



Review Paper

Organic Agricultural Crop Nutrient

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Abstract

Organic agriculture is farming without the use of pesticides, herbicides, fungicides etc. To maintain the better nutrient management in organic farming, there are various factors which support nutrient supply to plants either by recycling or proper management of biologically related phenomena such as limited use of slowly soluble off farm materials. Regenerative agriculture is a dynamically advanced modified techniques involving use of organic farming methods. Basic idea of organic farming is the minimum use of nonrenewable resources such as fossil fuel used for manufacture of fertilizers. The excessive use of fertilizers containing nitrogen in farming cause a serious and havoc damage to the ecosystem. In the present study, an attempt has been made to focus on the long term goal to help and maintain sustainable farming by adopting new techniques and save our environment by avoiding the overuse of fertilizers. The study concluded that these practices not only prevent pollution but also maintaining nature over ecological balance. Sustainable organic farming providing enormous environmental benefits. So, organic agriculture is eco-friendly, improve soil fertility and sustain high yield.

Keywords: Nutrient management, organic agriculture, nonionic surfactant, nutilite farms, nutriplant.

Introduction

Land is regarded as a natural resource which has many benefits for human beings while as the same time provides a habitat for many living organisms¹. However currently, the behavior of land fertilizer has been changed due to the increasing population which leads to a higher demand of production². With the eye on increasing demand of production, there is stress on the farmers to yield more. That is why, farmers using more and more pesticides. Pesticides reach the air from aerial spraying aimed at certain crops. At the same time, consuming pesticides led to environmental degradation. The impact of pesticides is often greater than what is intended by those who use them. Due to the scarcity of land and since the reform of free trade environment policy; people have stopped using the natural fertilizer and now use chemical fertilizers which provide high cause of losing Nitrogen fertilizer and providing soil and land degradation³. Hence, excessive use of fertilizers cause environmental degradation⁴. Moreover, the fertilizer provides 43% of Nutrients which the global products extract each year, and the consumption may raise as high as 84%⁵. Among states, Punjab took a very big and early lead in fertilizer application. Punjab continues to be at the top with more than 300 Kg use of fertilizer per hectare per year followed by Haryana. Relative use of N, P, K used to compare imbalance in fertilizer use presents an increase in growth rate. In a situation like this, imbalance can cause adverse impact on yield.

Concept of chemical fertilizers

The practice of Agriculture has in order to protect their young plants ⁶Ever-growing of population; people have to find a new

approach for themselves for surviving. Increasing agriculture land and products is a new approach for them to save their life. Since the development of the Green Revolution, pesticide became a hot and famous approach for people to promote the agricultural products, especially increasing the yield of products⁷.

Looking at the high population growth agriculture productivities cannot meet the demand of food for large amount of people, thus new methods for enhancing the crop yield is regarded as a key point. In order to improve the productivity of cropping, there are five common practices to meet the human needs: increasing title land or land expansion, improving the quality of plants. Pesticide became predominate in the irrigated area from the emerging of green revolution with the most concern on food security for a rapidly growing population⁸ around for thousands of years, and has become an increasingly popular way of life in the world, Moreover, it provide countless people with substances and livelihoods⁹ No doubt, chemical fertilizers help in enhancing agricultural production to a large extent in many parts of the world. Farmers add a large amount of fertilizers and pesticides at the time of sowing.

Organic and Sustainable Agriculture

Organic agriculture is one of the best alternative technologies to save our environment. No doubt, it increases the quality of crop yield but also sustain ecosystem.

It is much more beneficial than conventional farming and socially and ecologically sustainable. Its main target to obtain profit and prosperous farming community.

Organic Farming

In organic farming, the term Organic refer to denotes products that have been produced and used according to some standard norms either it is a matter of handling, processing, food production or marketing stages. Organic standard will not make any kind of negotiation with producers and processors from compliance with general requirements such as food safety, regulation, pesticide registration, labeling rules etc. If there is comparison between conventional and organic farming, there is lot of question in our mind for discussion-whether organic farming producing enough food, whether it is possible to meet the nutrient management of crops entirely from organic sources or whether food produced is in superior in quality. The application of these techniques restores and maintain soil fertility. Organic agriculture is preferred because of its systematic approach that ties food production to ecology and connects a common goal of healthy vital environment for all. Organic farmers are motivated by goals to produce contaminant-free foods, reduce exposure to potentially harmful chemicals, and price incentives in the marketplace. Many non-chemical practices are being adopted by non-organic farmers in order to reduce costs and negative impacts on the environment. This is a rapidly growing part of the food sector. The study shows that environmental impact indicators such as floral diversity, faunal diversity, habitat diversity, soil biological activity, soil organic matter, soil structure, soil erosion, landscape, leaching use, nutrient use has shown tremendous growth with use of organic farming techniques. The organic farming looks at the human element, good for the planet, for the economy and for society.

