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IS ORGANIC FOOD GOOD FOR HEALTH AND THE ENVIRONMENT?

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ABSTRACT

Global organic food consumption has increased significantly in the last decade. Organic product agriculture is a one-of-a-kind technique that strikes a balance between environmental sustainability and consumer safety by developing a good client relationship with the end customer or consumer group. According to environmental studies, organic farming is less damaging to the environment than traditional agricultural methods. Recent studies show that customers who eat organic foods have lower pesticide exposure, which results in fewer human diseases. Organic food has more nutrients. However, the evidence to support this is lacking, and no well-designed human study has shown any direct health benefits or disease prevention benefits from consuming organically produced food. Furthermore, some researchers mention that for some types of plants, the nutrients in the case of conventional products were better. This study aims to identify the benefits of organic foods over conventional foods and consumers' beliefs about health and environmental benefits associated with organic foods. Secondary data for this research have been gathered from different international journals and the Internet, utilizing information from a variety of scholarly publications. The author addresses the present state of organic farming, as well as the benefits and disadvantages of consuming organic and conventional food,. The article has also investigated the effects of organic and conventional food production on both health and the environment.
Keywords: organic farming, organic food, biodiversity, chemical fertilizer, organic fertilizer

INTRODUCTION

Over the past two decades, organic food production has developed from a loosely organized network of local producers to a global system of legally controlled commerce connecting the various sites of production and consumption, both socially and physically. Broadly defined as "traditional agriculture", it is regarded as one of the most feasible alternatives for the long-term growth of the agri-food sector. This is achieved through expanding local production and consumer networks, as well as

organic farming and fair trading. As agriculture has become more modernized, the market for agricultural food items has expanded. However, the expansion of agriculture was associated with the increased usage of synthetic fertilizers and pesticides. However, research has proved that some types of these synthetic fertilizers and pesticides (Organochlorine Pesticides) can be harmful to both health and the environmental (*Nicolopoulou-Stamati et al.*, 2016) as a result a growing number of individuals are turning to organic foods to meet their nutritional needs (*Vilvijayan & Lalitha*, 2021).

Many consumers show their preferences for organic food when they are asked to think about well-being and foods (*Ares et al.,* 2015). They feel pleasure and happiness when they consume products (*Vega-Zamaro et al.,* 2014). It is believed that the consumption of organic foods show responsible behaviour both ecologically and socially since they are grown without the use of chemical fertilizers or pesticides that are detrimental to the environment and people (*Dickson-Spillmann et al.,* 2011). The popularity of organic foods has increased worldwide in recent years. The idea that organic foods are more ecologically friendly and healthier than conventionally produced goods has increased the demand for organic foods. It is well known that organic foods are those that are grown without the use of synthetic agents such as synthetic pesticides, synthetic antibiotics, and chemicals (*Dahm et al.,* 2009). Throughout the manufacturing process, including handling, processing, and marketing, certified organic requirements are followed. Organic fruits and vegetables, dairy products, cereals, pulses, oils, and cosmetics are all created with their environmental impacts in consideration. Even ready-to-eat meals are created with environmental considerations in mind.

However, there are certain controversies about whether organic foods are healthy, or whether they are not significantly different from conventional ones. Although many people would assure that organic food is the best, certain farmers use "natural fertilizers" in growing their organic foods. The question is, how "natural" are those fertilizers? As organic pesticides are also used in organic foods. "How dangerous are these organic pesticides and do they make organic food less safe to eat than conventional food?" (*Norwood et.al,* 2015). The truth that many people do not want to accept is that synthetic materials are utilized in the production of both organic and non-organic foods whereas pesticides and fertilizers are two examples of synthetics that are used in the production of both organic and non-organic foods.

Furthermore, sustainably produced natural raw materials are used in organic agriculture and other strategies were employed in this type of agriculture like biological pest control, biofertilizers application, and crop rotation (*Durán-Lara et al.,* 2020). Hence, natural fertilizers and pesticides are used by organic farmers, unlike traditional agriculture processes in which farmers used synthetic pesticides, fertilizers, and growth regulators which drastically increase crop productivity, and for milk and meat production, antibiotics and hormones were used in animals to improve the efficiency ofproduction (*Epule et al.,* 2015). A holistic production system is involved in organic farming which is seen as the rejection of the use of harmful chemicals, pesticides, fertilizers, etc., and by this means detrimental impacts on the environment are minimized. Therefore, it is advantageous for the environment and conservation

of natural resources. Soil health and yield growth can be achieved by this kind of farming which favors the extensive use of biological control pesticides, microbial fertilizers, and organic materials (*Massimi & Haseeb,* 2019).

