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Advantages and Nutritional Importance of Organic Agriculture Produces Food on Human, Soil and Environmental Health in Modern Lifestyle for Sustainable Development

Kamal Prasad

Warkem Biotech Pvt. Limited, Agro Division, Swastik Disha Business Parks, via. Vadhani Industrial Estate, LBS Marg, Mumbai- 400086, Maharashtra, India.

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***Corresponding author:** Kamal Prasad, Warkem Biotech Pvt. Limited, Agro Division, Swastik Disha Business Parks, via. Vadhani Industrial Estate, LBS Marg, Mumbai- 400086, Maharashtra, India.

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Abstract

Manuscript deals with the nutritional value of organic agriculture and benefits of organic foods on human, soil and environmental health. Biofertilizers, biopesticides and bioinsecticides are usage in organic agriculture production systems. This paper describes with some fascinating findings of organic agriculture produce systems and its beneficial impact on human, soil and environmental health.

Key Words: Organic Farming; biofertilizers; Nutrition; human; soil; environment health

Introduction:

Organic agricultures produce (OAP) are extremely safety food system compared to conventional agriculture (CA) and extremely lower impacts on the human, soil and atmosphere. Organic agriculture 9OA) is developed victimisation strategies that accommodate organic agriculture necessities. OA structures practices that cycle resources, promote ecological balance and conserve biodiversity. Organic agriculture organization regulation restricts the uses of chemical fertilizers and pesticides in OA. Commonly OAP food isn't processed using radiation and artificial food flavours. OAP food is safer, maximum beneficial nutrition and healthier to eat than CA produces food. OA is well known from CA respect for healthier food values to human, the environment, animal welfare and soil health for sustainable development. Soil health is termed because the soil's capability to operate as a vital living system, within the ecosystem and land use boundaries, so as to sustain productivity to healthy human, animals and plants for sustainable development. OA enhances or maintains air and water quality, moreover, as enhances human, animal and plant health. Soil health is critical to crop production for nutritive quality produces. Soil is a very important resource that desires special care for OA users. Currently, majority of crop and soil management systems aren't sustainable because of excess use of chemical fertilizers and pesticides. On the one hand, overuse of chemical fertiliser has resulted in nitrogen deposition that may be a threat to the sustainability of an approximated 70% of nature [1]. On the other hand, in most regions of the planet underutilization of chemical fertilisers entails that soil nutrients exported along with crops fail to be replenished, leading to the degradation of soil. According to the World Health Organization (WHO) and the United Nation Environment Programme (UNEP), twenty-six million people in worldwide were infected by pesticides every year. The uses of pesticides will increase the incidence of assorted cancers and therefore the risk of Parkinson unwellness [2]. CA pays an excessive amount of attention to crop yield and taste, and neglects its nutritionary performance, leading to the decline of crop nutritionary quality. It had been found that the contents of forty-three totally different fruits and vegetables decreased considerably in protein, Ca, P, Fe, vitamin B and vitamin C from 1950 to 1999 [3]. The decline in crop nutrition quality has serious problem of hidden hunger. Hidden hunger caused by the shortage of trace elements threatens over 2 billion people within the world, and therefore the most vulnerable groups are women, children and therefore the old men or women [4].

Biological Bio-Fertilizers (BBF) for Organic Food Production (OFP) Systems:

Organic agriculture (OA) uses organic manures, organic nutrients as well as microbial biofertilizers and biopesticides [5,6]. Microbial biofertilizers has provided sufficient nutrients to plant growth development and productivity [5]. Fungi and bacteria are a vital living organism in human life. Fungi conjointly play a basic role in numerous physiological processes as well as mineral and water uptake, chemical changes, stomatal movement, and biosynthesis of compounds termed biostimulants, auxins, lignin, and ethylene to boost the pliability of plants to ascertain and environmental stresses. They play a significant role in medicine by yielding antibiotics, in agriculture by maintaining soil fertility, are consumed as food, and form the basis of the many industries. Mycorrhizal fungi are widespread in agricultural systems and are particularly relevant for OA because they can act as natural biofertilizers, enhancing plant growth and yield. Arbuscular mycorrhizal fungi (AM fungi) are the foremost common symbiotic association with most of the vascular plants form a mutually beneficial relationship with living roots of plants [7]. AM fungi provide nutrition's to plants by sequestering nutrients from the soil and chanelling them to the root's morphology [7,8]. AM fungi can have an effect on many alternative macronutrients and micronutrients and in plants and conjointly influence host volatile compound synthesis. It absolutely was found that AM fungi immunisation accrued the nutrients quality of fruits for most nutrients. AM fungi infected plants roots has utilization of nutrients in extremely economical. AM fungi provide a variety of important biological services; especially by enhance nutrition, stress resistance tolerance, soil construction, pollution management, fertility as well as decrease plant pathogens [9,11, 8]. AM fungi interact with cereals, pulses, vegetables, and fruit trees and produces are be very nutritive; so, they receive increasing attention for their potential uses in sustainable agriculture systems [8]. An AM fungus has great potential for given rise to a blossoming agricultural industry for agriculture, horticulture, landscaping, wasteland reclamations and pollution management for sustainable global development [7,9, 12].

Plant growth promoting rhizobacteria (PGPR) are capable of converting rhizospheric soil insoluble inorganic phosphorous into available soluble form by producing organic acids and acid phosphatases that play a significant role within the mineralization of organic phosphorus. PGPR play a significant role within the plant growth promotion induced systemic resistance, and biological management of pathogens. PGPR based mostly bio-formulations (*Pseudomonas* spps) use for OA in place of artificial fertilizers and agrochemicals. *Fraturia* species utilizing the carbon source of soil or exudates of the root produces organic acids and enzymes that facilitate solubilize the fastened potassium into exchangeable form and create it assumable by plant for growth and development. Free living nitrogen fixer microorganisms (*Azotobacter, Acetobacter Azospirilium* species) stimulate rhizospheric microbes. They can shield the plants from phyto-pathogen, improve nutrients uptake and ultimately accelerate biological nitrogen fixation [6]. Leguminous species are nodulated by *Rhizobium* spps. and capable of enhancing the ability of legume to fix atmospheric nitrogen into ammonia, that acts as a natural organic fertilizer for the leguminous crops. Its helps in increasing the productivity of leguminous crops by assimilating atmospheric nitrogen and fixing within the root nodule, formed within the roots of leguminous plants [13,14]. Zinc solubilizing bacteria produces organic acids that convert the insoluble sulphide, zinc oxide and zinc carbonate into available Zn+ thereby increasing the crop yield and quality of the produces. OAP foods produce has all useful nutrient contents and vitamins needed for human health. Usually, the majority of the BBF and BNF are improves in root, soil, food yield health and influence climate changes for global sustainable development [6].

Biological Fungicide (BF):

Trichoderma species are a really effective biological technique to plant disease management for organic farming [5]. Biological fungicides (BF) are reduces growth, survival or infection caused by pathogen by completely different mechanism such as competition, antibiosis, mycoparasitism, hyphal interaction and enzyme secretion. BF is effective for plant damping off, root rot, seedling blight, collar rot, dry rot, loose smut, Karnal bunt, black scurf caused by numerous fungous species found in ecosystems. BF's are very effective against rots on a wide range of crops, caused by *Fusarium*, *Rhizoctonia*, *Pythium* and *Sclerotium* forming pathogens such as Sclerotinia and Sclerotium. Additionally the BF enhances yield along with quality of produce, boosts seed germination rate, increase shoot and root growth of the plants, solubilizes numerous insoluble form of phosphates, augments nitrogen's fixation, promotes health growth in early stage of crop, increase dry matter production substantially and provides natural long run immunity to crops and soil [5].

