A Review of Organic Agricultural of Some Vegetables Crops

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Abstract

Organic farming is a sustainable farming system that produces healthy crops and livestock without damaging the environment. It avoids the use of artificial chemical fertilizers and pesticides, relying instead on developing a healthy and fertile soil and growing a mixture of crops. In this way, the farm remains biologically balanced with variety of insects and wildlife that act as natural predators of crop pests, and soil full of microorganisms and earthworms to keep its vitality. Animals are reared naturally without any routine use of chemical to increase the growth rate. Organic farming refers to agricultural production systems used to produce food and fiber. Organic farming management relies on developing biological diversity in the field to disrupt habitat for pest organisms, and the purposeful maintenance and replenishment of soil fertility. Organic farmers are not allowed to use synthetic pesticides or fertilizers. All kinds of agricultural products are produced organically, including produce vegetable crops, grains, meat, dairy, eggs, flowers, and processed food products. Some of the essential characteristics of organic systems include: design and implementation of an "organic system plan" that describes the practices used in producing crops and livestock products; a detailed recordkeeping system that tracks all products from the field to point of sale; and maintenance of buffer zones to prevent inadvertent contamination by synthetic farm chemicals from adjacent conventional fields.

Keywords

Organic Agricultural, Vegetable Crops, Food Safety

1. Introduction

Organic agriculture is developing rapidly, and statistical information is now available from 154 countries of the world. According to the Research Institute of Organic Agriculture (FiBL) and the International Federation of Organic Agriculture Movements (IFOAM), 35 million hectares of agricultural land were under organic management (both certified and in conversion) in 2008. The regions with the largest areas of organically managed agricultural land are Oceania (12.1 million hectares), Europe (8.2 million hectares) and Latin America (8.1 million hectares). The cropped area (arable land and permanent crops) constitutes 8.2 million hectares. Horticultural crops play an important role in organic agriculture. These crops (temperate and tropical fruit, citrus fruit, berries, grapes and vegetables) constitute at least 760,000 hectares and thus almost ten percent of the organic cropland. Regarding consumer preference, fresh vegetables and fruit are among the most popular organic products. In Switzerland for instance, organic vegetables account for ten percent of all vegetables sold, organic fruit for 6.5 percent of all fruit. In the U.S., organic fruits and vegetables account for

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37% of all organic food sales (retail value). The most important categories are vegetables (28 percent of the organic horticultural land); grapes (20 percent) and tropical and subtropical fruit (19 percent).

Organic agriculture is a production system that sustains the health of different type of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved (www.ifoam.org) The phenomenon of organic agriculture has started in the 1930s and 1940s in the developed countries as a consequence of the raised dangerous effects of using synthetic fertilizers and pesticides in agriculture on both health and environment. In other words, they were looking for safe food that is free of pesticides and any additives (El-Meliegy, 2010).

Organic foods were considered, for long time, a kind of luxury goods. In 2006, it was commercially practiced in 120 countries, representing 31 million hectares of certified croplands and pastures (~0.7 percent of global agricultural lands and an average of 4 percent in the European Union), and a market of US$40 billion (~2 percent of food retail in developed countries) (Willer and Youssefi, 2007). In 2009, organic agriculture is no longer a phenomenon of developed countries. It's practiced in 160 countries and 37.2 million hectares of agricultural land are managed organically by 1.8 million farmers. The global sales of organic food and drink reached 54.9 billion US dollars in 2009 (IFOAM 2010).

The majority of certified organic produce is destined for export markets, with the large majority being exported to the European Union. The African market for organic products is still small. Certified organic products are currently recognized in only a few domestic markets, including Egypt, South Africa, Uganda, Kenya and Tanzania. For exports, most African countries rely upon foreign standards. To date, the majority of organic production that is certified in Africa has been certified according to the EU regulation for organic products As for Egypt, although there is an augmented supply market for organic food gained from its significance as a safety production, high quality food and its positive environmental influences. The supply market is growing at much quicker rate than organic food consumption does (IFOAM, 2010). The logic interpretation for this situation is that organic agriculture is grown mainly for export market. As a result, the share of organic agricultural land has increased and has represented about 0.01% of the total agricultural land. It ranked third between African countries after Uganda and Tunisia (IFOAM, 2008).

2. Scientific Research About Organic Agriculture of Vegetable Crops

2.1. About Plant: “Vegetable Crops”


Oil management practices have recently changed dramatically including an increased use in synthetic fertilizers and pesticides to help crop yields. However, some studies have suggested that the excessive use of these agrochemicals may actually increase pest problems in the long run (Altieri and Nicholls 2003).

