

To Whom It May Concern

Problematic Agriculture with Some Answers In Sight!

Viewing the world population and the reported future predictions, it is possible that severe changes in the world population can reasonably change easily. The nature could easily convert the numbers from year to year. There are presently 7,401,984.00 individuals that will grow to 8,141,661,007 by 2025, and further predicted an increase to 9,725,147.994.0 by 2050. This information was obtained from and some biological experiments will be needed in order to get higher yields and better crop improvements. In addition technical studies are needed in order to encourage crop improvements and other changes will be needed as indicated in the following pages

A total of 23 phosphate solubilizing bacteria (PSB) and 35 phosphate solubilizing fungi were identified by the research company that reported on their findings. (PSF) which were isolated from 19 samples of salt affected soils. The ability of 12 selected PSB (bacteria) has been reported by a Saudi Research Group! Baadd and PSF (fungi) are to grow and solubilize. Some elements are converted into plant nutrient source. The utilization of ground rock- phosphates in the presence of different bacteria and fungi could certainly give you considerable dollar savings in comparison to the synthetic form of phosphate fertilizer grades.

[Click here to read more on the effect of salt on survival and PLANT BACTERIAL STRAINS \(12\) AND PSF-Plant FUNGAL STRAINS \(35\) = potential of phosphate solubilizing microorganisms from salt affected soils.](http://www.sciencedirect.com/science/article/pii/S1319562X12000381)
(<http://www.sciencedirect.com/science/article/pii/S1319562X12000381>)

By viewing the present numbers and the future population growth, a question arises what will all these people eat and who will feed them? Based on the present agricultural research advances (during the past 10 to 30 years), the main problems started at the time by switching to mono-culturing, practice which means planting corn after corn or soybeans after soybeans for a number of years without such technologies. Based on past experiences causes severe increases in various plant diseases such as root rot, bacterial blight, dry rot, smut, black stem, rust, scab, corn borer, corn maggots, including stalk rot, including secondary & micro nutrient deficiencies are only a few that can severely increase the effects on yields and quality.

The application technologies will add to the soil 100% of its organic matter and organic plant nutrients that will be converted by the soil bacteria and fungi from organic entity into inorganic matter which the growing vegetation preferentially utilizes.

Before I continue with my technical and practical experiences please let me explain my background a little bit further. My name is Joseph Neubauer. I earned a Master's Degree from the University of Minnesota in Agricultural Sciences and Plant Cytogenetics. I am a professional agronomist for over 46 years now. My base idea was to develop a system to minimize or replace the use of the synthetic fertilizer sources since the prices of the synthetic fertilizers are almost cost prohibitive. I am experienced in crop improvements and soil amelioration technologies by utilizing plant nutrients from renewable plant resources such as Kentucky bluegrass and possible others such as clovers that utilize \and deposit the nitrogen source into the root nodules.

After my Master's Degree Graduation I worked for almost over 1+ year as a research associate for Dr. Charles Burnham who was known as the world leading corn cytogeneticist working primarily on corn and barley breeding situations. After graduation and completion of the assignment, I was contacted by ARCO/Atlantic Richfield who offered me a position as the chief agronomist evaluating with ARCO Staff members about some plant breeding companies since ARCO was interested at that time in purchasing one or more of the largest US plant breeding companies. After ARCO's investigative

research, it was learned that the purchase prices for a plant breeding companies **were too high** and as a result, ARCO gave up their interest in purchasing a plant breeding company.

After several months passed ARCO Oil Company merged with a fertilizer CO-OP since ARCO had a number of phosphate mines and wanted to utilize their raw rock-phosphate mines from which they intended to produce high grade phosphoric acid at the facility. ARCO produced 1,500.0 tons of various fertilizer formulations and 1,000 tons of the 83 % anhydrous- ammonia.

With the ARCO merger ARCO adapted 24 fertilizer retail facilities were operated out of Minnesota, Iowa and Indiana. The ARCO sales staff was to be also trained how to interpret the soil analysis and trained them how to formulate various fertilizer formulations based on soil test & intended crops to be grown. ARCO at their facility also opened up their soil-testing laboratory was capable of testing 4,000 soil samples per year for regular and complete soils analysis.