Organic Farming → Economical-Ecological- Social

Organic farming is an earth and eco-friendly approach which:

Prohibits: Pesticides (herbicides, fungicides, insecticides etc.), manmade fertilizers, toxic chemicals and spray.

Prevents: Soil erosion, soil biological activity, soil structure by crop rotation, composting and diversity on the farm and other agricultural techniques

Protects: Ecology and environment, its habitats and species diversity.

Sustainable Farming System

To maintain sustainable organic farming and maintain soil health, advanced agricultural techniques must be adopted to protect our planet. There are specialized techniques and practices such as biodynamic, bio-intensive farming, natural pest, effective microorganism, homa farming, living fences, multicropping polyculture, and many more manage the relationship between plants, pest and ecosystem. These techniques not only protect our soil health but also supply nutrition to plants from the beginning. Another commitment to nurture and protect our health, Nutrilite has come up to remove

or minimize pesticide and artificial fertilizers pollution. NUTRIWAY is rich in nutrients, minerals and act as boon for all organic farms. NUTRIWAY is economically, sustainable way in organic farms for the future generation. The use of NUTRIWAY not only eliminates 80% of the pest and disease but also inhibits the growth of potential insects, termites, weeds and control disease. So, Nutrilite is substance that maintains physical, chemical and biological activities of the soil. It increase soil fertility by maintaining optimum balance of nutrients and minerals in the soil Nutrilite farms are certified on a yearly basis by state organizations accredited under National Organic Program by USDA.

Features of Nutrilite's Sustainable Farming Systems

The major feature of Nutrilite in sustainable farming is diversity of the plants under cultivation. It can be grow locally adopted varieties having some quality traits for the premium markets. The economics of Nutrilite farming over a period of years indicate that there is reduction in cost of cultivation and increased gross and net returns. With this use, farming is economically viable and sustainable for families who depend on it. When Nutrilite applied to soil, they feed the soil with natural minerals and protect the soil against pests and disease. With this usage, wide varieties of crops can be cultivated such as cereals, pulses etc. and help in preserving the crops. Nutrilite farming helps in preservation of diversity of animal species and their habitats within the farm boundaries, maintaining ecological balance. They provide quality assurance in the final product and protect the soil as a living organism by feeding the soil with natural minerals.

Non-Ionic Surfactant

APSA-80 is an 'All Purpose Spray Adjuvant'. It is an agricultural product and an international brand with rich heritage of over 40 years. It is boon for irrigation. Actually, this adjuvant when mixed with insecticides, fungicides, herbicides and defoliators increases the performance of pesticides many folds. Use of this useful adjuvant not only helps to control pests, insects, and disease but also provide more production of crops, fruits & vegetables. Chemically, APSA-80 consists of special ingredients -'Non Ionic Surfactants' which help to reduce the surface tension of water. Figure 1 shows **APSA-80**. The phenomena is that these surfactant work on surface of droplets of water and reduce its surface tension by pulling water and wax on leaf surface together, When pesticides is mixed with water and adjuvant, there is better and even distribution of pesticides on the surface of leaf and cover more coverage. More coverage area means effective pest control with less consumption of pesticides and result in better and higher yield. It is a Performance Maximizer which offers farmers an excellent opportunity to increase their crop yields. Adding an adjuvant to water carrying the pesticide increases the coverage by reducing the surface tension of the water. That is exactly what APSA does.



Figure-1
APSA 80

APSA-80 has following useful properties: i. **Spreader:** APSA-80 is designed to be added to a spray solution such as a tank mix. As such, is highly effective in causing spray droplets to spread and penetrate the surface of foliage. This provides for more uniform spray deposit on plants, improving coverage of herbicides, insecticides and fungicide sprays. ii. **Activator:** Increase the activity of certain herbicides, especially those applied to emerge weeds. The thorough wetting action provide by surfactants in APSA helps improve performance of post emergent herbicides, insecticides and fungicides. **Use on Field crops:** Rice, Soybeans, Corn, Wheat, Cotton, Sugarcane etc. **Vegetables:** Cabbage, Carrots, Pea Pods, Spinach, Peppers, Cauliflower etc. **Fruits:** Orange, Apple, Grapes, Peaches, Mangoes, Pears, Bananas, Tomatoes etc.