Dauda et al., 2008. Reported that, application of poultry manure significantly enhance growth parameter vigor and number of fruits of watermelon during the two seasons.

Organic manures such as cattle manure and poultry manure improve the soil structure, aeration, slow release nutrient which support root development leading to higher yield and better quality of broccoli plants Abou El-Magd et al., 2005. Moreover, organic matter plays an important role in the chemical behavior of several metals in soils throughout its active groups (flavonic and humic acids) which have the ability to retain the metals in complex and chelate forms.

Organic manure plays a direct role in plant growth as a source of all necessary macro and micronutrients in available forms during mineralization, improving the physical and physiological properties of soils.

Hala Kandil and Nadia Gad (2009) stated that, Using organic manure plus inorganic solution fertilizers gave a significant promotes effect of plant growth, heads yield, chemical constituents and mineral composition of broccoli.

About vermicompost Adriana Hernández et al., (2010) found that, the vermicompost treatment showed a higher contribution of Mg, Fe, Zn, and Cu, and lower Na in lettuce leaf content when compared to compost usage. Several organic fertilizer formulations are now available in the market that enables the formulation of an efficient fertigation program for organic vegetable production (Ferguson, 2003 and Tuzel et al., 2003).

Several studies on comparative nutritional quality of organic and conventional crops have been conducted, on different vegetable crops. Worthington (2001) suggested that there appeared to be genuine differences in the nutrient content of...
organic and conventional crops. Zaller (2006) used vermicompost as a substitute for peat in potting media in tomato cultivation, and suggested that nearly all determined parameters of morphological and chemical fruit quality (circumference, dry matter content, firmness of peel, contents of C, N, P, K, Ca, Mg, Vitamin C, glucose, fructose) were significantly affected by the substrate mixture used to raise the seedlings.

Concerning organic fertilizers, many investigators found that about sweet pepper, addition of organic fertilizer had a major effect on vegetative growth characters of sweet pepper (Abdel-El-Moez et al., 2001, Arancon et al., 2005, Ewulo et al., 2007 and Wei Lan et al., 2010), total yield (Salama and Zake 2000, Shehata et al., 2004, Awodun et al., 2007, Dass et al., 2008 and Huez-Lopez et al., 2011) and quality of sweet pepper plants (Amor and Del., 2007, Arafa and Zake 2000, Shehata et al., 2001, Arancon et al., 2004, Awodun et al., 2007, Dass et al., 2008 and Huez-Lopez et al., 2011) and quality of sweet pepper plants (Ghoname and Shafeek 2005 and Reyes et al., 2010).

Many investigators reported that, the addition of bio fertilizer had a major effect on vegetative growth characters of sweet pepper (Berova and Karanatsidis 2009, Kaya et al., 2009 and Berova et al., 2010), total yield (Berova and Karanatsidis 2008) and quality of sweet pepper plants (Ghoname and Shafeek 2005 and Reyes et al., 2008). Abou El-Magd et al. (2006) the highest vegetative growth of broccoli plants was recorded by plants which was supplied with 100% cattle manure. However, the highest total yield and quality of broccoli were recorded by adding poultry manure in the two seasons. Using poultry manure with Southern star cv. gave the highest total yield and quality of broccoli.

Al-Ziadi and M. Aloosy (2011) demonstrated that, addition of organic sheep manures to soil caused significant reduce in Ece, SAR and Soil pH, and increase in yield of flower disk. Increasing rates of P fertilizer caused significant increase in yield of flower disk by 45% and 73% for 45 and 90 Kg P ha⁻¹ respectively compared with 0Kg P ha⁻¹, while it has no effect on soil chemical characteristics tested of cauliflower.

Deore et al., (2010) studied the effects of foliar application of a novel organic liquid fertilizer on growth and yield in chilli (Capsicum annuum L. var. Shama) they found that the present investigation has revealed the consistent and significant results for growth parameters due to application of novel organic liquid fertilizer.

Taha et al., (2011) In light of the results it is concluded that Azotobacter and sheep residues do have an additive impact on the growth and yield of squash plants. Azotobacter alone or in combination with sheep residues significantly hence vegetative (shoot) growth of squash plants and substantially improves the fruit yield and quality of the squash cultivars.

This will greatly help in development of organic farming techniques in the area and will considerably reduce the cost of production and environmental hazards due to greater dependence on synthetic fertilizers.