Biological Agent (BA) for Agriculture:

Bacillus subtilis is an associate aerobic, key gram-positive soil bacterium that has been wide used for the assembly of heterologous proteins for industrial and biocontrol agent for agricultural plant diseases management. It secretes varied enzymes to degrade a range of substrates, facultative the bacteria to survive throughout a continuously dynamic atmosphere. *B. subtilis* and a number of its shut relatives have glorious macromolecule secretion ability, making them necessary hosts for the assembly of medicinal proteins and industrial enzymes. *B. subtilis* has been wide accustomed manufacture heterologous proteins. *B. subtilis* features have a strong capability for macromolecule expression and secretion that has led to its wide use within the production of industrial protein preparations. The industrial application of *B. subtilis* has developed speedily within the last decades for several industrial products such as enzymes, heterologous proteins, antibiotics, vitamins, and amino acids. Chemicals created by *B. subtilis* put together play an important role in various fields, such as food, feed, cosmetics, chemicals, and pharmaceuticals furthermore as biocontrol agent. As a result of it is a non-pathogenic probiotic, *B. subtilis* is often used as a microorganism additive to boost up enteral operates in animals and as biocontrol agent for management of agriculture inflicting sickness. It completely was found promote animal growth and stop diseases. It should be store-bought at intervals the shape of endospores, that then enter the intestinal tract of animals and quickly reactivate to secrete intestinal active proteases, as lipases and amylases within the upper intestinal tract, that's helpful to degrade complicated carbohydrates in plant feed and suppress fungi inflicting plant diseases such as *Rhizoctonia*, *Fusarium*,

fungus genus, genus *Phytophthora*, *Botrytis Sclerotia*, etc. [5]. Moreover, *B. subtilis* can produce polypeptides that have associate antagonistic impact against intestinal pathogens, effectively improving the digestibility of feed. Additionally, it can be manufacture for used in water bioremediation and vaccination for forestall diseases in agriculture for sustainable development.

Biological Insecticide (BI):

Verticillium lecanii is an entomophagous white halo plant type white mycelial growth on the edges of infected insects. These funguses infect insects by manufacturing hyphae from germinating spores that penetrate the insect's integument then develops within the insect body destroying its internal contents, leading to death of the infected host. The fungus aids in integrated pest management (IPM), and management of varied gadfly such as whiteflies, thrips, aphids, mealybugs, jassids, leaf hopper, rust fungi, scale insects etc. *Metarhizium anisopliae* is a green muscardine entomorphogenic fungus that infects insects that are available in contact with it. It's controlled the economic important gadfly of crops like leaf hoppers, root grubs, borers, cutworms, termites, palm weevils, root weevils, plant hoppers, Japanese beetle, spittlebug, white grubs etc. *Beauveria bassiana* causes white muscardine malady. *B. bassiana* kills the gadfly by parasitisation which ends up once the insect comes connected with fungal spores. *B. bassiana* manage the assorted necessary gadflies such as whiteflies, aphids, grasshoppers, weevil, cereal leaf beetle, bark beetle, lygus bugs, chinch bug, fire ants, codling moth termites, root weevils, plant-hoppers etc. True bacteria Thuringiensis taxonomic group, *Bacillus Thuringiensis subspecies israelensis* (BTI) and *Bacillus Thuringiensis subspecies kurstaki* (BTK) used as biological agent for larvae stages of bound dipterans. BTI is known to produce protein crystal poisonous substance that are effective in killing varied species of mosquitoes, fungus, gnats, blackflies etc. BTK is ideal for controlling tent caterpillars, gypsy moth, cabbage inchworm, tomato hornworm, potato worm and alternative leaf feeding caterpillars on trees, shrubs, tomatoes, and alternative vegetables crop.

Biological Nematicide (BN):

Biological nematicide such as *Paecilomyces lilacinus*, *Pochonia chlamydosporia* etc. are nematophagous entomogenic filamentous fungus effective against plant parasitic nematodes. BN protects the roots against varied parasitic nematodes and helps to scale back the chemical pesticide load. It's increased the productivity by containing the nematodes pests. microorganism applied organic products had a higher dry matter, extremely nutritive, higher vitamin contents, lower nitrate content and contained less chemical pesticide residues.