Several months after the merger the wholesale market failed drastically and ARCO sold the facility to a COOP facility. As a result, my employment by ARCO changed to move to Alaska to help determine what plant nutrient the arctic soil had to offer, that would require to vegetate the entire pipeline corridor that was 100' to 200' wide and 800 miles long.

It was impossible to predict what the arctic soil fertility had to offer. As a result a decision was made to submit 900 to 1,000 soils samples for a complete soil analysis along the pipeline corridors..

Based on the soil analysis it was determined that a larger number of soil samples would have to be collected within each alignment sheet along the entire 800 miles long pipeline corridor. Approximately 900 composite soil samples were collected from the 132 alignment sheets (each alignment sheet was 6.06 miles long) which were submitted to Harris Soils Laboratory in Lincoln , Univerrsty of Nebraska for a complete soil analysis.

Based on the final soil test analysis 6 complex fertilizers mixtures were formulated. The seeding & fertilizer applications were very successful. Each of the fertilizer formulations contained 13 fertilizer elements which were applied based on the soil test result requirement. Considering the total width and the length of the following within the pipeline corridor all the areas where the vegetation was destroyed were fertilized and vegetated: Total acreages within the pipeline corridor contained the following acreages:

Total acreage 100 ft. wide x 800 miles in length / pipeline corridor = totalled 96,970.44 acres.

Total acreage at 200'wide x 800 miles in length / corridor **all totaled** 193,490.89 acres

Based on the total it takes 138,335 years to cut the entire area at 3 miles/hour.

In summary I worked as the Chief Agronomist for ARCO/ Atlantic Richfield for a period of 16 years. I was also on loan by ARCO to Alyeska Pipeline Service Company for an additional 2 years to help resolve some of the additional revegetation and re-fertilization needs.

After completion of the pipeline construction ARCO offered me a position in some of their ARCO location in the lower 48 states. My family and I decided to remain in Alaska and start a new company in marketing products that we were familiar with and I incorporated the company as a "C" Chapter Corporation as GeoCHEM, Inc.

My wife and I decided to incorporate our business as GeoCHEM, Inc. on February 1982 (now 36th year in business since)) marketed and expanding in more specialty products for civil construction and land protection. GeoCHEM, Inc. gained an exclusive distributorship from Presto/Reynolds Products Company over 15+ years ago and other materials that were approved by the EPA (Alaska Environmental Protection Agency), including other approvals by state & federal agencies

such as military and other agencies. These products have been approved to build roads or pathways over the permafrost and non-permafrost areas in Alaska. Presently we sold considerably more than 1,500 pallets+ or 78,000 sq./ft.+ (each van load carried 52 pallets) of 81,000 Geoblocks, (each 20 inches wide x 40 inches long covering 43.5+ acres, or 1,897,473.60 sq. ft. Additional Geoblocks have been ordered for this coming spring 2017 and 2018 deliveries. To view our website please elect & see www.geochem,inc.com

New Cultural Soil Improvement Technology Was Developed

The utilization of renewable resources for higher yields and higher quality has been developed. Further, special formulations will be applied for faster bacterial reproduction. Some of the bacterial colonies convert the organic matter into inorganic elements that are preferably utilized by the growing plants. The specialty designed machines macerates the organic matters into a paste like media that is diluted 0.5 gallon up 1 part of extracted plant nutrient media with water at 1 part of organic plant nutrients and to 1 part of water which should be applied onto the soil for deeper soil profile penetration.

The deep penetration into the top and or subsoil coupled with deeper plowing mixes the nutrients and the organic matters (fibers etc.). The plowing or disking the soil microbes were moved into deeper soil levels which allows a breakage of possible hardpan which will allow better water penetration and increase in soil fertility in general. It also allows the growing vegetation to enter into a deeper soil profile to search for potential plant nutrients and water sources. The deeper the soil nutrient penetration it corrects the sub- soils pH level as well.

The old green-**manuring** technologies that were practiced many years ago failed miserably and as a results the cultural practices are no longer in use. The application of the above-mentioned technology takes 3+ years of non-cultivation (rest period) that yielded very little if any toward any yield increases.

The main problem exist that the land owners or managers of the land are not sufficiently aware of getting free technical agronomic service (due to the reduction or elimination of free state agronomic services to learn how to collect and submit soil samples to interpret complete soil analysis or being unable to learn what plant nutrient the farmer needs or where to purchase the needed products in order to help eliminate the nutrient deficiencies effectively.