Uses: APSA-80 is useful for grown and harvested crops. It can easily applied on crops in powder form by aerial spray. Its unique properties help in reducing leaf spot infection on banana fruits. The equipment where it is to be kept is quite safe because of non corrosive nature. It has biodegradable nature.

Nutritional Supplements

Nutriplant AG - 2-1/2 Gallon: Another way to enhance the crop yield is achieved with this nutritional supplement. NUTRIPLANT AG is a liquid foliar nutritional supplement which is designed to apply on the crops only at critical stages during the development of crops. Most crops never reach full genetic yield potential, so Nutriplant AG is designed to be applied at critical stages of fruit set and crop growth. Figure 2 shows benefits of Nutriplant AG. The study reveals that yield of crops have been increased by 15% although results are not uniform.

Benefits: Nutriplant AG is specially designed for use at critical growth stages of plant. This is generally used with a normal NPK fertilizer which not only Increases photosynthesis by an average of 16% but also more yield¹⁰ of fruits and vegetables. Another benefit of Nutriplant AG that it can improve uptake of nutrients through the root system¹¹ when it enter the soil. It has high antioxidant activity which reduces the cleavage of free

radicals and prevents the plant from free radical. Nutriplant AG helps to up-regulates genes involved in plant response to abiotic and biotic stress and reduces negative effects of abiotic stress of heat, freezing, drought and plant diseases. With use of Nutriplant AG, there is reduction in drought damage to leaves by 15% and plant can withstand to higher temperature.

Designed for foliar application, this liquid micronutrient supplement fertilizer should be applied at specific growth stages in crop development. For a particular plant, there is need of nutrients at every stage of growth because plants are lacking the sufficient nutrients. NUTRIPLANT AG is designed to give the plant what it needs at these critical growth stages and solve the requirements of nutrients it needs.

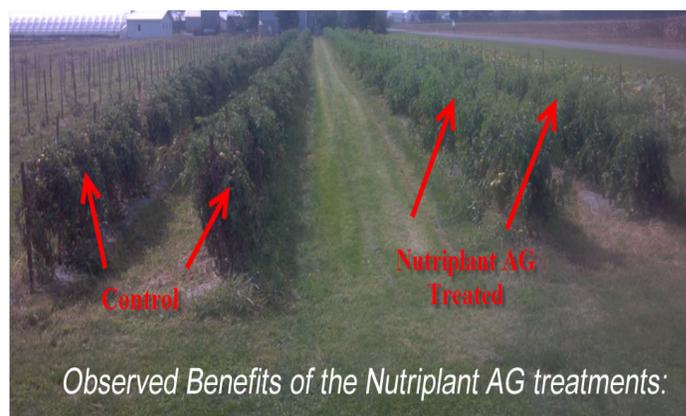


Figure-2
Benefits of Nutriplant AG

SD Powder or SL Liquid Nutritional Fertilizer: i. Dry Nutriplant SD for application in the field at planting, ii. Liquid Nutriplant SL for commercial and in-furrow application.

These are micronutrients supplement given at the time of seedling for faster germination and growth of seeds. These are generally given at the time of growing season just to get head start. With use of Nutriplant SD supplement, crop emerges out from the surface of ground with thick stem. This enhances the crop yield by almost 15% but again the results vary. These crops which are given micronutrient supplement which satisfy all necessary requirements for growth and enhance seedling vigor lead to higher yield. It stimulates root growth and overcome negative impact of pesticides on seeds.

Usage Cost of Nutriplant SD

The cost of Nutriplant SD depends upon size of seed and its application on farm. For larger seeds like corn, cost of Nutriplant is about \$1 per acre and for smaller seeds like alfalfa, the costs drop to about 45 cents per acre. So, quicker seed germination is quite helpful not only in stronger, bigger root system and better crop stand but also helpful in better crop yield. Figure 3 depicts how enhancement in growth of plant with usage of nutriplant SD.



Figure-3
Enhancement in growth with Nutriplant SD/SL

Nutriplant SL- 1.6: Nutriplant SL is in liquid form of Nutriplant SD. This substance has same application as solid powder form, this is also applied to seedling of crops and help in easy emergence of crop from ground with thick stem. Crops will be better prepared to compete for nutrients, water, and sunlight – helping dynamic improvement in crop yield. Nutriplant SL is intended as a supplement to a regular fertilizer program Figure 4 shows the difference of seed treatment under control and treated stage.