Organic Agriculture Produce (OAP):

Organic agriculture produces (OAP) food isn't produced or processed by the utilization of chemical pesticides or chemical fertilizers; it doesn't contain any element of toxic chemicals and should not have any harmful effect on human health. The utilization of natural techniques such as manure, organic plant stimulants, biofertilizers to fertilize the lands alone with and crop rotation and biopesticides uses for gadfly and malady management work completely well in producing safer, healthier, and smellier final food product. OAP foods are healthier because of bigger nutritional value and fewer toxic chemicals present in OAP food. Studies of the nutrient content in organic foods vary in results because of variations within the ground cover and maturity of the organic agriculture operation. Nutrient content additionally varies from farmer to farmer, land to land in addition as year to year. However, numerous studies show that organic produces give considerably bigger levels of antioxidant, vitamin, iron, sodium, magnesium, and phosphorus compared to non-organic product of an equivalent produces. Whereas being higher in these nutrients, they're additionally considerably lower in nitrates and pesticide residues. Additionally, organic foods generally give greater levels of a number of necessary antioxidant phytochemicals (anthocyanin's, flavonoids, and carotenoids). Although biological analysis studies of organic fruits and vegetables systematically demonstrate that organic foods have bigger antioxidant activity, are more potent suppressors of the mutagenic action of toxic compounds and inhibit the proliferation of certain cancer cell lines. Clear health advantages from consuming organic dairy products are have been demonstrated in regard to allergic dermatitis. Moreover, healthy foodstuff merely means that healthy people and superior nourishment for a more robust living for each people and animals.

Nutritious Value of Organic Product:

Current discovery recommended that conventional produced fruit, cereals, vegetables, meat, milk, fish, and poultry contain dramatically less vitamins and minerals as compared to organic produced once application of biological inputs [15]. OAP foods contain terribly high nutritional content as a result of they are doing not contain changed ingredients compared to the traditional agricultural food product (Table 1). Another factor that makes them extremely nutritious is that are given time to develop and are supplied with the simplest natural conditions for growth. The alimentation vitamin and mineral contents of OAP foods are continually high because the soil life and health offers the foremost appropriate mechanism for crops to access soil nutrients.

S.No.	Description	Organic Agriculture	Conventional Agriculture
1	Land Exhaustion	Use of natural fertilisers, crop rotation improves soil quality.	The land and soil quality degrade over time due to the utilization of artificial chemical and pesticides.
2	Fertilisers and Pesticide	Only natural fertilisers like manure, compost, biofertilizers etc. are used.	Synthetic fertilisers such as N, K, P, Dichloro-diphenyl-trichloroethane (DDT) insecticide and another chemical micronutrient used.
3	Nutrient Quality	The OAP foods contain higher human beneficial nutrients content.	There is a nutrient loss. Food product has high chemical nutrients.
4	Impact on Soil	The soil remains fertile and healthy.	The soil becomes infertile due to exploitation and chemicals produce pollution in environment.
5	Impact on the Environment	Organic agriculture is sustainable and respects the environment.	CA is not sustainable; has a toxic effect on environment.
6	Genetically Modified Organisms	GMOs are not used or encouraged in OA.	Mostly GMOs organisms are used to increase crop growth and yield.

7	Health Safety	Crops fully grown through OA technique don't cause any damage to human, animal, soil health as well as environment.	Crops fully grown through CA technique are often prejudicial to human, animal and soil health as well as environment.
8	Animal Cruelty	There is not any animal cruelty.	Usually inject antibiotics in livestock.
9	Farming Techniques	Generally, uses of mixed crops, crop rotation, companion planting etc. retain soil quality and improve soil health.	The CA techniques are focused only on increasing the yield and improving the economy. That is not good for the human and soil health in addition as environment in long runs for the future.
10	Change the Lifestyle for the Farmers	It's the better for farmers in addition as different consumers.	It spells doom. Chemical agriculture could be a threat to their livelihoods.
11	Reduce Pollution	OA practices could cut back pollution, conserve water, reduce soil erosion, increase soil fertility, and use less energy	CA practices increase pollution, soil erosion, decrease soil health due to heavy use of chemical fertilizers,
12	Impact of Bird and Animal	OAP without synthetic pesticides is additionally better for nearby birds and animals as well as people that live on the point of the farm	CA used synthetic pesticides is harms for nearby birds and animals as well as people who live close to the farm
13	Carbon Footprint	OA includes a smaller carbon footprint, conserves and builds soil health, replenishes natural ecosystems for cleaner water and air, all without toxic pesticide residues.	Conventional agriculture causes exaggerated greenhouse gas emissions, soil erosion, water pollution, and threatens human health.

