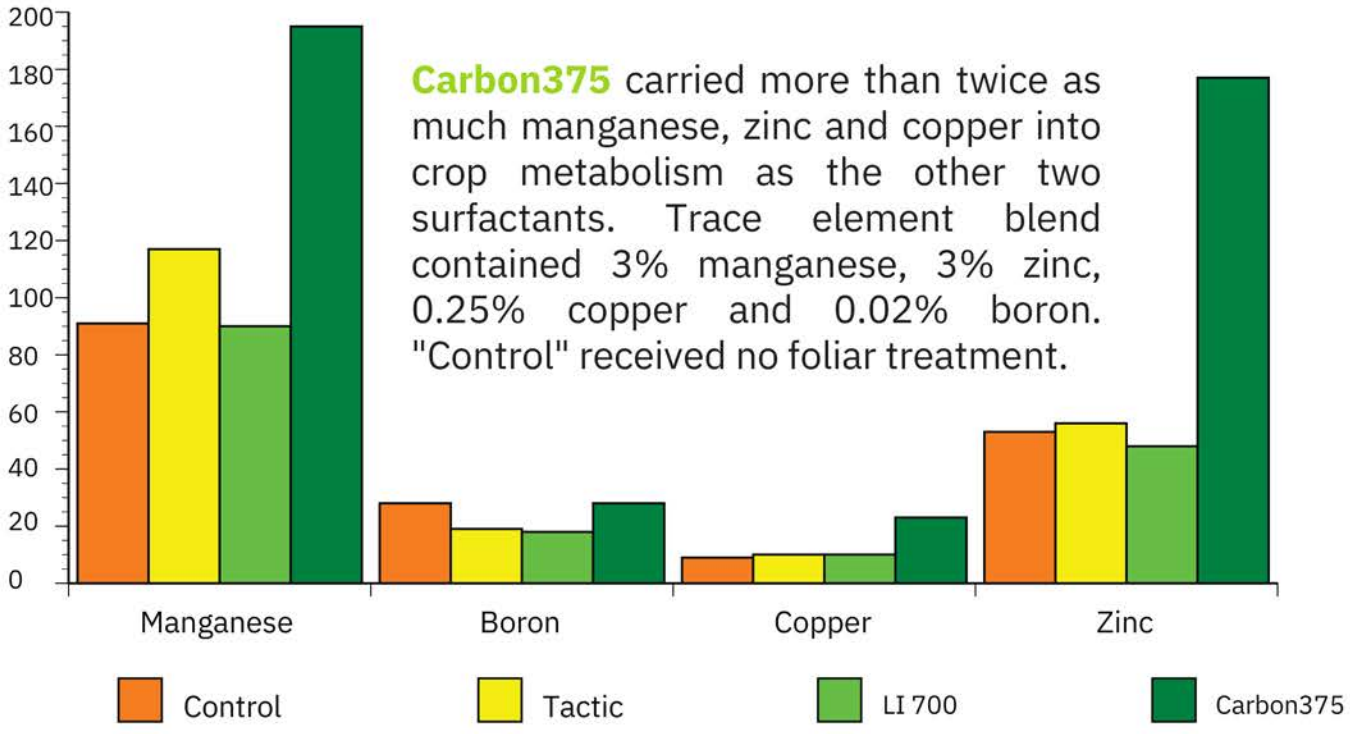
Carbon375 enables foliar-sprayed materials to *penetrate through the leaf cuticle and into cell metabolism.* **Carbon375** creates a nano carbon structure in water which gently softens and lifts the waxy leaf cuticle and carries foliar products deep into the leaf palisade cells with its unique negative-ion bonding.

Products applied in water which is structured with **Carbon375** are **rain-fast within about 15 minutes.**

Sprayed leaves appear dry after a few minutes, even on a cool, humid day, because the moisture film on the surface quickly penetrates deep. Data in the chart below comes from a foliar translocation test in which a standard trace element blend was sprayed on crop leaves in late afternoon, before a heavy rain. Tissue samples were taken 48 hours later.

The results are similar to dozens of translocation studies conducted with our ***Systemic Carbon Technology*** since 2008. The principles work with NPK, trace elements, herbicides and other foliar materials.

Trace element content of corn at V5, 48 hours after foliar spraying with the same trace mix, but carried by three different surfactants



Carbon375 carried more than twice as much manganese, zinc and copper into crop metabolism as the other two surfactants. Trace element blend contained 3% manganese, 3% zinc, 0.25% copper and 0.02% boron. "Control" received no foliar treatment.

Corn was sprayed at three-leaf stage, samples taken 48 hours later and sent to the lab.