This study aims to describe the advantages and disadvantages of using organic food products from health and environmental aspects. The study will also provide an insight into the pros and cons of conventional products. Besides, this study will provide an insight into the most important studies and their results related to the topic of this study in the last decade. Therefore, it will be important for scholars and even practicians to get a brief look at the current literature and results related to this topic. A thorough review of the literature will offer a better understanding of the sustainability approach associated with the production and consumption of organic products and the health benefits linked with organic products.

To achieve the purpose of this study, conventional literature review methods will be used to present a comprehensive and critical review of current knowledge related to the topic of this study. Finally, the study will draw conclusions and make suggestions for potential researchers for future directions.

ORGANIC PRODUCTS VERSUS CONVENTIONAL PRODUCTS

Around 40% of arable land is used by agriculture worldwide, and it is a major cause of environmental problems. However, in the past few decades, shown in agricultural production produced tremendous gains, but malnutrition and hunger are still a big challenges to overcome, on the other hand, the demands for agricultural products are continuously rising (*Larsen et al.,* 2021). With this growing demand for agricultural products and pressure on increasing the productivity resulted in the use of pesticides in non-organic farming globally, in spite of the fact that chemicals pollute groundwater and surface water. This is very hazardous to aquatic life as well as to those of us who consume or use water in our gardens (*Baker-Dowdell,* 2018). Organic farming is often seen as a much more ecologically friendly method of food production. The lack of synthetic pesticides and the rise in the quantity and variety of plants enhance biodiversity and soil quality while reducing pollution from fertilizers and pesticide waste (*Korres et al.* 2019). On the other hand, organic foods are seen as healthy foods by a majority. This is mainly because such food is believed to be healthy and does not cause any harm to the human body. Many people would opt to buy organic foods to reduce the potential risks of cathcing diseases such as cancer and other serious medical conditions (*Crinnion,* 2010). In addition to that, many people who consume organic foods believe that their energy and fitness levels increase, hence increasing the demand for such foods. This literature review will offer an insight into the growth in demand for organic foods and their health and environmental benefits. Also, it will provide a brief comparison of these products with conventional products and the pros and cons of conventional products.

Organic products

Organic foods are referred to by various terms interchangeably, for example, ecological, free of pesticides, biological, eco-friendly, natural, and alternatively

produced (*Schifferstein & Ophuis*, 1998). The processes of organic food production and their treatment are different from conventional food production (*McCluskey*, 2000). As the production system of organic foods avoids the use of synthetic chemicals, and addintionally livestock do not receive any chemical preventive treatment as may happen with conventional food input components. Therefore, the residues of such chemicals in organitionaic end products are not likely to exist (*Schifferstein & Ophuis,* 1998). Organic production can be defined as "an ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain, and enhance ecological harmony" (*Winter & Davis,* 2006). On the other hand, organic foods are defined as those foods that are "processed by biological, mechanical and physical methods in a way that maintains the vital quality of each ingredient and the finished product" (*Kahl et al.,* 2010).

