Journal of Soil Sciences and Agricultural Engineering

Journal homepage: www.jssae.mans.edu.eg
Available online at: www.jssae.journals.ekb.eg

Environmental Impact Assessment of Organic and Conventional Agriculture

Elkholy, M. M.; Gehan H. Abd El Aziz; Wafaa A. Hafez and Shreen S. Ahmed*

Soils, Water and Environment Res. Institute, ARC

ABSTRACT

The target of this search is to identify the environmental conditions of the traditional and organic farms to protect natural ecosystems to minimize environmental pollution and save sustainable productivity. Farms under study were organic and conventional. Samples were collected from organic and conventional farms located in Cairo - Alexandria Desert Road and Cairo - Fayoum Desert Road.A total of 21 samples of fruits (Red grapes, yellow grapes, Pear, Orange); vegetables (Garlic, Onion, Cabbage, Alfalfa, Pea, Bean,Tomato,and Cucumber); Medical and aromatic plants (Mint, Lemon grass, Chamomile,Chrysanthemum, Fennel); Cereal (Wheat, Maize, Sorghum) and Oil crop (Sesame) were collected randomly from different farms during year 2017.Desirable substances (sugar, vit c, phenol and flavonoid) were determined. Undesirable substances [Gibbrillic acid (Gib), α- naphthalene acetic acid (α-NAA); naphthalene acetamide (NAD);6-benzylaminopurine(6-BA); 2,4- Dichlorophenoxyacetic acid (2,4-D) and Ethephon (Eth)] residue compared with Maximum Residue Limits (MRLs) were determined. Data indicated that organically grown crops (fruits, vegetables and medical aromatic plant) had a higher nutritional value (sugar, vit c, phenol and flavonoid) compared to non-organically grown crops. The results observed that the content of protein in organic crops was lower than inorganic crops. Data showed that conventional crops had higher values of synthetic growth regulators than organic crops. It was found that 58.6% of the traditional and 5.3% of organic sample exceeded the MRL values, while 25.16% of the traditional and 21.6% of the organic samples had measurable residues at the MRL value, whereas 8.2% of the traditional and 73.0% of the organic sample have measurable residue below the MRL value.

Keywords: organic crops, traditional crop, organic farm, synthetic growth regulators.

INTRODUCTION

Traditional agriculture is distinguished by using a great rate of chemical fertilizers, synthetic pesticides, and PGRs, etc., resulting in heavy reliance on non-renewable resources, reduced biodiversity, polluted water resources, chemical residues in food, soil degradation, and health risks to farm workers handling pesticides, all of which bring into question the sustainability of the Traditional farming system (Zhu *et al*., 2000; Reganold *et al*., 2001).

Organic agriculture emerged with the aim of solving a series of environmental, safety, and health problems faced by the modern conventional agriculture. Organic food is grown and processed without using any synthetic fertilizers or pesticides (insecticides, herbicides, and/or fungicides), plant growth regulators, such as hormones, livestock antibiotics and GM organisms, and human sewage sludge (John 2011).

Nutritional value of food is largely a function of its vitamin and mineral contents. In this respect, organically grown plants are higher in element contents than conventional grown plants. Advantage of organic food for consumers is that free of contaminates health harming substances as synthetic growth regulators, pesticides, fungicides and herbicides...etc. There are clear results of increase nitrate and decrease vitamin C contents for conventional vegetables (Woese *et al*., 1997). Various studies mentioned that healthy fatty acids (10-60 %), omega-3 fatty acids, vitamin C (5-90%) and secondary metabolites (10-50%) were more in organic products (Butler *et al*., 2008). in contrast , less residues of harmful pollutants are present in organic products (Huber and van de Vijver, 2009). Heaton, (2002) stated that organic products had higher minerals and contain 10-50 % higher of phytonutrients. Lower cell proliferation of cancer cells is noticed on extracts of organic strawberries fruits (Olsson *et al*., 2006). Alfven *et al*., (2006) they stated that 30% from eczema and allergy complaints was less with organic and biodynamic food in five EU countries. In animals, organic feed leads to increase fertility (Staiger, 1988) and increase immune parameters (Finamore *et al*., 2004). Other studies indicated that the most systematic differences between organic and conventional crops are the contents of secondary metabolites (Brandt and Mølgaard, 2001). Organic feed for animal causes fertility increments (Staiger, 1988) and led to increase immune parameters (Finamore *et al*., 2004). Brandt and Mølgaard, (2001) mentioned that the differences between organic and conventional product was in the secondary metabolites contents.