Midwest Laboratories®

CARBON 375
SYSTEMIC CARBON TECHNOLOGY

TESTED IN NORTH CAROLINA STATE UNIVERSITY SOYBEAN YIELD TRIALS

POTENTIAL YIELD ENHANCEMENT

Dr. Jim Dunphy is widely known as "Mr. Soybean" in the Southeast. His official title is Professor of Crop Science and Crop Science Extension Specialist.

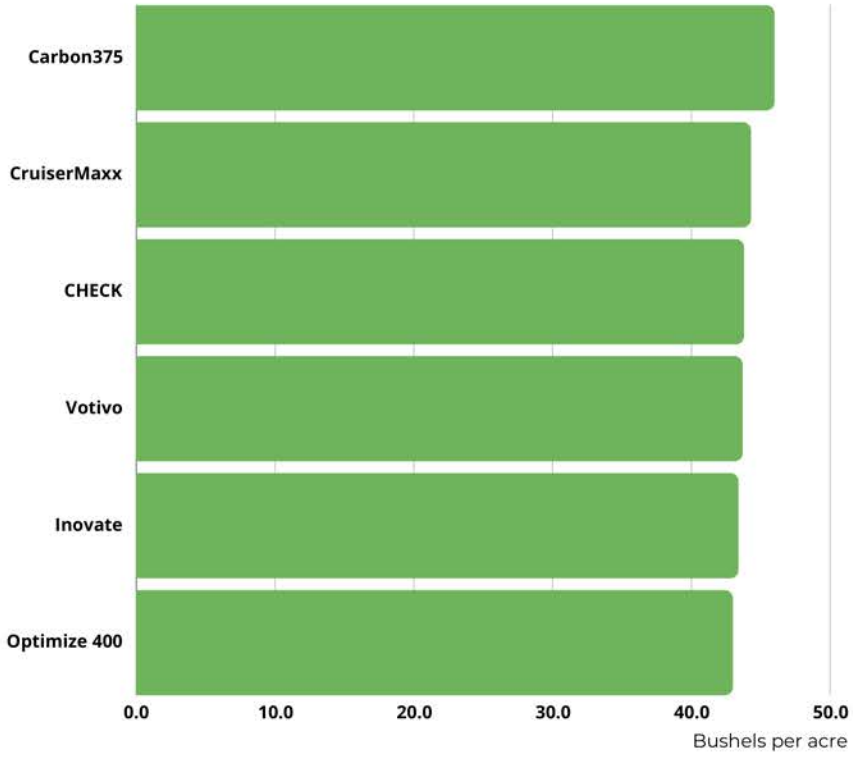
Each season, Dr. Dunphy, his associates and county extension agents conduct soybean trials in at least four counties across North Carolina, screening innovative new products. The trials give growers an objective early look at the new products for soybeans.

The chart at right shows yield averages from all four counties in the trials: Caldwell, Craven, Perquimans and Union.

The research is not intended as a competition. Each Product has specific purposes for use on soybeans.

But when we ranked the four-county average yields from high to low, we noticed that **Carbon375** treatments emerged in the yield positions.

Note that the yield range of all treatments from high to low is fairly narrow, only 3.5 bushels. That's an indicator of uniform experimental design. It also underscores the challenge that farmers face to find cost-effective "specialty" treatments to consistently gain that highly profitable extra three or four bushels of soybean.



We appreciate this research. We encourage soybean growers to continue using ***Carbon375***, using these tips to help maximize yield:

1. Apply Carbon375 at the first two trifoliate leaves, which is the optimum time to encourage deep, early rooting which sustains pod retention, especial through dry weather stress. In the trials above, applying products to plants four weeks after planting was done for consistency across treatments.

2. Tank-mix Carbon375 with yield-enhancing nutrients such as trace element blends, to improve effectiveness of foliar feeding. New data on ***Carbon375*** prove it's a highly effective and consistent "carrier" of beneficial nutrients into the leaf and through crop circulation systems.