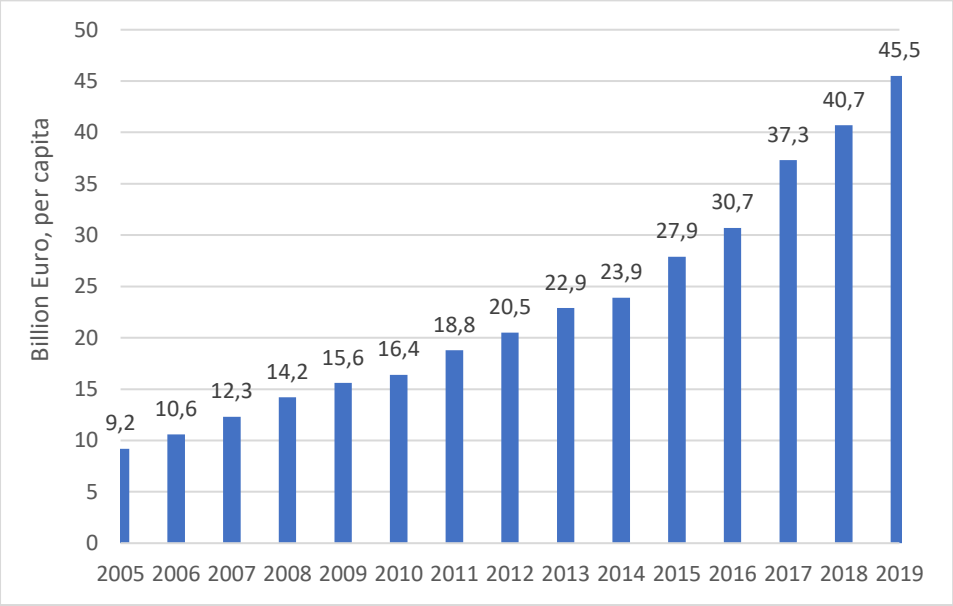
Furthermore, according to *Bublitz et al.* (2013), a growing number of studies in the literature investigated the impact of health and well-being on the decision-making regarding foods and products. This makes consumers critical of their food choices and the production system of agricultural products that may impact the environment. Therefore, it is necessary to find ways for sustainable development of agricultural products to support the increasing population and reduce the detrimental impact on human health and the environment (*Larsen et al.,* 2021). In this regard, the areas of organic food farmlands are growing rapidly, in 2019, the areas of farmlands utilized for organic production in the EU's total area increased to 14.6 million hectares. Similarly, in Europe, the organic market grew by 8 percent in 2019 and it achieved a growth of €45.0 billion (*FIBL,* 2021). This drastic change in the growth of organic products can be due to consumer confidence in it and concerns towards environmental and health risks associated with the conventional food system. According to *Van Huy et al.* (2019) , the drivers of increasing demand for organic food are busy lifestyles, health concerns, and global environmental problems.

Across the globe, the organic food market has expanded significantly. In 2016, the global organic food sale was around 90 billion US dollars which increased six times compared to its expansion in 1999. As the USA is the biggest market for organic products, the sale of organic food has grown from $3.4 billion in 1997 to over $45 billion in 2017, which is an increase of 15 times (*Van Huy et al.,* 2019). The reason for this is that consumers consider organic food as healthier, safer, tastier, and more environmentally friendly (*Padel & Foster,* 2005; *Van Huy et al.,* 2019). The growth of EU organic retail sales is presented in *Figure* 1. The demand for and sales of organic produce is gradually increasing since 2005.

According to research of dietary history, bio-food purchasers purchased 17 percent more fruit on average than the rest of the population. Around 50 percent of individuals who bought organic goods consumed 250 g of fruit daily, whereas the other 40 percent consumed less. The biological buying indications show that 65 percent of organic food consumers are regular, and 52 percent of organic products are bought on an irregular basis. According to differences in organic fodd consumption by gender, women are more likely to consume at least 250 g of fruit

every day than men, with 54 percent for eating and 44 percent for buying. It was also found that there were statistically significant differences between consumers of organic and non-organic food, as well as differences between organic male and organic female consumers (*Eisinger-Watzl et al.,* 2015). Several studies emphasized that the consumption and purchase of organic products have extensively been connected to perceived health advantages (*Chen*, 2009).

Figure 1: European Union Organic Retail Sales Growth from 2005-2019



Source: *Pawlewicz*, 2019; *FIBL,* 2021.