Table 1: At a glance for organic Agriculture vs. conventional agriculture produces food

Superior Flavour in Organic Produces:

After application of organic inputs such as manures, biostimulants, microbial fertilizers in OA, soil and plants are healthy and its products flavour is delicious create food that tastes the best. OAP mature fruits, cereals and vegetables taste much more vivacious and powerful as compared to CA produced. Except nutrition, the mineral and sugar structures in organic foods are tasty because of the crops are given longer to develop and mature. The usage of natural and environmentally friendly agricultural production techniques (NEFAPT) is unconcealed to be the explanation for the superior flavour in OAP foods. It's unremarkably reported that the flavour of organic vegetables and fruits are of upper quality compared to those who are conventionally developed.

Harmless Organic Agriculture Product:

OA and its produces are harmless than CA produces. OA doesn't pollute ground water with nitrogen run-off and terribly less pesticide residue found in OAP foods as compared to CA produce foods [16].

Organic Food Reduced Pesticide Contact:

Currently people are health conscious and plenty of customers opt for organic produce foods as a result of they need to lower their exposure to the pesticides found on conventional produces. Certified organic produces (COP) is free from chemical pesticide residues in order that CA produces was cut back sales considerably [17].

Organic Agriculture and Water Status:

OA doesn't use the chemical fertilizers and pesticides. Organic inputs (OI) and microbial fertilizers (MF) applied by organic farmers for their farming. OI and MF are didn't polluting the ground and therefore the water supply system (WSS). This conjointly supports the soil conservation and WSS efforts. As a result of there is not any chemicals utilized in the production of OA foods, there's no potential for harmful chemical runoff. OAP is healthier for everybody. Eradicating the prevalence of chemical fertilizers can create entire environment even healthier.

Innovation in Organic Food Production (OFP):

Organic food producers are on the innovative of science as they are focused on finding ways that to produce quality foods without the utilization of the chemical fertilizers and pesticides that are harmful to human and soil health, and therefore the health of the earth. OA farmers have used current innovative techniques such as biological fertilizers, biopesticides and bioinsecticides to exchange the chemical fertilizers, pesticides and insecticides [1,21].

Organic Agriculture Produce Foods Non-Genetically Modified:

OAP foods are genetically modified organism (GMO) free, that is, they're not genetically engineered in nature. Genetic engineering of agriculture food products may be an immense concern within the current era. They're foods or plants with altered DNA in manners that don't turn up in nature, typically to boost resistance to pesticides/herbicides. Whereas there's lack of conclusive proof of its dangers, food safety advocates are involved that long term research has not been conducted to verify their safety.

Environment Protection through Organic Agriculture:

OAP are striking the environment. Conventional agriculture strategies erode soil and use dangerous chemicals and pesticides. Conventional chemical and pesticides are harmful and very unhealthy for human health likewise as environment [17, 18]. OI, organic biofertilizers and biopesticides are generally safe and shield human health and atmosphere. OAP are domestically fully grown and pose terribly minimal interference to the environmental resources that support healthy living. Since harmful chemicals are proscribed in OA, there's minimum water, air, and soil pollution thus making certain a healthier and safer environment. To be precise, OA lessens the long-term human health implications caused by air, water, and soil pollution [18].

Antibiotic resistance of Organic Produce Food:

Humans are vulnerable to varied health problems and unwellness, and most of the time they need to require precaution measures to confirm they continue to be healthy. This can be achieved by obtaining a spread of vaccinations and antibiotic medicine once a brand-new strain of virus or bacteria is realised. Similarly, non-organic food sources (especially livestock and feeds) use vaccines, growth hormones, animal by-products, and antibiotics to treat and feed the animals. Once humans consume the non-organic food products, they indirectly consume the antibiotics, growth hormones and vaccines that weaken immune systems on the account of antibiotic, vaccine, hormones, and animal by-products drug overdose. This might alter the immune system thereby rendering humans unable to defend themselves against diseases. The advantage of OAP foods is that their production processes doesn't involve the utilization of chemical antibiotics, growth hormones, animal by-products, or vaccines.