Data source: Dr. Jim Dunphy, NCSU

LEAF CALCIUM CONTENT OF YOUNG OATS ROSE 19% AFTER SPRAYING WITH LITHOVIT... AND 34% WITH CARBON375

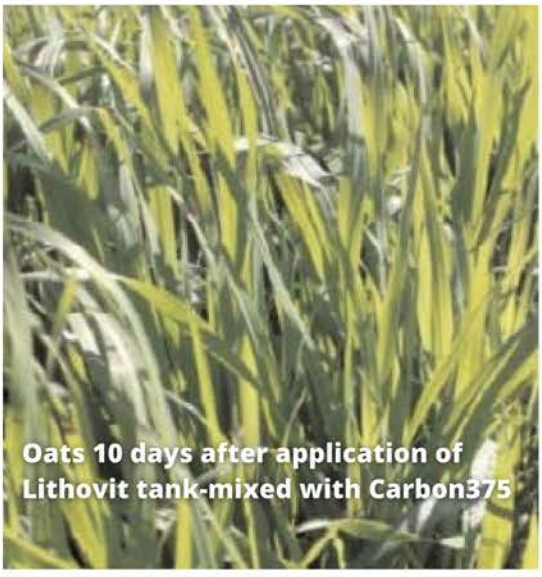
PERCENT INCREASE IN TISSUE NUTRIENT CONTENT OF OATS 11 DAYS AFTER FOLIAR SPRAY WITH LITHOVIT (NANOTECH CALCIUM) WITH AND WITHOUT CARBON375 IN TANK MIX

Calcium is the biggest "king of nutrients" among farmers who use renewable farming principles to build soil biological life and natural fertility.

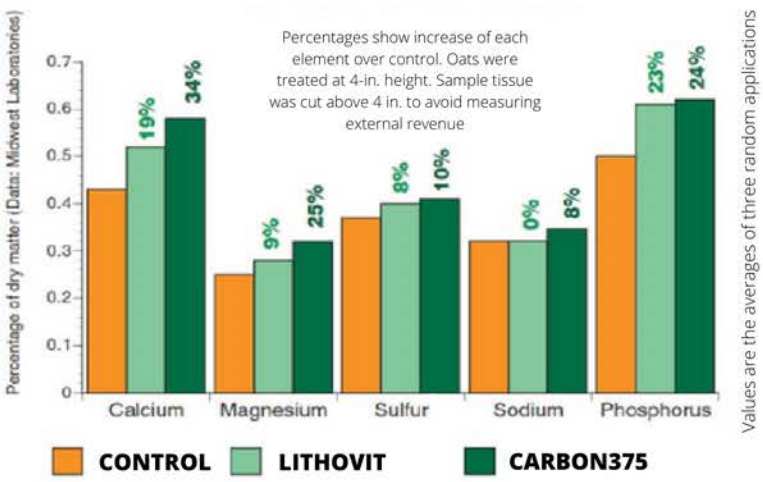
Calcium is vital for strong cell walls, resistance to insects and disease, and mobilizing other nutrients. However, building calcium content in vigorously growing crops has long proven a major puzzle. Soil-applied calcium is taken up slowly.

"Nanotech" calcium - particles of calcium carbonate as tiny as one billionth of a meter - offer an opportunity to enhance calcium content of growing crops. However, getting nano-sized calcium efficiently absorbed and mobilized within the crops remains a challenge.

So we tested two "nanotech" products in one spray mix. In a preliminary trial with three random replications, we found that Lithovit, (a calcium carbonate product with nano-sized particles) raised tissue calcium content of young oats leaves by 19% when sprayed at a rate of 2 lbs. per acre. When Lithovit was tank-mixed with ***Carbon375,*** leaf calcium tests jumped by 34% over controls.



Oats 10 days after application of Lithovit tank-mixed with Carbon375



"Lithovit" is the brand name for a German-manufactured calcium carbonate with particle sizes of about a billionth of a meter. Other manufacturers are attempting to build similar products. At this tiny size, calcium carbonate easily suspends in spray solution. When Genisys is added to the tank mix, leaves are coated smoothly. The data here indicates that Genisys improves absorption into the leaf, and translocation through the plant's circulation system.

Leaf samples were cut from new growth 11 days after spraying. Oats were about 4 in. high when sprayed, and twice that high when cuttings were taken for analysis.

Only calcium was applied in this test, but several other elements showed increases in the leaves - possibly because calcium enhanced uptake of soil nutrients. Zinc, not shown in the chart above, rose 10%. Genisys Mobility contains some zinc (It's registered in Iowa as a micronutrient product). In other foliar-applied micronutrient tests of alfalfa, wheat and soybeans, the same pattern emerges in tissue test data: The foliar spray alone shows some response, but the levels are substantially enhanced when ***Carbon375*** is included in the tank mix. We use a standard 1:256 ratio of ***Carbon375*** concentrate in water, That translates to five ounces per acre of concentrate if the total application rate is 10 gal. per acre.

So for a low cost, ***Carbon375*** "amplifies" effectiveness of foliar nutrient sprays such as nano-calcium or a trace element blend.

Calcium and iron are important in building leaf thickness. Dr. Dan Skow of International Ag Labs, Fairmont, MN says: "If you could somehow double the thickness of a crop leaf, its photosynthetic capacity would rise by 400%."