However, *Lusk* (2013) elaborates on some of the misconceptions that people have about organic foods. He challenges the misconception that organic food has not been exposed to any kind of pesticides or herbicides. This is the first misconception that people have. They believe that all foods that have been labeled as "organic" have not been exposed to any chemicals. However, the label does not guarantee that organic foods are free from contaminants. Secondly, there is no confirmed proof that keeping agri-cultural land free of pesticides is better for the environment. The production and distribution of organic food does not guarantee that they pose no risks for the environ-ment. The working conditions of the farmers and those who process these foods may not be one hundred percent conducive to the safety of the environment. Working conditions here refer to the working hours, the number of physical and psychological complaints related to work, and the effect of barn conditions on health. For example, farmers as poor workers may be exposed to hazardous conditions, heat stress, including pesticide exposure, shortage of enough clean drinking water, and shade. Working conditions are therefore perceived as an indicator of food safety, product quality, plus social dimensions, and animal welfare, and therefore the bad

working conditions result in compromised food quality (*NFWM*, 2020; *Duval et al.*, 2021)

However, it is believed by many consumers that the toxicology and nutritional value of organic foods are higher than those of conventional substitutes (*Hoefkens et al.*, 2009). A study conducted by *Pino et al.* (2012) surveyed around 291 consumers and their purchasing habits of organic foods, these consumers were classified as occasional or regular buyers. They found that ethical motivations influence the purchasing behavior of "regular organic food consumers" while food safety concerns impact the buying intention of "occasional consumers". Another study reported that environmental concern was a major factor that affects the purchase and consumption of organic food (*Tsakiridou et al.*, 2008). Also, *Davies et al.* (1995) reported that food and health risks are important concerns for organic food buyers in comparison to conventional food buyers. Likewise, another study found that food safety is the most crucial predictor of the attitude toward organic foods is. Hence, there are several pieces of evidence that organic food buyers believe that their concern for health and the environment is a major factor which is conducive to their deeper trust in organic foods more than conventional foods.

Conventional products

In simple terms, conventional foods are those foods that are grown using chemical fertilizers whereas organic foods are agricultural products that are mainly grown and processed without the use of any fertilizers. When it comes to animal husbandry, farmers use antibiotics and growth hormones to improve the growth and general well-being of the animals. This is the major difference between organic foods and conventional foods. In conventional farming, farmers use chemicals. These chemicals have detrimental effects both on the environment and human beings. However, these foods are safe for consumption since there are no records of anyone who has suffered from any forms of illness because of taking conventional foods. Organic farming, on the other hand, avoids the use of chemicals in the growing and processing of foods. Since there are no chemicals used, this makes such plants and crops are safe both for human consumption and the environment.

When it comes to animal farming, conventional farmers use antibiotics and growth hormones to improve the growth of the animals and prevent them from any diseases. In organic farming, farmers allow their animals to roam freely, and these animals strictly feed on organic foods. From the ecological perspective, pesticides and other synthetic chemicals used in traditional agriculture are not always avoided. Land cultivation, chemical percolation, particularly in sloping regions, illicit pesticide usage, wind drift, spray drift from conventional farms, filthy soil water, irrigation water, as well as transportation, processing, and storage, may contaminate these goods (*Tamm et al.,* 2007). Some soil has become so polluted by former agricultural practices that it may not even be viable for organic farming after three years. To transform a field from a conventional farm into an organic farm may take several years as land must not be improved?? with prohibited chemicals for three years before organic cropproduction. However, herds of animals can get converted into organic by giving them 80 percent organic feed for at least nine months and

afterwards, 100 percent organic feed for three months. It is necessary that animals take 100 percent organic feed in order to be sold as organic food, however, these animals can be given mineral and vitamin supplements (*Winter &Davis*, 2006).

Major new research comparing residue levels in organic and conventional veggies has been published (*Baker et al.,* 2002). The authors utilized data from the Farmers' Market Surveillance Program, the California Department of Pesticides Marketplace Surveillance Program, and Consumers Union on commercial goods without regard to market claims (assumed to be conventionally grown). A total of 94,000 food samples were collected and analyzed statistically. Pesticide residues (at least one kind) were detected in organically produced fruits and vegetables about one-third less often as in conventionally grown fruits and vegetables (*Baker et al.,* 2002). The apparent increase in residues in both organic and conventional products has been attributed to improvements in analytical technology and the lowering of detection thresholds for several residues. According to *Baker et al.* (2002), total contamination rates for conventional commodities were almost tenfold higher (26.7% of 60,642 samples) than for organic goods. When the findings of the three data setswere pooled, organic samples had significantly lower residual levels in approximately 69 percent of cases.