Stronger Immune System of Organic Produces Food:

The CA practices aim at enhancing production and farm output by all means that necessary. The nation of producing a lot of cereals, a lot of meat and greater fruits through genetic modifications and use of chemical growth hormones appears to unravel a number of the world's food insecurity issues. The effects aren't nonetheless visible, however within the long term; the implications are sensitivity to allergens and a serious reduction in immune system strength. By eating OAP foods, the risks of decline in immune system strength are considerably reduced because OAP foods aren't altered in any respect. Moreover, OAP foods have quality and better nutrition, vitamin and mineral contents that facilitate to strengthen the human immune system

Organic Food Improved Heart Condition:

Exclusive grazing on natural grass can increase the amounts of conjugated linolic acid (CLA) found in animal products. The suns energy is well taken in by natural grass through photosynthesis and is regenerate into the foremost fascinating organic CLA by the herbivores that feed on it. CLA is a heart-healthy fatty acid with the potential of bolstering cardiovascular protection, and it's found in higher quantities within the meat and milk products of animals that are pastured in free range.

Organic Agriculture Produce Poison-Free:

OA doesn't use any reasonably dangerous chemicals to stay away pests and diseases. The entire practices are natural and so don't damage the consumer. Aspects such as bio magnification are lessened via the practice of OA as chemical pesticides, fertilizers, herbicides; associated artificial growth hormones are all prohibited on an OA. Therefore, OA merchandise is freed from contamination with health harming chemical substances.

Lower levels of Toxic Metals in Organic Food:

OA doesn't use agrichemicals for crop production means that decreased consumption of noxious metals. Current reports make sure that OAP crops have 48% lower levels of the noxious metal cadmium than conventional produce crops [17, 18].

Advantages of Organic Agriculture for Human and Environmental Health:

Conventional non-educated farmers claim that there's not enough scientific evidence for organic crops production being better for the environment and human health. Non educated farmers produce agricultural products for more yields only. Presently farmers are educated and awareness so that conventional food producers convert into OA. OA eliminates soil and water contamination since organic production strictly avoids the uses of all synthetic fertilizers and pesticides, it doesn't create any risk of soil and underground water contamination as CA. OA crops production helps preserve helpful soil biota, native wild life through avoiding harmful chemicals, exploitation of planting as a natural pest and maintaining field margins and hedges. OA provides a get back native wildlife instead of CA. OA helps to conserve biodiversity because of avoid of chemicals fertilizers and use of alternative biofertilizers to OA. OA strategies have been facilitating to conserve biodiversity because it encourages a natural balance within the ecosystem and help forestall domination of explicit species over the others. OA helps the fight against global warming [18]. Most organically produced food is distributed regionally, as a result, less energy is used for transportation that mechanically reduces carbon dioxide emission that are believed to be the most reason of global warming [18.19, 21]. OA reduces soil erosion and improves soil quality and health (20). OA technologies don't foresee elimination of all vegetation aside from crops. As a result, additional soil is roofed with vegetation preventing the wind to hold away the topmost fertile soil layers.

Increase Income through Organic Agriculture Products:

In recent decades, the farmers and food growers has been educated and legendary to profit of organic and traditional agriculture. Educated farmers converted into the organic agriculture and benefited to OAP because OAP food sales a lot of revenue due to its quality and nutritive value.

Conclusion:

OAP foods provide a variety of benefits and nutritional value for human, soil and environmental health. Organic foods have additional useful nutrients such as antioxidants, then their conventionally grown counterparts, additionally; folks with allergies to foods, chemicals, or preservatives typically notice their symptom lessons or escape after they eat solely organic foods. OAP foods contain fewer or no pesticides and harmful chemically as compared to CA produces food. Pesticides are chemicals such as fungicides, herbicides, insecticides etc. These chemicals are wide utilized in CA and residues persist in soil and within the food crops. OAP fresh foods taste is better, healthier and contain nutritious elements and vitamins as compared to CA produces foods. Organic foods are typically fresher as a result of it doesn't contain preservatives that make it last longer. OAP practices decrease pollution, conserve water, scale back soil erosion, improve soil fertility and health for next crop, and use less energy. Farming without chemical nutrients and pesticides are additionally better for nearby living microorganisms and small animals further as humans. Therefore, in my robust opinion that OAP are makes folks healthy, improve soil health as well as safe environment for global sustainable development [18].

Conflict of Interest

There is no conflict of interest.

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