Bottom line: *Carbon375* can be effective in correcting leaf tissue mineral deficiencies and thus enhancing crop productivity. We have much more research to do, but as one widely respected crop scientist tells us, "This looks promising".

Analysis of Soybean Pods Shows: Carbon375 Helps Mobilize Foliar-Applied Micronutrients in Crops

CARBON 375
SYSTEMIC CARBON TECHNOLOGY

Farmers who raise glyphosate-tolerant corn and soybeans *often foliar-feed manganese, boron, zinc and other elements to assure adequate levels in plant tissue.*

Crop consultants report that corn and soybeans frequently have inadequate trace elements. One reason: Glyphosate ties up, or chelates, these metals.

Curing this deficiency has been difficult. Crops are slow to absorb foliar-fed compounds containing trace metals. The "missing link," says surfactant scientist Jerry Pritchard, is to find a way to carry nutrients into crop leaves and transport them through the plant's system.

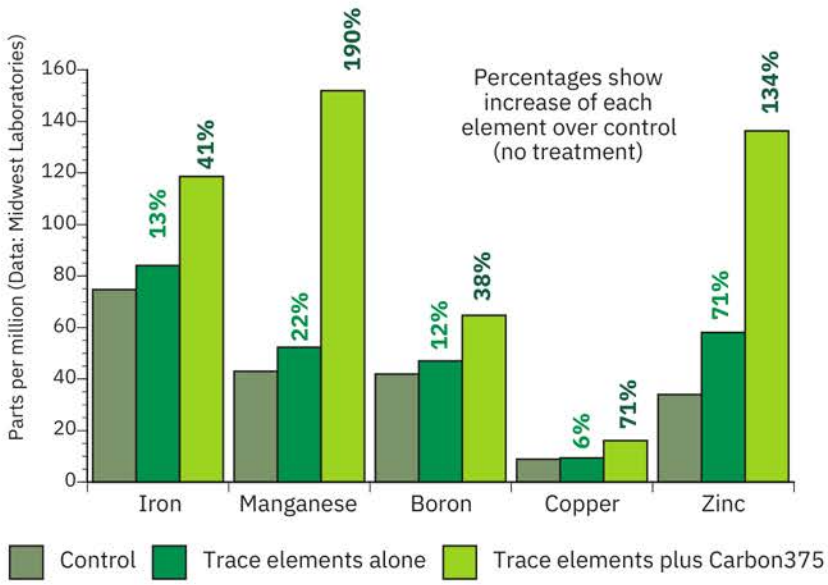
Pritchard says, *"Finally we have that missing link, which I've tried since 1973 to develop. Amp Liquids did it with Carbon375. It's the best surfactant and transporter I've found."*

Pritchard's career has focused on formulating surfactants and emulsifiers for almost 40 years. He originated adjuvants used in crop protection chemicals worldwide. He currently operates his new research center, Blackhawk Laboratories, in Coila, MS.

Evidence of Carbon375's effectiveness : Each trace element analysis shown in this chart is the average of seven randomized plots. Seven were backpack sprayed Aug. 3, 2010 with a mix of trace elements (analysis in box below). Rate: Two pints per acre. Seven other sites in the same test field were sprayed with the trace mix tank-mixed with Carbon375 at 1 part Carbon375 to 256 parts of spray solution. The beans were at R6, developing new pods.

The test was conducted on beans with glyphosate-tolerant genetics. The crop had been treated with glyphosate early in the season. Seven unsprayed control blocks were randomly distributed through the experimental field. Plot design was supervised by Dr. Bertel Schou, owner of ACRES, a research firm serving worldwide clients for more than 20 years.

Trace element content of soybean pods and beans with foliar-applied trace element blend, with/without *Carbon375* transporter

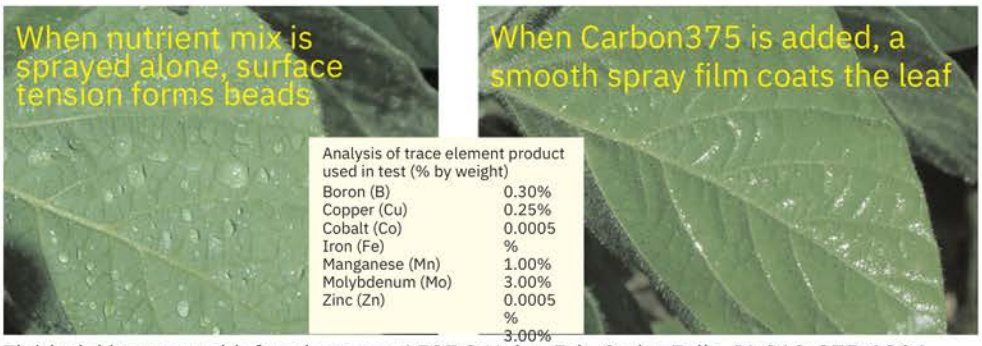


Test in cooperation with ACRES research farm, Cedar Falls, IA

After two weeks to allow for nutrient translocation into soybean pods, 30 or more pods were pulled from each of the 21 plots and analyzed by Midwest Laboratories of Omaha, NE. Very little of the spray had reached the pods, which were under a full leaf canopy.