According to *Norwood et.al.* (2015), human beings are constantly exposed to natural pesticides in their everyday life. Many of the plants we eat produce their own pesticides to guard themselves against pests. If humans are exposed to an unsafe dosage of pesticides, then it can cause cancer and several neurological illnesses like Parkinson's disease. To provide the answer to the question that organic foods contain pesticides, *Norwood et.al.,* (2015) stresses that organic foods contain fewer pesticide residues in comparison to conventional foods. This claim ignores the use of "natural" pesticides which are allowed to be used by organic farmers. These natural pesticides are minerals, biological agents, and chemicals that exist in nature and are not required to be converted into chemicals in big factories and by advanced chemistry. Hence, they are safer than the chemicals used for conventional farming.

ADVANTAGES AND DISADVANTAGES OF ORGANIC AND CONVENTIONAL PRODUCTS

Nutritional differences

Consumers assume organic food is healthier than conventionally cultivated vegetables, but the evidence is mixed. No significant differences in carbohydrate or vitamin and mineral content have been found. Organic foods may contain fewer nitrates than conventional food, which may be desired given the connection between nitrates and gastrointestinal cancer and methemoglobinemia in newborns. In 21 of 36 (58%) studies (*Williams*, 2002), organic green vegetables including spinach, lettuce, and chard had higher vitamin C contents than conventionally grown veggies. Other research has shown increased total phenols in organic vegetables compared to conventionally cultivated produce, suggesting antioxidant advantages (*Asami et al.,* 2003). Studies comparing organic and conventional food have had mixed outcomes (*Forman et al.,* 2012). A systemic study that was done in 2009 showed that the nutritional content of food was influenced by several variables, including farm

location, soil characteristics, seasonal climate, harvest ripeness, storage, and testing time. In fact, the number of nutrients mentioned in different papers is enormous and the authors, therefore, categorized them into 11 categories. Remarkably, only three nutrient categories, namely nitrogen concentration, titratable acidity, and phosphorus were found to be different between conventional and organic food (*Dangour et al.,* 2009). In 2008, researchers examined the nutritional differences between organic and conventional food samples from 236 matched pairs. The results of this study showed that in terms of total phenolics, vitamin E, vitamin C, quercetin, and total antioxidant capacity, organics outperformed conventionally farmed food by an average of 80%. The conventional products had more potassium, phosphorus, and total protein, which are all important ingredientss of traditional fertilizers, but they also had lower total protein content (*Benbrook*, 2008). Furthermore, *Lombardi-Boccia et al.* (2004) observed that conventional plums (cv. Shiro) were the greatest sources of total polyphenols compared to organic ones. Conventional plums were more abundant in quercetin (54.1%), while organic plums were more abundant in myricetin (22.2%) and kaempferol (183.3%); caffeic acid, chlorogenic acid, and quercetin were the most abundant components in both organic and traditional fruits. In contrast to these findings, *Gąstoł* (2013) showed no differences in polyphenol concentration between organic and conventional vegetable juices from celery, carrot, and red beet. *Valverde et al.,* (2015) found no differences in total phenols and flavonoids levels in broccoli cultivated over two years in a split-plot factorial system experiment. *Granato et al.* (2015) observed no difference in the total phenolic content of organic and conventional purple grape juices.

Natural toxins

Organic agriculture may be more susceptible to natural toxins, such as phytotoxins and mycotoxins, due to stressed plants that, in the absence of pesticide protection, initiate a defensive response against pests, producing secondary defense-related metabolites, as well as a lack of fungicide applications that may facilitate fungal infections (*Pussemier et al.,* 2006; *Mithöfer & Boland*, 2012). Additionally, organic farming is estimated to benefit biodiversity by boosting species richness by more than 30% when compared to conventional farming. While this is beneficial for ecosystem variety, it may also contribute to increased synthesis of natural defense-related toxins to mitigate plant harm (*Tuck et al.*, 2014). Additionally, resistant crop variants are often utilized in organic farming to compensate for the absence of synthetic pesticides and thereby limit plant illnesses, while conventional farming focuses on high-yielding crop strains. As a result, organic plants probably devote more energy to the creation of natural poisons than conventional plants, which may utilize that energy to expand. These viewpoints suggest that organic crops may have greater quantities of natural poisons than non-organic crops (*Brandt & Mølgaard,* 2001).