Organically grown food taste better than that conventionally grown. The tastiness for fruits and vegetables was directly related to its sugar content that in turn was a function of the quality for nutrition which the plant itself has enjoyed. Organically grown plant is nourished naturally, rendering the structural and metabolic

* **Corresponding author.**
E-mail address: shreenashraf@gmail.com
DOI: 10.21608/jssae.2019.79689

integrity of their cellular structure superior to those conventionally grown. As a result, organically grown foods can be stored longer and do not show the latter's susceptibility to rapid mold and rotting.

A lot of chemical compounds including PGRs were used for agriculture (Mickel., 1978). PGRs are classified as pesticides under according to The Pesticides Amendment Act, 1979. Utilization handling facilities can result in the contamination of crops with postharvest pesticides, especially fungicides and plant growth regulators (US, 1992). The tolerance level of NAA, NAD, 2,4-D; Gib, Cyto and Eth is set at 0.1, 0.1, 0.07, 0.1 and 3.0 ppm, respectively according to CODEX, (2010). The aim of this search is to identify the environmental conditions in the traditional and organic farms to protect natural ecosystems to minimize environmental pollution and save sustainable productivity.

MATERIALS AND METHODS

The study Area and sampling

Samples were collected from organic and conventional farms located in Cairo - Alexandria Desert Road and Cairo - Fayoum Desert Road. The following conventional and organic crops were evaluated. A total of 21 samples of fruits (Red grapes, yellow grapes, Pear, Orange); vegetables (Garlic, Onion, Cabbage, Alfalfa, Pea, Bean, Tomato and Cucumber); Medical and aromatic plants (Mint, Lemon grass, Chamomile, Chrysanthemum, Fennel); Cereal (Wheat, Maize, Sorghum) and Oil crop (Sesame) were collected randomly from different farms during year of2017.Various samples were collected from certified organic farms, and the same type of samples were collected from traditional farms. Randomly representative crop samples (1.0 kg) were collected. The edible part was included, whereas bruised or rotten part was removed. Organic farmers used compost, organic mulch and farmyard manure. The most of organic sites were certified and held valid certificates.

Analytical methods:

Regarding the plant desirable substances, phenol was estimation by Folin-Ciocalteu phenol reagent according to Singleton and Rossi, (1965). Total flavonoids were determined according to method of Wei and Intan, (2012).Vitamin C was determined according to method of Hewitt and Dickes, (1961). The soluble sugar was determined using phenol-sulfuric acid method as described by Dubois *et al*., (1956).

Concerning the undesirable substances, sample (1.0 kg) was shredded and homogenized. Samples (200.0 g) were used for PGRs analysis (NAA- NAD- 2,4-D- Gib- Cyto and Eth.).

Plant hormone was determined in plant samples as methods of Wurst *et al*., (1984) using HPLC Agilent infinity better 1250 Model.

RESULTS AND DISCUSSION

Desirable Vs undesirable content in organically and conventionally crops

- **Desirable substances**

1.Total phenolics and flavonoids

The content of total phenolics and flavonoids from organically and conventionally crops are shown in Figures 1 and 2. Generally, the results showed that the content of phenols and flavonoids in organic products was higher than inorganic products. The increase of total phenols in organic products (fruits, vegetables and medical aromatic plant) reached to 2.2, 1.4, 2.1-fold than inorganic products, respectively. The same trend was observed for flavonoid, the increase of total flavonoids in organic products (fruits, vegetables and medical aromatic plant) reached to 10, 4, 7-fold that inorganic products, respectively. Nutritional value of fruit and vegetable is depended on having the suitable content of substances necessary for the human body. There is evidence that secondary plant metabolites may be significant from nutritional point view (Lundegårdh and Mårtensson, 2003). Plant phenolic metabolite is particularly interesting due to their potential antioxidant activity and medical characteristics, including anti cancerous activity (Brandt and Mølgaard, 2001).

Generally, the comparative study recorded a significant higher content of phenol and flavonoids organic samples than inorganic. This result is in agreement with (Brandt *et al*., 2011), who conducted a meta-analysis of the published comparative studies of the content of secondary metabolites as phenol and flavonoids in organic versus nonorganic crops, found that organic ones contained 12 % higher levels of secondary metabolites than corresponding nonorganic fruits and vegetables.