Almulla et al., (2012) studied the effect of three organic fertilizer formulations on growth and yield of cherry tomato (Lycopersicon esculentum cv. Sakura). A mixture of organically approved vermicompost, sphagnum peat moss, coco peat and perlite at 1:1:1:1 ratio (volume basis) was used as growing substrate. The formulations like Earth Juice products (T1), Fish Hydrosylate and seaweed (T2), and Fish Fertilizer and seaweed (T3) were compared against the soil-based inorganic cultivation (control) and were replicated. Stock solutions were prepared for each organic fertilizer formulation and one liter of diluted stock solution. The results showed that the organic fertilizer treatments remained comparable with control in terms of height, leaves and chlorophyll index in the experiment conducted in 2009. In the experiment conducted in 2008 a similar trend was observed in leaf number of plants; whereas plant height remained significantly high in the organic treatments against the control. Though control plants excelled in total yield of the plant in both experiments when compared to the organic fertilizer treatments, the organic treatments remained comparable to the control.

Fawzy et al., (2012) studied the evaluate response of sweet pepper (Capsicum annuum L.) plants to nitrogen fertilizer source under field conditions. They reported that different combinations of mineral nitrogen, organic (chicken manure) as well as bio fertilizer (Microbin and Biogen) were evaluated plant growth, total yield, fruit quality and some chemical constituents of sweet pepper fruits were assessed. Results showed that sweet pepper fertilizer plants with the mineral nitrogen as a chemical fertilizer had increased the vegetative growth, yield and fruit quality. Bio-N fertilizer improved vegetative growth, yield and quality of sweet pepper plants. Furthermore, using organic manure increased yield and quality of sweet pepper fruits. It can be concluded that nitrogen fertilizer as a mineral N fertilizer combined with bio-N fertilizers was the best treatment to obtain the highest vegetative growth, yield and fruit quality of sweet pepper.

Michael et al, (2012) the results showed that chicken manure levels significantly (P < 0.05) affected growth, yield and nutritional quality of lettuce. A trend of superiority of the different level of chicken manure application was observed as lettuce provided with 60 t/ha exhibited higher values in number of leaves, plant height, marketable yield and mean leaf dry mass. The second best results were obtained from plants supplied with 40 t/ha followed by plants previously fertilized with 20 t/ha and the lowest from those provided
with inorganic fertilizer. However, there was no significant ($P > 0.5$) difference in iron content on fresh mass basis for all treatments. Results of this experiment showed that inorganic fertilizer was less suitable in lettuce production. Lettuce may be grown using 60 ton/ha chicken manure for a more productive enterprise.

Mohsen Jahan et al. (2012) in general, the results showed amongst organic fertilizers used in this experiment, the chicken manure solely or combined with nitragin (Bio fertilizer) has superiority compared to other organic fertilizers, although, chicken and sheep manure, and vermicompost application in combination with or without nitragin inoculation, were not resulted in significant differences due to most studied traits. Cow manure solely application was better than in combination with nitragin. At a glance, utilization of biofertilizer combined with organic fertilizers could be resulted to an optimum quantitative and qualitative yield without any agrochemicals in a low input production system of zucchini squash.

### 2.2. About Soil

Organic manure play direct role in plant growth as a source of all necessary macro and micronutrients in available forms during mineralization and improving physical and chemical properties of soils (Chaterjee et al., 2005). Anant-Bahadur et al., (2006) pointed that organic matter plays an important role in the chemical behaviour of several metals in soils throughout its active groups (Flavonic and humic acids) which have the ability to retain the metals in complex and chelate forms. Organic manure can serve as alternative practice to mineral fertilizers for improving soil structure (Dauda et al., 2008) and microbial biomass (Suresh et al., 2004). Organic manure plays a direct role in plant growth as a source of all necessary macro and micronutrients in available forms during mineralization and improves physical and chemical properties of soils (Chaterjee et al., 2005). Anant-Bahadur et al., (2006) pointed that organic matter plays an important role in the chemical behavior of several metals in soils throughout its active groups (Flavonic and humic acids) which have the ability to retain the metals in complex and chelate forms.

The economic effect of liquid organic fertilizer on agriculture may be a factor in the extension of its practice in larger areas. The rates of compost required to supply sufficient N requirements might be economically challenging for farmers. Therefore, the organic liquid fertilizers might help in reducing the need of high rates of compost to maintain proper N amount and in reducing the expenses. Sureyya Altintas and Funda Eryilmaz (2012) investigate the effects of mineral and liquid organic fertilizers on some nutritional characteristics of bell pepper. Results show that the main effects and interaction between cultivars and fertilizers were not statistically significant on the subject parameters in this experiment. However, the application of mineral fertilizer resulted in the highest ascorbic acid content in fresh fruits.