Another types of toxins that are associated with organic agriculture are fungi, molds such as Aspergillus, Penicillium, and Fusarium that are widely found in organic agricultural foods and feeds (*Vrček et al.,* 2014). These fungi create mycotoxins such as aflatoxins (B1, B2, G1, and G2), which are carcinogenic and cytotoxic (*Liu et al.,* 2015; *Liu &Wu*, 2010). Furthermore, most mycotoxins are heat resistant and may be

passed down the food chain (*Vrček et al.,* 2014) producing substantial health threats as well as significant economic losses (*Gourama*, 2015). Taking this into consideration, mycotoxin contamination has been extensively researched and documented, especially by the European Food Safety Authority (EFSA). Due to the absence of fungicides in organic farming, concern has developed that this agricultural technique may be more contaminating than conventional farming (*Escobar et al.,* 2013).

It is also important to mention toxics such as toxic metals and metalloids (i.e., copper, cadmium, lead, chromium, nickel, zinc, aluminum, and arsenic) which may be found in agricultural products due to numerous environmental conditions such as water, soil, and air, fertilizer (*Vrček et al.,* 2014; *Cooper et al.,* 2011), and also may be found due to the nature of the production method used (*Rossi et al.,* 2008). While many heavy metals and metalloids are critical micronutrients for plants and animals, excessive ingestion may be harmful (*Alloway,* 2013). The use of mineral fertilizers in conventional farming, which is forbidden in organic farming, has raised concerns among scientists owing to rising amounts of unwanted metals in soils and foods (*Vrček et al.,* 2014; *Yang et al.,* 2013). Organic farming, on the other hand, depends on Cu fungicides, which are connected to a harmful metal buildup (*Yang et al.,* 2013; *Krejčová et al.,* 2016).

Taste of food

When it comes to customers' perceptions of the taste and flavor of organic goods, *Theuer* (2006) finds no significant variations in taste and organoleptic quality, which does not indicate that organic products taste better than conventional food. *Theuer* (2006) adds that these studies do not provide information on soil properties or management strategies, which limits the relevance of the findings. According to *Reganold et al.* (2010), organic strawberries taste better than non-organic strawberries. Additionally, perception is influenced by a variety of complex cognitive processes, including informational framing, expectancies, training, and attitudes (e.g., environmental concern) (*Sörqvist et al.,* 2013).

Environmental aspects

An important issues in the organic debate are whether organic farming practices are less harmful to the environment, more productive, and less costly than conventional methods. Many surveys and research have compared organic and conventional agricultural practices. Many people feel that organic farming is better for the environment since it does not utilize or release synthetic pesticides into the environment, some of which may affect soil, water, and local animals (*Oquist et al.,* 2007). Organic farms are also regarded to be better at supporting various ecosystems, including plant, insect, and animal populations, than conventional farms, due to measures like crop rotation. Organic farms consume less energy and create less trash per unit area or production (*Hansen et al.,* 2001). Organically maintained soil has better quality and retains more water, which may enhance output in dry years.

Environmental-conscience.com (2021) has summarized the main issues related to the environmental impact of conventional food production and farming as follows:

conventional farming may damage the soil as excessive use of fertilizers and pesticides can degrade the soil over time, leaving farmers unable to produce enough food in the future. It may also let pests develop resistance and conventional pesticides may cease to function in a few years. As a result, many farmers may be unable to keep pests out of their fields and may lose a large portion of their annual harvests to pests. Furthermore, as a result, conventional food production plants may become relatively weak and susceptible to disease as a result of being genetically engineered to enhance food production and productivity. At times, plant diseases may spread rapidly and drastically reduce food output for years, if not decades. Additionally, conventional agriculture is frequently criticized for depleting our planet's resources, as everything is optimized for profit and yield maximization, and the majority of conventional farmers are unconcerned about our ecosystems and the negative effects of conventional farming on our planet (*environmental-conscience.com*, 2021). Moreover, through conventional farming and the use of pesticides and chemical fertilizers, and deforestation related to intensive farming, many species may become endangered or even extinct shortly and overall biodiversity loss may lead to an ecological imbalance in the long run, with rather unclear effects on our planet and also on humanity. Not only many animals may disappear since their natural habitats may get destroyed, but also many insects may vanish due to the excessive use of chemical substances in conventional crop production, and this may hurt nature in the long run. Which may also lead to significant pollination problems (*environmental-conscience.com*, 2021).