The trace mix alone showed a 22% gain in pod levels of manganese, a 12% gain in boron and a 71% gain in zinc. Tank mixed with Carbon375, the absorption and translocation of traces showed substantially higher levels of all trace elements in pods, compared to the trace mix sprayed alone.

The greatest gain in pod analysis was a 190% increase in manganese, to 151 parts per million. Zinc analysis rose 134%, to 136 parts per million. We also see a rise in translocation and metabolization of other fertilizers, as well as herbicides, when they're tank-mixed with Carbon375.



Analysis of trace element product used in test (% by weight)

Boron (B)	0.30%
Copper (Cu)	0.25%
Cobalt (Co)	0.0005
Iron (Fe)	%
Manganese (Mn)	1.00%
Molybdenum (Mo)	3.00%
Zinc (Zn)	0.0005
	%
	3.00%

Field trial by renewablefarming.com, 1527 S.Union Rd., Cedar Falls, IA 319-277-1904

SCT™

IDENTIFICATION

CORN AT V3
MINERAL ANALYSIS

PLANT ANALYSIS

	REPORT OF ANALYSIS-PERCENT							REPORT OF ANALYSIS - PARTS PER MILLION							
SAMPLE ID	N NITRO-GEN	P PHOS-PHORUS	K POTAS-SIUM	Mg MAG-NESIUM	Ca CALCIUM	S SULFUR	Na SODIUM	Fe IRON	Mn MANGA-NESE	B BORON	Cu COPPER	Zn ZINC			
CONTROL	5.05	0.36	2.61	0.34	0.81	0.34	0.002	736	91	19	9	53			
CORN-2	H	S-L	D	S	S-H	S-H	S	E	S-L	H-E	S-L	H			
3418282 NORMS	4.60	0.45	3.60	0.30	0.65	0.30	0.009	185	105	12	11	38			
Stage of growth: V4, 2 Week, 4 Leaves															
SCT	5.43	0.41	2.99	0.32	0.95	0.39	0.002	727	195	28	23	177			
CORN-2	H	S	L-D	S	H	H	S	E	H-E	E	E	E			
3418283 NORMS	4.60	0.45	3.60	0.30	0.65	0.30	0.009	185	105	12	11	38			
Stage of growth: V4, 2 Week, 4 Leaves															
LI 700	5.01	0.41	2.12	0.39	0.94	0.34	0.002	755	90	18	10	48			
CORN-2	S-H	S	D	H	H	S	S	E	S-L	H-E	S	S-H			
3418284 NORMS	4.60	0.45	3.60	0.30	0.65	0.30	0.009	185	105	12	11	38			
Stage of growth: V4, 2 Week, 4 Leaves															
TACTIC	5.37	0.43	2.55	0.39	0.89	0.39	0.001	489	117	19	10	60			
CORN-2	H	S	D	H	H	H	S	E	S-H	H-E	S	E			
3418285 NORMS	4.60	0.45	3.60	0.30	0.65	0.30	0.009	185	105	12	11	38			
Stage of growth: V4, 2 Week, 4 Leaves															
NUTRAGR	5.33	0.39	2.88	0.35	0.83	0.39	0.001	534	89	24	10	56			
CORN-2	H	S	L-D	S-H	S-H	H	S	E	S-L	E	S	H-E			
3418286 NORMS	4.60	0.45	3.60	0.30	0.65	0.30	0.009	185	105	12	11	38			
Stage of growth: V4, 2 Week, 4 Leaves															

D or Deficient L or Low S or Sufficient H or High E or Excessive

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NC STATE UNIVERSITY

The Effect of Genisys Mobility on Corn Yield

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The Study

This study was conducted in 2009 on the Everett farm near Kinston, NC on a Goldsboro sandy loam soil. The site was previously planted to soybean and was tilled using a disk and finishing harrow prior to planting. On 30 April Dekalb DKC 68-08 treated with Poncho 1250TM was planted in 30 inch rows at a seeding rate of 33,000 seeds acre^{-1}. A starter fertilizer, 12-12-4, was placed beside the seed in a 2 X 2 band at a rate of 10 gal acre^{-1}. At growth stage V6-7 40 gal acre^{-1} of 30% UAN solution was broadcast using drop nozzles. No other fertilizer was applied, weeds were controlled with a layby application of 0.6 oz of Stout mixed with 1 qt of atrazine per acre. Weed control was good with the exception of some pigweeds scattered in the alleys between the plots.