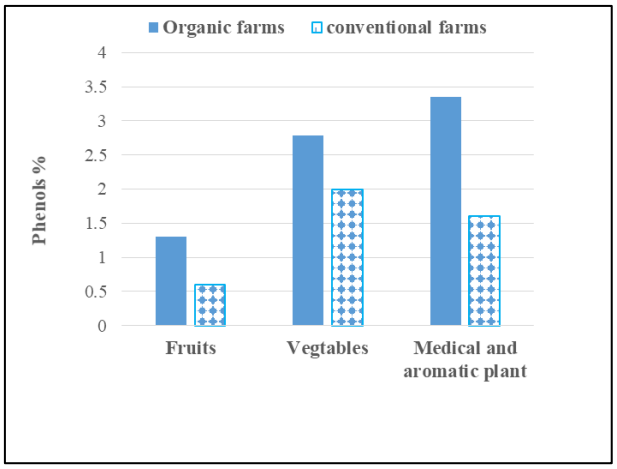

Fig 1. Phenolic content in organic and conventional crops

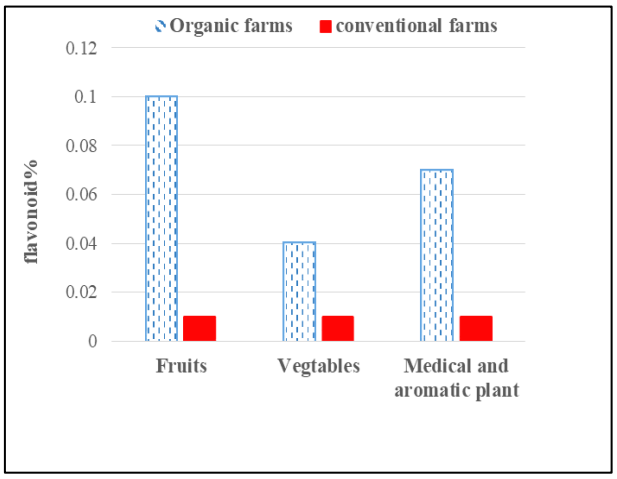

Fig 2. Flavonoid content in organic and conventional crops.

2.Ascorbic acid (vit c)

Ascorbic acid is a major antioxidant in plant cells. Its derivative, which is tested on cancer cells, revealed anticancer activity. In addition, ascorbic acid, as found in most fruits and vegetables, protects against heart disease, high cholesterol, high blood pressure, and cancer. Comparative studies of vit C content from organically and conventionally crop is showed in Figure 3. Data showed that the content of vit C in organic products was higher than inorganic products. Increment of vit C in organic products (fruits, vegetables and medical aromatic plant) reached to 1.5, 4, 1.5-fold than inorganic products, respectively. Moreover, the excess content of the vit C in organic crops is essential for health because vit C reduces the hazard effect of nitrates on human health C so it inhibits the creation of carcinogenic nitrosamines (Ruxton, *et al*., 2006). Järvan and Edesi, (2009) stated that potatoes that planted under organic condition were higher in vit C than those planted under chemical fertilizer. Excessive content of vit C was showed in sweet bell peppers that planted under organic farm compared to those planted under traditional farms (Hallman and Rembialkowska, 2012).

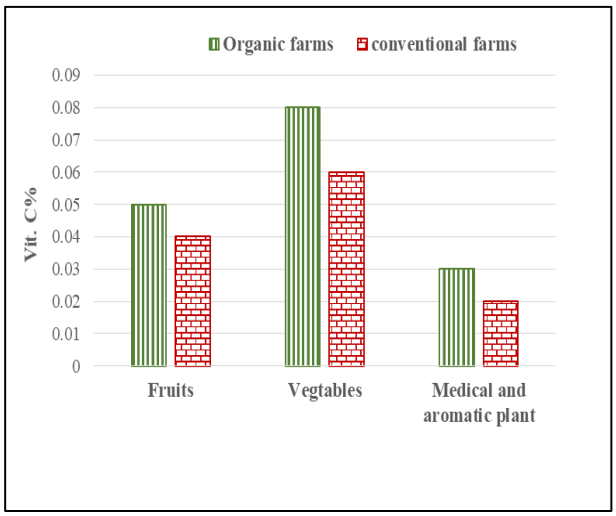

Fig. 3. Vit. C content in organic and conventional crops.

3.Total sugars

The comparative study of total sugars content from organically and conventionally crops are found in Figure 4. Data observed that the content of total sugar of organic crops was greater than inorganic crops. The increases of total sugars of organic crops (fruits, vegetables and medical aromatic plant) reached to 1.8, 1.5, 2.5-fold than inorganic crops, respectively. The content of total sugars in organic plants led to better taste. The highest content of sugars was recorded in organic vegetables and fruit (Zadoks, 1989; Rembiałkowska, 2000).