As you are aware the cut lawn grasses are usually placed into a municipal disposal site. The disposer is in many cases unaware that the nutrient losses for the disposed lawn grasses are high and no attempts have been made to develop a program that will extract the plant nutrients for soil improvement in order to get higher yields, and better crop quality. It is advised to adjust the pH level requirement to the pH level of the new crop.

An Organic Plant Nutrient Extraction Technology Was Developed:

A number of different size plant nutrient extraction machines have been developed. You can get one from the total of 10 units. Each of the unit has a dual function **to extraction or destruction phase** Depending on the smallest size of an plant nutrient extraction machine a unit is able to extract several gallons up to 1.5 tons of plant nutrients from 6 hrs.to 8 to 10 hours (depending on the size of the extraction machine used). Mix a ratio of 500+ gallons of extracted plant nutrients in every 1,000 to 2000 gallons of pH corrected water (= 450 gallons of plant nutrient extraction media plus 1,000+gallons of pH corrected water/acre would be an ideal application ratio. In other words 3 to 4+ acres could be pH corrected and nutrient enriched/ day. This means that the cost of the machine would very quickly pay itself off by getting high quantities of extracted plant nutrients. At a very low cost. Keep in mind for that type of operation a larger liquid sprayer may be beneficial. As we understand the Fire Department in a given area may be open to rent and utilize

their heavy application unit so that the municipalities, the farmers, gardeners, greenhouse owners and many other could participate in the win-win soil improvement technology by utilizing the so-called lost nutrients for soil and crop improvement. The modified plant nutrients could probably be purchased for a lower cost in comparison to the cost of synthetic fertilizers from a garden store, fertilizer dealer, COOP or nutrient formulator.

Based on a present municipal disposal sites millions of dollars worth of plant nutrients (according to the EPA approximately 20% of all municipal disposal sites are filled at 20% to 25% of their disposal sites annually yarea which are being filled within the municipal disposal site. The plant nutrients extraction machines can be utilized for crop production and be used annually for crop quality improvements throughout the nation(s). These regained plant nutrients would save the farmer considerable quantities that could be leached annually. Elements can either carry a negative or a positive electrical charge which determined if plant nutrient is or is not leachable. Unlike charges attract each other. Unlike charges attract and like charges repel each other.

The negative charged ions or the positive charged ions (like charged ions) repel each other and are subject to be washed out, and can be carried with water into rivers, lakes and oceans. If 2 negative charged elements may repel itself and the negative ions could be washed with water into deeper depth of the soil profile.

I do however believe very strongly that the adoption of a repeal technology would encourage major negative charged minerals to be washed out into the deeper soil profile. Financially this could mean that the end product could be of a great loss to the farm owners and others such as nation ,state, municipalities, private business enterprises, and the farm communities would mean great losses. The other losses are by discarding the cut lawn grasses into the municipal disposal site. By utilizing the plant nutrient extraction system machines could mean a recapture a greater part of the plant nutrients & sell these to the customer at a discounted price. The gain could mean a great benefit for the highway construction, landscape contractor, greenhouse owners, or directly to the farmers and others that could save considerable amounts of money from the plant formulated organic bluegrass media that could be sold to the company mentioned above but also to the orchard, grape producers, gardeners, horticulturalists and other crop producers in the lower 48 states. Based on my practical and theoretical experiences the above-mentioned soil improvement could create a win-win situation to the operator. To following professional could benefit from it. These are the following professionals that would benefit from it:

1. Lawn owners
2. Municipality Grounds
3. State Highway Embankments
4. State Landowners
5. Federal Landowners
6. Flower Gardeners etc.
7. Municipality Grounds
8. Greenhouse **Owners**
9. Horticulturalist
10. Home Gardeners
11. Winery growers (grapes)
12. Orchards of all kinds etc.
13. City Parks etc.