Economical aspects

It is critical to recognize that conventional food production may boost employment possibilities, accelerate production, decrease farmer costs, mitigate the danger of global conflict, and improve the global nutrition balance. However, these economic advantages may make it difficult for organic food producers to compete as their costs are higher, not many customers are ready to pay high prices for organic food, and marketing and selling their goods will be difficult and expensive (*environmental-conscience.com*, 2021). However, the impulse to acquire organic goods is primarily not driven by health concerns. It is a more complicated idea that is influenced by a variety of things. Apart from health, they include a deep concern for environmental sustainability and food system resilience, risk perception, and cultural norms, and are rooted in ecological, ethical, and political convictions (though religion does not seem to be a significant factor) (*Aertsens et al.,* 2009; *Kahl et al.,* 2012; *Læssøe et al.,* 2014). As a result, organic food producers may benefit from these factors in achieving positive attitudes toward their organic products and concentrating their marketing efforts on the individuals who are delighted by such products, which may eventually result in customer loyalty (*Naz et al.,* 2021; *Dias et al.,* 2016).

To provide a better understanding of the consumer's perception of organic and conventional products, the authors summarized the key findings of some of the recent studies. *Table* 1 shows the key findings which reflect the drivers/barriers and a comparison of organic and conventional products.

Table 1: Key findings of previous studies on organic and conventional products.

Authors	Country/ Sample size	Type of Product	Key Findings
Danner & Menapace, 2020	USA, 1069	Organic and conventional food	It found that the main drivers of organic food purchases are health and food safety. Taste, nutritional value, and quality all play a role in converting consumers from conventional to organic food. The high cost of organic food remains a deterrent.
Drugova et al., 2020	USA, 1009	Organic and conventional wheat products	Their findings on organic bread consumption show that consumers value price and taste. Also, consumers believe organic products are overpriced and inferior to conventional products, such as organic bread. So, the high cost and inferior taste of organic wheat products (like bread) deter consumers from buying them.
Feil et al., 2020	Brazil, 1997	Organic and conventional products	The findings show that consumers' attitudes towards organic food are unrelated to their intentions. It means they don't intend to buy organic food. Women and college students are the main drivers of organic product purchases. Women are more concerned about buying organic food, and education increases knowledge about organic products, changing consumer buying behavior.
Ostapenko et al., 2020	Ukraine, 82	Organic and conventional agriculture produce	There are no stable organic markets in Ukraine due to the low price difference between organic and conventional products. Products like pig meat have huge price differences between conventional and organic farming. Consumers prefer conventionally grown meat over organically grown meat. Organic farms have lower land profitability than conventional farms.
Rahman et al., 2021	Systematic literature review worldwide	Organic and conventional fresh fruits, vegetables, and cereals	They found that consumers are willing to pay more for organic fresh produce than conventional fresh produce. Organic produce is thought to be free of synthetic fertilizers, herbicides, fungicides, and insecticides. Constants in organic farming are sugar content and soluble solids. The latter is dependent on the growing conditions.
Śmiglak-Krajewska & Wojciechowska-Solis, 2021	Poland, 1108	Organic	Consumers' preferences for organic produce are influenced by health-related values, according to researchers. Consuming organic food is based on the principles of organic farming which does not use chemicals. Health, sustainability, material quality, and environmental preservation are the main drivers of organic food consumption today.
Taghikhah et al., 2021	Australia, 1003	Organic and conventional wine	Environmental awareness is linked to the willingness to pay a premium for organic wines. The main reason to buy organic wines is health benefits. Despite their health and environmental beliefs, one of their studies clusters preferred conventional wine. Impulsiveness caused by negative emotions leads to spontaneous purchases of conventional wine.

RESULTS AND DISCUSSION

Why is it important to use organic food products? According to the literature review on the current topic, consumers tend to use organic food products for three main concerns that are health concerns, environmental concerns, and social norms (*Chekima et al.,* 2017; *Mørk et al.,* 2017; *Ghali, 2020; Rana & Paul,* 2020) on the other hand, the consumption of conventional food products is also determined by three influencing issues: the lack of awareness on the importance of using organic food, low financial viability, and the price of organic food which is relatively high (*Denver & Christensen,* 2015).