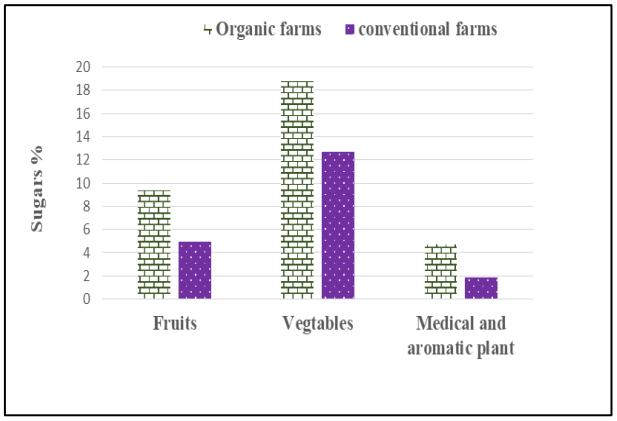

Fig. 4. Sugar content in organic and conventional crops.

4. Crude protein

Results of the protein content of organic and in organic crops are shown in Figure 5. The results observed that the content of protein in organic crops was lower than inorganic crops. The decrease percent of protein in organic crops (fruits, vegetables and medical aromatic plant) reached to 25, 55, 66 % compared to inorganic crops, respectively. Different types of nitrogen fertilizer influenced on the quantity and quality of the protein plant (Worthington 2001). Increase amount of available nitrogen for a plant increases protein production. Rembiałkowska, (2000) and Worthington, (2001) mentioned that total protein was lower in organic than traditional crops, but that protein quality is higher in organic crops. Data of NitikaPunia and Khetarpaul, (2008) observed that non-organically grown cereals had higher protein content than their organically grown counterparts.

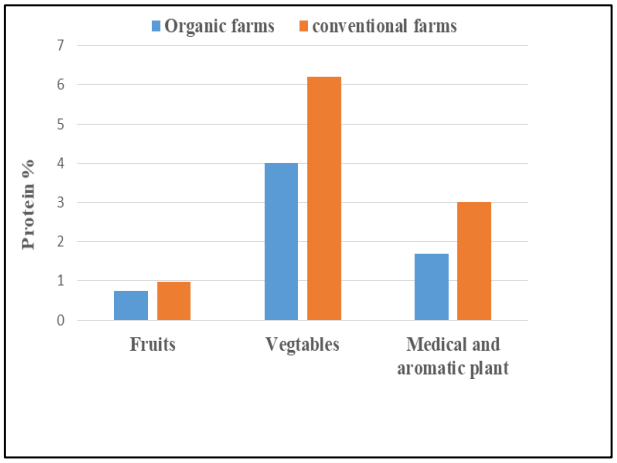

Fig. 5. Protein content in organic and conventional some crops

Generally, organically grown crops (fruits, vegetables and medical aromatic plant) had a higher nutritional value (figure 6) compared to non-organically grown crops. These results was agreement with (Lundegårdh and Mårtensson, 2003) they mentioned that organic crops had a higher nutritional value such as dry weight, vit C, secondary substances, sugars, certain mineral components and essential amino acids. The nutritional value of food depends mainly on having the appropriate content of compound necessary for the human body.

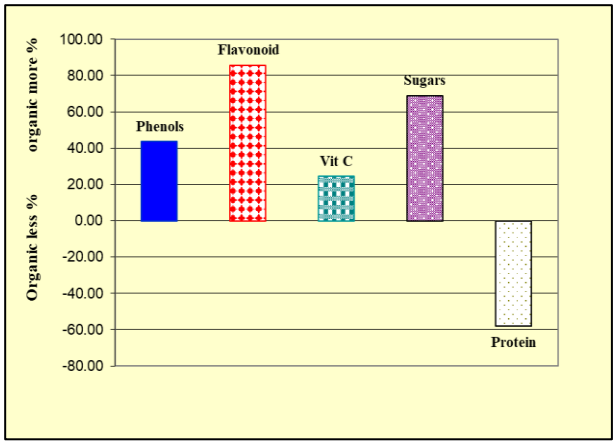

Fig. 6. Comparative selected parameters between organic and conventional farm

2. Undesirable substance

Residual of PGRs in conventional or organic products

PGRs are the part of important of pollutants of food and perhaps main important problem to environment. PGRs affect the nutritive values for fruit or vegetable further more had harmful effect on human using this food. This study evaluated the PGRs [Gibbrillic acid (Gib), α-naphthalene acetic acid (α-NAA); naphthalene acetamide (NAD); 6-benzylaminopurine (6-BA); 2,4-Dichlorophenoxyacetic acid (2,4-D) and Ethephon (Eth)] residue compared with Maximum Residue Limits (MRLs) of the (EU 2010). MRLs were used on the Egyptian exports to the European countries. According the (EU 2010) MRLs was recorded 0.2, 0.1, 0.1, 0.01, 0.07 and 3.0 ppm for Gib, NAA, NAD, 6-BA, 2,4-D and Eth, respectively.