The Experiment

Experimental design consisted of a randomized complete block arrangement with four replications. Plots were four rows wide and ~37 ft long. The two treatments consisted of either a non-treated check or Carbon375 applied twice at 12 oz acre at growth stage V6-7 and again at V10. Each time Carbon375 was applied it was mixed with water and applied over the top of the corn canopy in a broadcast application using 20 gal of spray solution per acre. At harvest grain yield, moisture, and test weight were measured on the center two rows of each plot using a K2 Gleaner combine equipped with a HarvestMaster grain guage. The grain weight from each plot was adjusted to 15.5% moisture before calculating yield. Because of variability in the site due to slope position statistical comparisons were made using the REML option in Proc Mixed with a spherical model to determine the effects of spatial correlation.

Results

Early growing conditions at the site were ideal with adequate rainfall and moderate temperatures. However, dry weather from June 1 to July 7 resulted in stress during the early grain fill period. This stress had more impact on the sideslope area of the field resulting in a large amount of variability within the study area as evidenced by a CV for grain yield of 13.1%.

Analysis of the data found that grain moisture and test weight were identical for both the untreated check and the 2X application of Carbon375 (moisture = 15.5% and test weight = 54.5 lbs bu^{-1}) Figure 1 shows the difference in grain yield between the non-treated check and Carbon375 treatments. While there was a numerical yield advantage when Carbon375 was applied of 14 bu acre^{-1}(135 vs 149 bu acre^{-1}) the statistical analysis indicated that this difference was not large enough to overcome the spatial variability at the study site

Summary

While it is unfortunate that the variability in the field site made it difficult to determine if there was a true yield advantage from the use of Carbon375 on corn, the numerical difference was large enough to warrant further investigation of this product. Certainly, a fourteen bushel yield advantage would be enough to pay for the product; particularly if it could be applied with other inputs such as herbicides or nitrogen. Based on this test we suggest a wider evaluation of Carbon375 on corn that will allow us to isolate the impact this product has on yield.

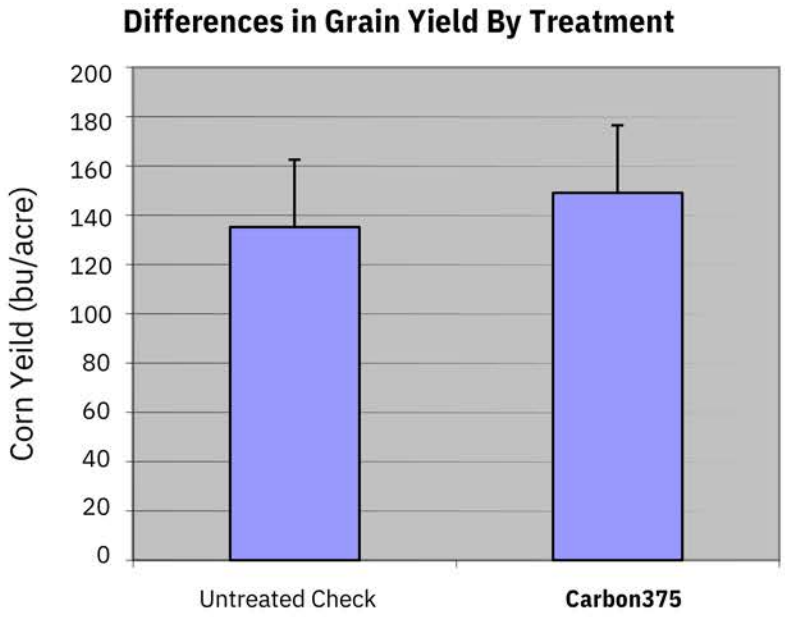

Figure 1. Differences in corn yield with and without Carbon375. Anything between the top of the colored bar to the top of the error line would not be considered statistically different.

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RESEARCH REPORT

Tank-Mix Evaluation for Amp Liquids in a Low Speed Wind Tunnel

Jeffrey Golus

University of Nebraska - West Central Research and Extension Center

North Platte, NE

2023

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Tank-Mix Evaluation for Amp Liquids in a Low Speed Wind Tunnel

One nozzle and two spray solutions were analyzed with a Sympatec Helos Vario KR particle size analyzer in a low speed (15 mph air flow) wind tunnel. With the R7 lens installed, it can detect particle sizes in a range from 18 to 3500 microns. This system uses laser diffraction to determine particle size distribution. The width of the nozzle plume was analyzed by moving the nozzle across the laser by means of a linear actuator, and each treatment was replicated three times. The nozzle tested was AIXR11004 at 40 psi.