The review of the literature also showed that many previous studies have examined and explained the reasons for using organic products in more detail. According to *Aschemann-Witzel et al.,* (2015) the major reason for people to shift toward organic food was related to health concerns. Customers nowadays are more informed about the relationship between food and health (*Annunziata & Pascale* 2009). A great deal of previous studies have correlated using conventional food with different negative health issues like gaining extra weight, and increased rate of heart attacks (*Lusk*, 2013). Furthermore, using organic food according to USDA helped some patients to reduce their allergies and sickness since it has fewer chemicals and pesticides (*Baker-Dowdell*, 2018). Despite this, *Lusk* (2013) has mentioned that some people do not use organic food products and he related that to behavioral economics explaining that people are not patient enough to use healthy things and make a diet. They always prefer to use tastier and easier food to consume despite the fact that it is unhealthy.

An important reason why people tend to use organic or nonorganic food products is related to social norms and socio-demographic characteristics of the customers. For example *Zanoli & Naspetti* (2002) found that although Italian consumers understood the connection between using organic food and health, they tend to prefer nonorganic food since they allocate a great importance to food taste in their choices. Another study among Kurdish consumers found that specific characteristics of the food such as freshness compensate for being non-organic (*Ali*, 2021). Whereas a study among British and Danish consumers shows that these consumers prioritize the taste of the food and its freshness over its health threats (*Wier et al.* 2008). A study on Danish customers also (*Denver & Christensen,* 2015) found that consumers' economic background, the location of their residence, and their educational level were important in their choice for organic food; Customers in better economic situations, living in urban areas, and with higher education are more likely to purchase organic products and follow organic dietary recommendations; however, the availability of organic product selling points was an important indirectvariable. Whereas it could be seen in some studies that consumers preferred organic food over non-organic like Belgian consumers who care about health, low level of pesticides, environment, and finally the taste and quality of food (*Aertsens et al.,* 2011). Similarly *Śmiglak-Krajewska & Wojciechowska-Solis* (2021)found that health concerns and food quality were the main motivating factors of Polish customers to consume organic food.

Many studies have mentioned the importance of organic food for the environment since organic food depends on minimizing pesticides and chemicals as

much as possible which will result in better quality and healthier water and soil which will make food production more sustainable. That's why an increasing number of consumers will use organic food products (*Korres et al.* 2019; *Baker-Dowdell,* 2018).

CONCLUSION AND FUTURE STUDIES

The current study aimed to review literature that described consumer behavior toward organic products and to describe the disadvantages and advantages of organic and conventional food products.

The organic food industry is growing all over the world, and soon organic food will be in every household. Furthermore, organic foods are seen by customers as being more nutritious and of better quality. Organic food is better for the health and the environment. Using organic food products will promote health and environmental stability. Many farms are shifting toward sustainable solutions where the use of pesticides and chemicals is very low. The ban on mineral and synthetic fertilizers that have a detrimental impact on organic crop components is one of the fundamental bio-based agricultural concepts. Although many studies have highlighted the health benefits of organic food, some studies have argued that for some types of corps, there is no significant difference in nutrients between organic and conventional food products. Furthermore, other studies contend that organic food may increase the levels of various types of toxins in plants, potentially affecting human health.

On the other hand, some studies have found a connection between conventional food products and their negative effects on human health, for example, being overweight and having a heart attacks. Despite these negative effects, there are some benefits of conventional food production such as reducing the level of some toxins in plants that may exist due to, for example, the type of water, soil, and fertilizer. And achieving some economic feasibility for farmers and customers alike. For different reasons, customers are using conventional products in their daily consumption, mainly related to the lack of awareness, high prices of organic products, financial viability, and relatively better taste in some cases. It could be noticed that social norms are important influencing factors in making purchasing decisions related to organic food. Different social factors have a role in affecting this decision, and it varies from culture to culture and country to country.

Future research may provide a more systematic review of recent studies focusing on culture and social norms. Also, it would be nice if future research focused on a specific type of product and tried to understand its consumption separately, which would allow more reflection on the quality of the output products , making them acceptable for both researchers and businesses. Finally, future research can look at the long-term environmental benefits of organic food to find the best farming method.

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