Average of remaining of PGRs of samples that collected from organic and traditional farms are shown in figures 7. Residual % of PGRs was detected in the most of non-organic crops compared to organic crops. For Gib, data showed that Gib was detected in fruits, vegetables and medicine aromatic plant for organic and traditional farms, residual% reached to 28, 38 and 43% for organic farms while reached to 72, 64, and 57% for traditional farms. For 6- BA, residual % reached to 46, 47 and 41 for organic farms while reached to 54, 53, and 58% for traditional farms, respectively. Regarding NAA, residual in fruits, vegetables and medicine aromatic plant reached to 23, 21 and 21% for organic farms while reached to 77, 79, and 79%for traditional farms. Concerning NAD, residual in fruits, vegetables and medicine aromatic plant reached to 32, 40 and 21% for organic farms while reached to 68, 60, and 88%for traditional farms. For Eth, residual in fruits, vegetables and medicine aromatic plant reached to 12, 15 and 8% for organic farms while reached to 88, 85, and 92%for traditional farms. Concerning 2,4-D, residual in fruits, vegetables and medicine aromatic plant reached to 17, 12 and 20% for organic farms while reached to 83, 88, and 80% for traditional farms.

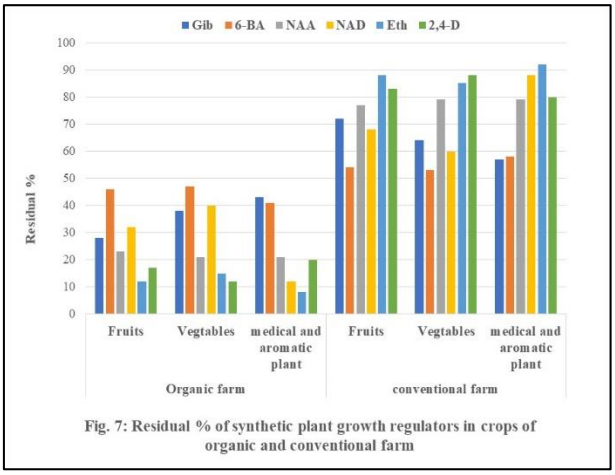

Fig. 7: Residual % of synthetic plant growth regulators in crops of organic and conventional farm

Number percentage of non-contaminated and contaminated samples by PGRs compared with EUMRLs under organic and conventional farms was shown in Table 1 and figure 8. Data observed that number percentage of non-contaminated sample was increased compared to contaminated sample that collected from organic farm.

For Gib, 18 % from samples was recorded above MRL, 62% blew MRL and 20 % at MRL for organic farm; while 79% from samples was recorded above MRL, 4% blew MRL and 18 % at MRL for conventional farm.

For NAA, 3% from samples was recorded above MRL, 69% blew MRL and 28% at MRL for organic farm; whereas 71% from samples was recorded above MRL, 4% blew MRL and 29% at MRL for conventional farm.

Regarding NAD, 3% from samples was recorded above MRL, 80% blew MRL and 17% at MRL for organic farm; while 58% from samples was recorded above MRL, 13% blew MRL and 29% at MRL for conventional farm.

Regarding 6-BA, 3% from samples was recorded above MRL, 77% blew MRL and 20% at MRL for organic farm; while 69% from samples was recorded above MRL, 14% blew MRL and 17% at MRL for conventional farm.

Concerning 2,4-D, 3% from samples was recorded above MRL, 63% blew MRL and 10% at MRL for organic farm; while 69% from samples was recorded above MRL, 10% blew MRL and 21% at MRL for conventional farm.

For Eth, 3% from samples was recorded above MRL, 87% blew MRL and 10% at MRL for organic farm; while 69% from samples was recorded above MRL, 10% blew MRL and 21% at MRL for traditional farm.