Our technology concentrates primarily on the utilization of the lawn grasses (blue grasses) within a given community. The slurry will be naturally modified with a bacterial enhancement media that would help the proliferation of the

bacterial colonies which assist in the decomposition of organics into in-organics that the plants preferentially utilize. The main purpose of blue grass utilization is multi-fold. It is known that a lawn owner usually fertilizes their lawn almost every spring with some sort of fertilizers and possibly some lime to reduce the soil acidity. The benefits to the lawn owners and the municipal landfill owners benefit the following:

The municipal disposal station usually charges the lawn owner for the disposal of the cut lawn grasses which gives the municipality some profits. The disposal items shorten the life span of the disposal site. It is known that the grass and others decay-able items usually create methane gas etc. As you may recall the Merrill Field disposal site here in Anchorage, AK caused the entrance of methane gasses into the family housing., Impermeable plastic liners had to be installed to eliminate the entrance of these gases into the family homes. Based on the above mentioned soil enhancement program creates a win - win situation where a specialty prepared grass slurry allows the municipality to sell the highway contractor the grass slurry (extracted soil nutrients) probably at a 50% discount rate in comparison to the existing cost of the synthetic manufactured fertilizers. The highway contractor does not have to follow the civil designer application rates. As you may have observed in the past, almost all re-vegetation attempts fail after the 2nd or 3rd year due to the improper recommendation such as type and depth of a top soil needed. In many cases, the re-vegetation failed to improve the seed mixture as well.

The greenhouse operators, gardeners, farmers, horticulturalist etc. could utilize similar applications. Theoretically the landfill would utilize a specially designed plant nutrient extraction machine Model # QM-1000 to 2000L (2+ to 3+ tons of SOIL NUTRIENTS via EXTRACTION MACHINE. The largest machine may cost larger amount of money + freight could be provided by utilizing a 380 Volt-3 phase electric power models or local 220-volt supply services. A processing unit can be modified to any local voltage requirement at a very insignificant cost.

As you know, the municipal landfill collects a payment from the homeowners or lawn service companies for disposing their grass cutting quantities. The manufacturer could make some additional money by offering them a modified grass media to the road or highway contractors or anyone that needs to fortify their land at a very low price in comparison to the synthetic fertilizer price. A bacterial enhancement formulation will be added to each batch, which would increase the bacterial population in the soil, which in turn will multiply the bacterial colonies that would encourage the conversion of the organic matter into inorganic substances that the bacteria and the plants prefer to utilize. Based on the design of the processing machines the unit could process a given tonnage of grass in every 6- 8 hours/day.

The biggest problem is that the unprocessed grass would be digested in several weeks. Whereas the extraction technology could speed up the bacterial conversion in several days.

Worth to consider is that there are 2 billions of bacteria in 1 gram of soil and as a result, the total grass surface is such that most of the soil bacteria cannot land and digest the grass with ease provided, In other words, the propagation of a bacterial modifier (without a bacterial modifier. Without a bacterial modifier thd bacterial colonies will not be able to digest the macerated grass effectively (for 2 billion of bacteria there is insufficient room for the majority of the bacteria to be able to participate in the conversion of the grass slurry from the organics into inorganics matter. It is believed that the profits will be such that the demand for such fertilizer media will grow which means that based on the results will increase the demand. By entering into organic/inorganic fertilizer business could become to be a very profitable business to enter into organic/inorganic fertilizer business.

The use of discarded grasses will increase the lifespan of the disposal site that will and eliminate the production of methane gas.

The farmers could also benefit by applying the treated grass slurries in form of in-organics that will produce higher yields and increase the quality of crops as well. The breakdown of grasses into small micron particles is designed to break down the grass into very small particle that are sprayable and as a result able to penetrate the soil into deeper layers of the soil profile. Since the bacteria converts, the organics into in-organics, which adds to the soil fertility improvement of the soil at the same time, increases the depth of the topsoil and eventually of the subsoil as well.

In practice, the topsoil can be ameliorated from the 6" to 8" inches topsoil to increase possibly to 8" to 10" depth. In time. This means that the soil fertility of 1 acre will be equal to 1.3 acres within 2 to 3 years and similar can be established for the sub soil known as the sterile layer) as well. As the saying goes our good Lord did not make more soils than what we have now. To increase the depth of the soil is up to the owner of the land. This means that the developed technology can & will become that.

The benefits given to the highway or county road contractors the municipal landfills would also benefit by selling the modified grass slurries at a discounted price to the public. A contractor could utilize the lawn green liquid media that can be sprayed via hydro-seeder onto the soils at a significant savings.

The design of a grass-processing machine is such that it will be able to make sprayable grass slurry media by processing 4 tons of grass within a period of 8-9 hours/day. The grass slurry could also be sold at a reduced price to the highway contractors, which will save the cost of purchasing synthetic fertilizers, and at the same time save the state, some cost of the synthetic fertilizer media.