Over the last few years, consumer awareness of food-safety issues and environmental concerns has increased the interest in organic farming (Bavec and Bavec, 2007). Almost from the beginning, arguments were gradually raised about organic growing practices. Numerous re-searchers have compared organic and conventional growing techniques and have revealed reasonable contradictory findings on organically grown products (their quality and yield). Foods and vegetables are the main topic of this controversy due to their significance as being source of antioxidants (Mitchell and Chassy, 2004). There has also been a concern for hygiene of composts. Most findings from comparative studies show that compost does not improve the yield (Flores et al., 2009; Amor, 2007; Evanylo et al., 2008 and Gül et al., 2007), however, some findings indicate that organic fertilizers sufficient to produce vigorous, healthy and high yielding plants at levels comparable to plants treated with synthetic N fertilizers (Olaniyi and Akanbi, 2007), and also that yield is higher when compost combined with bio N and mineral N (Ghonne and Shafeek, 2005). Nonetheless, both conventional and organic agricultural practices consist of dynamics that represent variations, depending upon the regions, soil quality, pests, growing season, grower, farm, sampling time, climate and genotype. Therefore making comparisons between these systems is very difficult (Mitchell and Chassy, 2004; and; Mitchell et al., 2006).

Fertilization is one of the most important dynamic to consider, when making comparisons between organic and conventional agriculture practices. There is a wide range of organic wastes and by-products that are available for plant nutrition in organic growing such as poultry manure, cattle manure, plant residues, etc. Nevertheless, because of their complex composition, it is very challenging to apply sufficient amount that will provide plant requirements (Mitchell and Chassy, 2004).

Although, it has proven to be valuable to improve the organic matter content, fertility, porosity, water holding capacity and bulk density of soil through the addition of organic composts (Zaccheo et al., 2002, Evanylo et al., 2008 and Mitchell et al., 2006), more quickly with the higher rates (Evanylo et al., 2008), some practices show that organic composts do not provide nitrogen in a form that is as readily accessible to plants as conventional fertilizers because of their high resistance to degradation (Zaccheo et al., 2002), and of a slower rate of availability and mineralization of nutrients.
from the organic comports (Amor, 2007).

Consequently, the yield of the crops is declined. Or it is difficult to say that improvements in soil physical properties benefit yield unless higher rates of compost is applied to soil (Evanylo et al., 2008). On the other hand, some results indicate that the slower release of nitrogen, as occurs when manure is substituted for synthetic fertilizers, results in higher polyphenol concentration in food, thus organic food compared to conventional ones has more health-promoting substances. It appears that the most strong influence or differences between organic and conventional systems is the quantity and behavior of N (Mitchell et al., 2006).

Esawy Mahmoud et al.,(2009) The results showed that the mature compost of plant residues was higher in saturation percent and lower in C/N ratio, pH, electrical conductivity and bulk density than the animal and mixed composites. The study demonstrated that the average cumulative cucumber yield was higher with 75% mineral N + 25% organic N treatments compared to other treatments throughout the experiment, especially in the plots treated with plant compost during the two successive summer seasons of 2007 and 2008. The average nitrate of petioles in the plots treated with N 100% organic decreased by 52-69% compared to 100% mineral N. The average nitrate content of cucumber fruits was only detected in the plots treated with 100% organic N from the comports tested. The nitrogen and phosphorus content of the soil significantly increased, as did the soil organic matter, with the increase of organic nitrogen applied. The experimental results confirmed that the combination of organic and inorganic fertilizers could increase plant growth, yield, and quality and soil fertility. It also confirmed that composted organic wastes can be used to substitute for around 25% of chemical nitrogen fertilizers.

The economics of organic agriculture may be a factor in the extension of its practice to larger areas since the rates of compost required to supply sufficient N requirements might be economically challenging for farmers (Evanylo et al., 2008). Therefore organic liquid fertilization products can help in reducing the need for high rates of compost to maintain proper amount of nutrients and hence in reducing the expenses.

3. Conclusion

It could be concluded that the scientists in organic agricultural should be working on how they could development and promote organic farming to produce safe and clean production of vegetable crops for local production and export because the agriculture is a major source for income in many countries in the worldwide.

References


