



## NITRATE RUNOFF REDUCTION

The validation testing at the Arise Research facility was performed primarily to determine the effect of a product containing SumaGrow on the *amount* of tile water runoff and the *percentage of nitrates* contained in the runoff water.

There are five test plots covered by this report: one control plot using the state recommended amount of conventional, petrochemical based fertilizer for corn grown in the State of Illinois; two plots treated with a product containing SumaGrow and 100% fertilizer; and two plots treated with only 50% fertilizer and a product containing SumaGrow.

Throughout the report, treatment #1 are the two plots (or their average) treated with 50% fertilizer and a product containing SumaGrow (SG50). Treatment #2 is the two plots (or their average) treated with 100% fertilizer and a product containing SumaGrow (SG100). Treatment #3 is a single control plot consisting of 100% fertilizer only (100).

The significant findings are as follows:

	<b>100</b>	<b>SG100</b>	<b>% Decrease</b>	<b>SG50</b>	<b>% Decrease</b>
Runoff water 7/20 – Gallons	77.0	40.0	<b>48.05%</b>	36.5	<b>52.60%</b>
Runoff water 9/30 – Gallons	37.0	19.5	<b>47.30%</b>	16.0	<b>56.76%</b>
Nitrates in Runoff 7/20	24.0	12.5	<b>47.92%</b>	15.5	<b>35.42%</b>
Nitrates in Runoff 9/30	16.0	13.0	<b>18.75%</b>	11.5	<b>28.13%</b>

The runoff water and nitrate data are from page 9 of 17 of the Arise Research report. The runoff water is identified as “Well Water” – runoff water from the containment bays is collected in wells. The nitrates in the runoff are identified in the report as “Water Nitrates.” **Both SG50 and SG100 decreased the amount of runoff water significantly** with SG50 reducing runoff water by an average of 54.68% and SG100 reducing runoff water by an average of 47.68%.

Perhaps more importantly, **the nitrates in the runoff water were significantly reduced as well** with SG50 reducing nitrates by an average of 31.78% (which had 50% less nitrogen placed on the soil to begin with) and SG100 reducing nitrates by 33.34% compared to the conventionally fertilized control plot. Please note the nitrates are measured in Parts Per Million (PPM), therefore, the reduction in runoff water, and a reduced percentage of nitrates in the

runoff water, **combine to reduce the total nitrates by 69.08% for SG50 [1-((1-.5468)\*(1-.3178))] and 65.12% for SG100.**

It is imperative to realize this remarkable reduction in nitrate runoff was achieved without cost! In fact, there are additional benefits to farmers, the consumers, and the environment as the chart below highlights some additional data excerpted from the Arise Research report.

	100	SG100	<i><b>% Increase</b></i>	SG50	<i><b>% Increase</b></i>
Yield (pg 6)	119.3	145.15	<b>21.67%</b>	142.20	<b>19.20%</b>
Chlorophyll (9/30)	40.2	54.0	<b>34.33%</b>	53.15	<b>32.21%</b>
Formazan	314.0	406.5	<b>29.46%</b>	444.5	<b>41.56%</b>

The yield on the corn crop increased by 21.67% for SG100 and by 19.2% for SG50 compared to the control. Again, please remember the control is what a typical farmer is currently doing. These yield increases are worth over \$160 per acre (page 6) and the manufacturer of SumaGrow products recommends at least a 50% reduction in fertilizer which would easily have increased the financial benefit to the farmer by at least another \$40 bringing **the total financial benefit to over \$200 per acre for the farmer using SG50**, which far exceeds the cost of products containing SumaGrow.

This yield increase is not a fluke as it has been repeatedly demonstrated in numerous field trials and with actual large scale farmers. There is additional data in the Arise report which further lends credibility to the increase yield claim: The plots treated with a product containing SumaGrow had better plant health, wider leaf diameters, bigger stalks and better color.

Consumers of corn grown with products containing SumaGrow benefit since a free market will lower the purchase price for corn as more farmers adopt the use of products containing SumaGrow.

Additionally, chlorophyll is a good proxy for overall plant nutrient value. The corn used in this field trial was field corn which will likely be fed to cattle. Better nutrient values will lead to increased/faster weight gain for cattle eating this corn – another benefit to the consumer of this crop.

Field corn may also be used to make ethanol. While this study did not measure the brix of the corn kernels (just the plant brix), other field trials have demonstrated products containing SumaGrow significantly increase brix levels. Higher brix levels lead to more ethanol per bushel of corn.

The environment is also a winner. In addition to the nitrate runoff reduction highlighted above, fewer gallons of water running off reduce the loss of topsoil and resulting clogging of waterways which would ultimately need to be dredged.

For the soil which does not runoff, the quality has been improved as demonstrated by the Formazan results. The Formazan test provides the biology in a soil sample with a specific amount of a food supply and waits a specific amount of time. The amounts of metabolic enzymes given off by the bacterial and fungal species are measured **when they are active**. The Formazan test is like the speedometer reading of microbial activity in the soil. It is an indirect microbial assay that gives us a picture of the forest—not the individual trees.

Low Formazan readings indicate a poor cycling of carbon, less microbial activity, and the inability of soil to break down organic inputs to supply plants with available nitrogen. The higher the Formazan reading the better and the product containing SumaGrow increased the Formazan levels by 29 to 41%.

The manufacturer of products containing SumaGrow believes the cost/benefit ratio to the farmer is significant enough to allow widespread implementation via the “carrot” approach – where every party benefits – rather than finding an alternative solution utilizing the “stick” approach which will have extra costs for the parties involved.

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