Table1. Number percentage of non-contaminated and contaminated samples with synthetic growth regulators compared to EUMRLs under organic and conventional farms

Hormones	Organic crops			Conventional crop		
	Above MRL	Blew MRL	At MRL	Above MRL	Blew MRL	At MRL
Gib	18.4	62	20	79	4	18.0
6-BA	2.6	69	28	71	4	19.7
NAA	2.4	80	18	59	11	19.6
NAD	2.5	73	20	69	11	17.2
Eth.	2.5	63	33	58	3	40.0
2,4-D	2.5	88	10	79	10	20.0

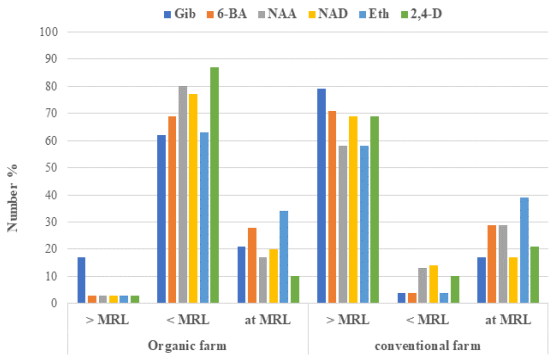

Fig. 8: Number percentage of non-contaminated and contaminated samples with synthetic growth regulators compared to EUMRLs under organic and conventional farms

When organic and conventional samples from fruit, vegetables and medical aromatic plant products in the 2010 EU-coordinated programme was compared, 58.6% of the conventional and 5.3% of the organic samples exceeded the MRL values, while 25.16% of the conventional and 21.6% of the organic samples had measurable residues at the MRL value., whereas 8.2% of the conventional and 73.0% of the organic samples had measurable residues below the MRL value figures 9.

Generally, the MRLs were well below the concentrations that were expected to lead to adverse health effects for consumers. If a synthetic PGRs residue of each crop was found at or below the MRL, the crop can be considered safe for the consumer. On the other hand, if a residue exceeds the MRL, it is not necessarily true that the consumer is at risk: a specific assessment must be performed, comparing the expected exposure with the toxicological reference values (VKM., 2014). Since the use of synthetic chemicals is not permitted in organic farming, most studies have shown that their presence in organic crops is considerably lower than for conventional ones. (Dani *et al*., 2007, Hoogenboom *et al*., 2008, Mansour *et al*., 2009, Corrales *et al*., 2010, Turgut *et al*., 2011).

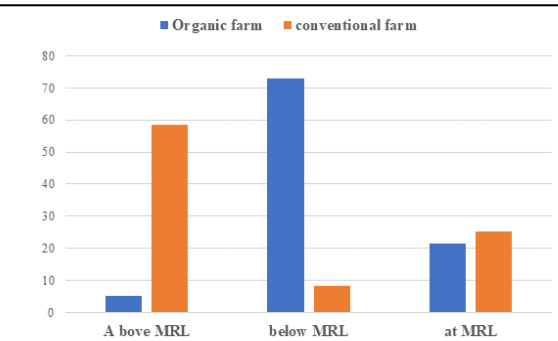

Figure 9: Non-contaminated and contaminated samples% with synthetic growth regulators compared to EUMRLs

CONCLUSION

The results of this study showed that 73% of the collected samples from the organic farms under study were safe, residual synthetic growth regulators were below maximum residue level. While91% of the collected samples from the conventional farms were unsafe, residual synthetic growth regulators was exceeded the maximum residue level. So, organic farms are harmony with nature compared to conventional farms.

REFERENCES

Alfven, T., Braun-Fahrlander, C.,Brunekreef, B. von,Mutius, E.Riedler J., Scheynius A., van Hage M., Wickman M., Benz MR, Budde J., Michels KB, Schram D., Ublagger E., Waser M. and Pershagen, G. (2006). Allergic diseases and atopic sensitization in children related to farming and anthroposophic lifestyle - the PARSIFAL study. Allergy, 61(4): 414–421.

Brandt,K.andMølgaard, JP. (2001). Organic agriculture: does it enhance or reduce the nutritional value of plant foods. J Sci Food Agric 81:924–931

Brandt, K., Leifert, C., Sanderson R., and Seal, CJ. (2011) Agroecosystem management and nutritional quality of plant foods: the case of organic fruits and vegetables. Crit Rev Plant Sci 30:177–197.

Butler, G, Nielsen JH, Slots T, Seal Ch, Eyre MD., Sanderson, R. and Leifert, C. (2008). Fatty acid and fat-soluble antioxidant concentrations in milk from high- and low-input conventional and organic systems: seasonal variation. J. Sci. Food Agric., 88: 1431–1441.