Results are in the tables that follow. Dv10 is the micron size (µm) at which 10 percent of the spray volume is of the reported size and smaller. Dv50 and Dv90 are similar statistics. Relative span is calculated by the formula (Dv90-Dv10)/Dv50, and is a measure of the uniformity of the droplet size distribution. The percent less than 105 µm (Pct <105 µm) is the percentage of the spray volume that is 105 µm and smaller, with percent less than 141 µm (Pct <141 µm), 150 µm (Pct <150 µm), 210 µm (Pct <210 µm), and 730 µm (Pct <730 µm) being similar measurements.
Droplet Size Distribution data is modelled for downwind deposition using AgDisp. A t test is performed comparing the three reps of a standard tank-mix solution containing Enlist Duo with the test Enlist Duo/Enlist One tank-mixtures. If the t test indicates the test Enlist Duo/Enlist One tank-mixture results in downwind deposition at 30 feet not greater than standard tank-mix solution containing Enlist Duo alone at 30 feet ($p>=0.1$), the tank-mix passes this portion of the process.

The data presented in this report is a factual finding of how various application parameters affect droplet size; in no way should anything in this report be considered an endorsement of any product on behalf of the University of Nebraska or the researchers involved in this work. In addition, this data represents the actual droplet size for each treatment. In no way should the following data supersede the label requirement for a given pesticide or adjuvant.

Table 1. Products used, rates and abbreviations.

Tr	Solution	Rate	Rate Unit	Nozzle
t 1	Enlist Duo	2.8	%v:v	AIXR11004
2	Enlist One + Carbon375	1.25 + 5.6	%v:v + g/l	AIXR11004

Table 2. Climatic data and instrument used during testing.

Metric	Data
Wind speed (mph)	15
Temperature(°F)	70
Relative humidity (%)	37
Measurement distance (in)	12
Particle size analyzer	HELOS KR with R7 lens

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Table 3. Reference nozzle measurements and spray classification.

Nozzle	Pressure psi	Classification Threshold	Dv10 µm	Dv50 µm	Dv90 µm	Relative Span	Pct <105 µm	Pct <141 µm	Pct <150 µm	Pct <210 µm	Pct <730 µm
11001	65.3	VF/F	67	142	243	1.25	29.20	49.51	54.56	81.52	100.00
11003	43.5	F/M	115	252	415	1.19	7.96	15.92	18.06	36.18	100.00
11006	29.0	M/C	172	382	641	1.23	2.98	6.28	7.18	15.46	96.31
8008	31.9	C/VC	207	458	754	1.19	1.88	4.09	4.69	10.28	88.47
6510	17.4	VC/XC	317	623	944	1.00	0.34	1.04	1.23	3.29	66.52
6515	14.5	XC/UC	392	761	1103	0.93	0.11	0.49	0.60	1.76	45.78

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Table 4. Droplet size characteristics for Enlist Duo with AIXR11004 at 40 psi (Oct 6 and Oct 24)

Solution	Rate	Nozzle	Dv10	Dv50	Dv90	Relative span
			µm			
Enlist Duo	2.8	AIXR11004	266	488	747	0.99
Enlist One + Carbon375	1.25 + 5.6	AIXR11004	278	515	788	0.99

Table 4. Continued.

Solution	Rate	Nozzle	Pct < 105 µm	Pct < 141 µm	Pct < 150 µm	Pct < 210 µm	Pct < 730 µm
				%			
Enlist Duo	2.8	AIXR11004	0.34	1.18	1.42	4.60	88.91
Enlist One + Carbon375	1.25 + 5.6	AIXR11004	0.29	1.01	1.23	3.97	85.36

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Table 5. Estimated deposition (fraction of applied) at 30 feet from AgDisp for tested tank-mixtures containing Enlist One compared to Enlist Duo alone. A p value greater than 0.10 is required for a tank-mixture to pass.

Solution	Base Deposition (Fraction of Applied)	TankMix Deposition (Fraction of Applied)	P Value	Metric
Enlist One + Carbon375	0.01528	0.01350	0.9982	Pass

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RESEARCH REPORT

Evaluation for AMP Liquids in a Low Speed Wind Tunnel

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North Platte, NE

2024

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Evaluation for AMP Liquids in a Low Speed Wind Tunnel

One nozzle and two spray solutions were analyzed with a Sympatec Helos Vario KR particle size analyzer in a low speed (15 mph air flow) wind tunnel. With the R7 lens installed, it can detect particle sizes in a range from 18 to 3500 microns. This system uses laser diffraction to determine particle size distribution. The width of the nozzle plume was analyzed by moving the nozzle across the laser by means of a linear actuator, and each treatment was replicated three times. The nozzle tested was TTI11004 at 63 psi, and the tests were run February 7, 2024.