Benefits of Nutriplant SD/SL: Nutriplant SD/SL increase crop yield by providing essential nutrients for development of strong shoots and roots. In roots Nutriplant SD increased the content of copper (Cu) by 35%, iron (Fe) by 53%, manganese (Mn) by 9.2% and zinc (Zn) by 16% over untreated control. Nutriplant SD/SL helps in Stimulate root hair growth and enhancing seedling vigor. These nutrients help in reducing effect of abiotic stress and biotic Stress by overcoming negative effects of pesticides applied to seed. It also reduces total Eyespot disease symptoms by 28% and severe symptoms by 43% over seeds



Figure-4
Nutriplant seed treatment

Precautions using Nutriplant Products

Care and precaution must be considered when Nutriplant SD/SL used manually. For obtaining better yield, ratio of Nutriplant SD/SL and seed is very important. Care must be taken how much dose of Nutriplant product required to mix with seed. It is not recommend mixing of Nutriplant AG and Nutriplant SL products with products containing phosphorus¹² when applying new combinations, it is recommended to use in small area.

Monitors: Excessive use of Nutriplant SD powder with seed not only gives unwanted result but disrupt correct analysis by monitoring system. Monitoring devices are sophisticated instrument, unable to analysis proper examination of products if any substance is taken in overdose. Thus, an overdose of SD or failure to thoroughly mix the SD with the seed could affect monitoring system or provide poor result. It is always advisable to try at small scale and analyze it with spectroscopic techniques. It is recommended that 1 oz of graphite per planter box/hopper be used. The graphite is needed to lubricate the equipment, so it should be used all of the time.

Jar Test: To test the compatibility of Nutriplant adjuvant, this can be easily achieved mixing water and Nutriplant AG or SD or SL in a jar in a required ratio and thoroughly mixed with a shaker machine. The mixture is transferred to the sprayer tank up to the marked scale. Mixing should be through and let it undisturbed for 30 minutes or more. If there is scum formation or crystal formed, again mix it thoroughly for another half an hour.

Neem Cake Fertilizer

Another boon for organic farm is use of Neem cake. It can be applied to farm, garden and lawn. Neem cake consists of neem seed along with natural nutrients which is required for the growth of plants, So, Neem is bitter boon as pesticides. Every part of tree i.e. leaves, flowers, fruits, bark, seed are utilized as a pesticides, insecticides, medicine, diabetic food, mosquito repellent. Neem is potentially one of most valuable and least exploited of all tropical trees. Neem Cake has adequate quantity of NPK in organic form for plant growth. Being totally botanical product it contains 100% natural NPK content and other essential micro nutrients. Though neem cake is a fertilizer it also acts as pesticide.

Benefits: Neem cake is rich source of NPK and other Micro Nutrients. Every 2-3 tree can protect one hectare of crops. The studies reveal that 20 kg of neem seed kernels protect three hectare of crops. Neem cake contain nutrients for plant, maintain power of soil and can improve soil organic content. Neem can be blended with fertilizers/Urea and used as fertilizers in sugarcane field. Neem tree used in soap, lubricants, paper, gums, paste, toothpaste. Azadirachin from neem act as insect repellent and inhibit the feeding upsets of insects's hormone balance so that it become permanently incapacitated.

Neem oil provides a cheap and harmless mosquito repellent that is effective against malaria carrying anopheles species. Neem oil mixed with kerosene and burnt in tin lamps keep mosquito away. Neem cake control 120 species of insects, species, termites, nematodes, migratory locusts, pulse beetle, rice weevil, white flies, citrus red mint and safe for earthworms. These supplements provide less cost and more yield than conventional farming using urea and fertilizers.

Better Yield: It gives 15-25% more yield than conventional farming. Conventional fertilizer has drawback of absence of all essential nutrients which is required for constant growth of fruit/crop. One more advantage of Neem cake is to control specially nematodes and other soil borne pest which absorb nutrients from soil. This is the reason why now more farmers are shifting towards to Neem cake for the growth of crops¹³.

Improve Soil Organic Content

Neem seed cake produces organic acids on decomposition and neutralizes excess alkalinity in soil. As Neem is totally natural and compatible with microbes in the soil. It enhances micro flora vegetation and fertility of the soil. Soil texture, water holding capacity, soil aeration for better root development can be increased by use of neem cake with other fertilizers. This elevates the soil organic content in soil. No doubt, this not only helps in avoiding the use of chemical fertilizers but also increase crop production.

Conclusion

After year effort of achieving self sufficiency in the field of agricultural, scientific community are taking an active interest in the matter and offer necessary leadership in educating the

government and public regarding the actual situation of environment¹⁴It is important that lay public must be informed about consequences of scientific development that are adopted for commercial purposes.

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