CODEX (2010). Codex alimentarius commission pesticide residues in food and feed. Downloaded from http:// www.codexalimentarius.net/pestres/data/pesticides/ index.html

Corrales, M., Fernandez, A., Vizoso Pinto, M. G., Butz, P., Franz, C. M., Schuele, E. and Tauscher, B. (2010). Characterization of phenolic content, in vitro biological activity, and pesticide loads of extracts from white grape skins from organic and conventional cultivars. Food Chem Toxicol, 48, 3471-6.

Dani, C., Oliboni, L. S., Vanderlinde, R., Bonatto, D., Salvador, M. and Henriques, J. A.(2007). Phenolic content and antioxidant activities of white and purple juices manufactured with organically- or conventionally produced grapes. Food Chem Toxicol, 45, 2574-80.

Dubois, M.; Cilles, K.A.; Hamilton, J.K.; Rober, P.A. and Smith, F. (1956). Colorimetric method for determination of sugar srelated substances. Anal. Chem., 28, 350-365.

EU Pesticides Database. (2010). Downloaded from http:// ec.europa.eu/sanco pesticides/public/ index cfm?event=substance.selection&ch=1.

Finamore, A, Britti MS, Roselli M, Bellovino D, Gaetani S and Mengheri E. (2004). Novel Approach for food safety evaluation. Results of a pilot experiment to evaluate organic and conventional foods. J. Agric. Food Chem., 52: 7425-7431

Järvan, M. and Edesi, L. (2009) The effect of cultivation methods on the yield and biological quality of potato. Agron Res 7(Special issue I):289–299.

Heaton, S. (2002). Assessing organic food quality: Is it better for you? In: in Powell J. et al., (eds.) Proceedings of the UK Organic Research 2002 Conference, pp 55-60. Organic Centre Wales, Institute of Rural Studies, University of Wales Aberystwyth.

Hewitt, E.J. and Dickes, G.J. (1961). Spectrophotometric measure mentson ascorbicacid and their use fortheestimationofascorbicacid and dehydroascorbic acid in planttissues. Biochem. J. 78:384-391.

Hoogenboom, L. A., Bokhorst, J. G., Northolt, M. D., Van De Vijver, L. P., Broex, N. J., Mevius, D. J., Meijs, J. A. & Van Der Roest, J.(2008). Contaminants and microorganisms in Dutch organic food products: a comparison with conventional products. Food AdditContam Part A Chem Anal Control Expo Risk Assess, 25, 1195-207.

Huber, M. and van de Vijver, L. (2009). Overview of research linking organic production methods and health effects in the lab, in animals and in humans. Department of Health Care and Nutrition, Louis Bolk Institute, Netherlands

Lundegardh, B. andMartensson, A. (2003). Organically produced plant foods – Evidence of health benefits. Soil and Plant Science, 53, pp. 3-15.

Mansour, S. A., Belal, M. H., Abou-Arab, A. A. and Gad, M. F. (2009). Monitoring of pesticides and heavy metals in cucumber fruits produced from different farming systems. Chemosphere, 75, 601-9.

Mickel, L.G. (1978). Plant growth regulators: controlling biological behaviour with chemicals. Chem. Eng. News, 56, 18.

NitikaPunia,D.andKhetarpaul, N. (2008). Physico-chemical characteristics, nutrient composition and consumer acceptability of wheat varieties grown under organic and inorganic conditions. Int J Food Sci Nutr 59:224–245.

Olsson, ME., Andersson, CS., Oredsson, S., Berglund, RH. and GustavssonKE.(2006). Antioxidant levels and inhibition of cancer cell proliferation in vitro by extracts from organically and conventionally cultivated strawberries. J Agric Food Chem., 54: 1248–1255.

Reganold, J. P., Glover, J. D., Andrews, P. K. and Hinman, H. R. (2001) Sustainability of three apple production systems. Nature 410, 926–930.

Rembiałkowska E. (2000). Wholesomenessand sensory quality of the potatoes and selected vegetables from the organic farms – habilitation thesis. Fund. Rozwój SGGW, Warszawa.

Ruxton, C.H.; Gardner, E.J. and Walker, D. (2006). Can pure fruit and vegetable juices protect against cancer and cardiovascular disease too, A review of the evidence. Int. J. Food Sci. Nutr., 57, 249–272.

Singleton,V.L. and Rossi,J.A. (1965). Colorimetry a total phenolics with phosphomolibdiphosphotungsticacid reagents. Am. J. Enol. Vitric. 16, 144-158.

Staiger, D. (1988). The nutritional value of foods from conventional and biodynamic agriculture. IFOAM Bulletin No. 4, 9-12.