Results are in the tables that follow. Dv10 is the micron size (µm) at which 10 percent of the spray volume is of the reported size and smaller. Dv50 and Dv90 are similar statistics. Relative span is calculated by the formula (Dv90-Dv10)/Dv50, and is a measure of the uniformity of the droplet size distribution. The percent less than 105 µm (Pct <105 µm) is the percentage of the spray volume that is 105 µm and smaller, with percent less than 141 µm (Pct <141 µm), 150 µm (Pct <150 µm), 210 µm (Pct <210 µm), and 730 µm (Pct <730 µm) being similar measurements. Data were analyzed using a mixed model ANOVA (PROC MIXED) with replication set as random in SAS 9.2. Mean separation was conducted at $\alpha = 0.05$ level using a Tukey adjustment.
Droplet Size Distribution data is modelled for downwind deposition using AgDisp. A t test is performed comparing the three reps of a standard tank-mix solution containing Engenia + Induce with the test Engenia tank-mixtures. If the t test indicates the test Engenia tank-mixture results in downwind deposition at 110 feet not greater than standard tank-mix solution containing Engenia + Induce at 110 feet ($p>=0.1$), the tank-mix passes and can be included on the list of approved tank-mixes.

The data presented in this report is a factual finding of how various application parameters affect droplet size; in no way should anything in this report be considered an endorsement of any product on behalf of the University of Nebraska or the researchers involved in this work. In addition, this data represents the actual droplet size for each treatment. In no way should the following data supersede the label requirement for a given pesticide or adjuvant.

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Table 1. Products used, rates and abbreviations.

Trt	Solution	Rate	Rate Unit	Nozzle
1	Engenia + Induce	12.8 + 4.8	fl oz/a + fl oz/a	TTI11004
2	Engenia + Carbon375	12.8 + 0.56	fl oz/a + %v:v	TTI11004

Table 2. Climatic data and instrument used during testing.

Metric	Data
Wind speed (mph)	15
Temperature (°F)	70.1
Relative humidity (%)	44
Measurement distance (in)	12
Particle size analyzer	HELOS KR with R7 lens

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Table 3. Reference nozzle measurements and spray classification.

Nozzle	Pressure psi	Classification Threshold	Dv10 µm	Dv50 µm	Dv90 µm	Relative Span	Pct <105 µm	Pct <141 µm	Pct <150 µm	Pct <210 µm	Pct <730 µm
11001	65.3	VF/F	65	140	239	1.24	30.09	50.75	55.88	82.82	100.00
11003	43.5	F/M	114	248	406	1.18	8.11	16.23	18.42	37.06	100.00
11006	29.0	M/C	172	383	643	1.23	3.05	6.37	7.28	15.53	96.31
8008	31.9	C/VC	207	456	762	1.22	1.85	4.07	4.67	10.30	88.07
6510	17.4	VC/XC	324	631	947	0.99	0.30	0.93	1.11	3.03	65.38
6515	14.5	XC/UC	391	756	1097	0.93	0.11	0.47	0.58	1.72	46.40

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Table 4. Droplet size characteristics for TTI11004 at 63 psi.

Solution	Rate	Nozzle	Dv10[1]	Dv50	Dv90	Relative span
			μm			
Engenia + Induce	12.8 + 4.8	TTI11004	309	621	969	1.06
Engenia + Carbon375	12.8 + 0.56	TTI11004	322	657	1015	1.05

Table 4. Continued.

Solution*	Rate	Nozzle	Pct < 105 µm[1]	Pct < 141 µm	Pct < 150 µm	Pct < 210 µm	Pct < 730 µm
				%			
Engenia + Induce	12.8 + 4.8	TTI11004	0.21	0.77	0.94	3.03	65.23
Engenia + Carbon375	12.8 + 0.56	TTI11004	0.20	0.71	0.85	2.71	59.61

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Table 5. Estimated deposition (fraction of applied) at 110 feet from AgDisp for tested tank-mixtures containing Engenia compared to Engenia + Induce. A p value greater than 0.10 is required for a tank-mixture to pass.

Solution	Base Deposition (Fraction of Applied)	TankMix Deposition (Fraction of Applied)	P Value	Metric
Engenia + Carbon375	0.00208	0.00194	0.9012	Pass