THE FOLLOWING INFORMATION DEALS WITH A NEW TYPE OF USED CROP COLLECTION SYSTEM THAT WAS UTILIZED during the World War 2 by the farmer and the COLLECTOR OF Waste Products FOR the FARMERS in Germany and Austria.

The answer lies in collecting unused food sources (old food sources or restaurants customers return, customers returns which were collected by the farmers from restaurateurs and supplied to the livestock animals during the World War 2 by collecting customers returns or unused food sources from restaurateurs such as ground coffee, bread,. potatoes, and any other restaurant returned or leftover food sources that the customers returns as waste after eating. The food sources can be reheated in a 50 or 100 gallon tank that can be re-heated (sterilized) within an 50 or 100 gallon tank to minimize any type of bacterial or other potential infection. Precooked materials can be run through a nutrient cutting /mixing unit.

As experienced from the past the synthetic retail prices for the fertilizer formulations or individual plant nutrients have been almost cost prohibitive. Our new plant nutrient extraction units will be able to reduce the nutrients cost reduced by 65%, to 70%. The most inexpensive source could be mined as powdered(ground byproducts such as rock -phosphate, egg-shells, blood- meal, powdered-calcium and other raw plant fertilizers products and others. All these products can be collected and stored for a short period of time, processes with a plant nutrient extraction unit. Plant mixed with the plant extraction unit water is to obtain a homogeneous wet slurry mixture for soil application, and uniform nutrient distribution.

Similar to the homogeneous mixture produced it is advised to dilute the media to a ratio of 1 part of organic ground plant nutrient media which is mixed with 1 part of water slurry. A mixture 1:1 to 1:2 nutrient mixture by adding clean water that should be pH corrected to the pH level converted to the pH level of the future crop type.

It has been learned that there are soil bacteria and fungi that convert the plant nutrients such as raw ground rock-phosphate to available plant nutrients. Additional nutrient carrying elements such as nitrogen, sulfur, magnesium calculate the individual rates in lbs. /acre applied, calcium, and other plant nutrient sources can be prepared with a plant

nutrient extraction units prepared as a homogeneous media on a broadcast basis for the growing vegetation. It should be noted the law of minimum can be easily overcome with least minimum cost since the machine puts all the materials into a homogeneous media which will be ideal for plants after converted by bacteria and fungi to an inorganics which the growing plants preferentially utilize.

There is a list of various products that can be converted by bacteria and fungi into valuable inorganic fertilizer nutrient mixture, Based on the source additions and conversions can save you on considerable quantities of inorganic plant nutrients. For ease of calculations the application rates can be easily calculated as shown in the following application rate tables as shown below.

Once individual rate are applied it will be rather easy to calculate the lbs. or milligrams/sq ft. to be applied.

100 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00229 lbs. / acre or 1.0390 gram / sq.ft.
200 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00457 lbs. / acre or 2.0819 gram / sq.ft.
300 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00688 lbs. / acre or 3.1210 grams / sq.ft.
400 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00918 lbs. / acre or 4.1640 grams / sq.ft.
500 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00111 lbs. / acre or 5.0530 grams/sq.ft.
600 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .0137 lbs. / acre or 6.2140.grams / sq.ft.
700 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00229 lbs. / acre or 7.2470gram / sq.ft.
800 lbs. fertilizer application rate / acre on 43,560 sq. ft. = .00229 lbs. / acre or 8.2860 gram / sq.ft.
900 lbs. fertilizer application rate / acre on 43.560 sq. ft. = .00229 lbs. / acre or 9.3250 grams / sq.ft.
1000 lbs. fertilizer application rate / acre on 43.560 sq. ft. = .00229 lbs. / acre or 10.039 grams / sq.ft.

Once the rate of organic fertilizers were produced it will be easy to calculate the rate of individual fertilizer nutrients which according to the soil analysis need to be applied.

You will have the opportunity to learn all about the capabilities of the plant nutrient extraction or plant nutrient destruction units will be needed. It will be safe to calculate and we will be able to show you the nutrient type and quantities of nutrients needed.

Should you have any question or suggestions please e-mail us at the following e-mail address jbauer@geocheminc.com for any questions you may have.

Professional Regards,

Joseph Neubauer | CEO | GeoCHEM, Inc. | Corporate



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