Turgut, C., Ornek, H. andCutright, T. J. (2011). Determination of pesticide residues in Turkey's table grapes: the effect of integrated pest management, organic farming, and conventional farming. Environ Monit Assess, 173, 315-23.

US Department of Agriculture (USDA) (1992). Agricultural Marketing Service, Pesticide Data Program Pesticide Data Program Annual Reports; USDA: Washington, DC, USA,.

VKM. (2014). Comparison of organic and conventional food and food production Part V: Human health – pesticide residues. Available:http:// https:// WWW .Vkm.no/7852b1a164.pdf

Wei, L. H. and Intan, S. I. (2012). Antioxidantactivity, total phenolics and total flavonoids of Syzygi umpolyanthum (Wight) Walpleaves. Int J MedAromPlants; 2(2): 219-228.

Woese, K., Lange, D., Boess, C. and Bogl, KW. (1997). A comparison of organically and conventionally grown foods –Results of a review of the relevant literature. J. Sci. FoodAgric., 74: 281-293.

Worthington, V. (2001). Nutritional quality of organic versus conventional fruits, vegetables and grains, The Journal of Alternative and Complimentary Medicine, pp301–304.

Wurst, W., Prikryl,Z.andVokoun, J. (1984). HPLC of plant hormones II. Determination of plant hormones of the indole type. J Chromatogr., 286:237–245.

Zhu, Y., Chen,H., Fan,J., Wang,Y. , Li,Y.,ChenJ., Fan,J., Yang,S., Hu,L., Leung,T. W. , Mew,H., Teng, P. S., Wang,Z., and Mundt,C. C. (2000). Genetic Diversity and Disease Control in Rice," Nature 406, 718–722.

تقييم الأثر البيئي للزراعة العضوية والتقليدية

محمد محسن الخولى ، جيهان حلمى عبدالعزيز ، وفاء عبدالكريم حافظ و شرين سامى أحمد

معهد بحوث الأراضى والمياه والبيئة

الهدف من هذه الدراسة هو تحديد الظروف البيئية في المزارع التقليدية والعضوية لحماية النظم الإيكولوجية الطبيعية لتقليل التلوث البيئي وتوفير الإنتاجية المستدامة. كانت المزارع تحت الدراسة هى المزارع العضوية والتقليدية. تم جمع العينات من المزارع العضوية والتقليدية الموجودة في طريق القاهرة - الإسكندرية الصحراوي وطريق القاهرة - الفيوم الصحراوي. جمعت 21 عينة من الفواكه (العنب الأحمر والعنب الأصفر والكمثرى والبرتقالي) ؛ الخضروات (الثوم ، البصل ، الملفوف ، البرسيم ، البازلاء ، الفول ، الطماطم ، والخيار) ؛ النباتات الطبية والعطرية (النعناع ، عشب الليمون ، البابونج ، الأقحوان ، الشمر) ؛ تم جمع الحبوب (القمح والذرة والذرة الرفيعة) ومحصول الزيت (السمسم) بشكل عشوائي من المزارع المختلفة خلال عام 2017. وتم تقدير المواد المرغوب فيها مثل نسبة السكر وفيتامين C والفينول والفلافونويدوكذلك قدرت المواد غير المرغوب فيهاكمتبقيات مثل حمض الجبريليك (Gib) وحمض الخليك ألفا-النفثالين (α-NAA)؛ أسيتاميد النفثالين (NAD) ؛ 6 (6-BA) benzylaminopurine-؛ 2-4- حمض ثنائي كلورو فينوكسيسيتيك2) ، (D-4و Ethephon (Eth)] مقارنة مع الحدود القصوى للمتبقيات (MRLs) . أظهرت النتائج أن المحاصيل المزروعة عضويا (الفواكه والخضروات والنباتات العطرية الطبية) كانت ذات قيمة غذائية أعلى فى نسبة السكر وفيتامين C والفينول والفلافونويدمقارنة بالمحاصيل غير المزروعة عضويا. كما أظهرت النتائج أن محتوى البروتين في المحاصيل العضوية كان أقل من المحاصيل غير العضوية. أظهرت البيانات متبقيات منظمات النمو الاصطناعية فى المحاصيل التقليدية أعلى من المحاصيل العضوية. وقد وجد أن 58.6 ٪ من العينات التقليدية و 5.3 ٪ من العينات العضوية تجاوزتقيم MRL ، في حين أن 25.16 ٪ من العينات التقليدية و 21.6 ٪ من العينات العضوية كانت عند MRL ، في حين أن 8.2 ٪ من العينات التقليدية و 73.0 ٪ من العينات العضوية أقل من قيمةMRL .