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The use of nitrates as insecticides and its effect on health in foods produced by traditional farming method compared to foods produced by organic farming

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Abstract: The study aimed to identify the quantity of nitrates present in food produced by the organic farming method compared to food produced by the traditional farming method. It also, aimed to identify the danger of the expansion the use of fertilizers and agricultural pesticides containing nitrates without proper supervision or awareness which leaves residues of nitrates in food, especially vegetables, and fruits that are eaten directly because of their harmful effect on human health and the extent of the risks that may be exposed to from eating foods containing nitrates among a sample from Prince Sattam bin Abdulaziz University employees. The number of the sample was (279) during Ragab, Sha'ban, and Ramadan in 1443 HD. Its average was 18.6% of the total sample. To achieve the study objectives, it relied on the descriptive and quantitative method for data collection where sample was identified that consumed food produced by traditional agriculture more than the same types of food produced by organic farming. The results of the laboratory analysis indicated that the nitrates ratio in the traditional food was with the average of 621.87 while the organically produced foods was with the average of 359, 05. The results of the survey indicated that (89.6%) of the total study sample had a bachelor's degree or higher, and (95.3%) were Saudi women. They also indicate that the study members' opinions about the meaning of organic products are that natural fertilizers are used in the cultivation of organic products, followed by the non-reliance on pesticides Then avoid using hormones as for the method of identifying organic products. It was found that 32% learned about organic products through television, and 22% through the market, while the motives for purchasing organic products were that they were of high quality by 23%, while 749 were healthy, while 10% believe that it is free of pollution. Individuals who get organic products through the supermarket were 55%, and that 13% from farms directly and individuals who prefer to buy traditional local products were 17%, while 57% prefer to buy local organic products, and that 4% prefer exported traditional products. The results indicate an increase in the consumption of organic products which may be due to avoiding harmful substances found in traditional products and obtaining healthy food that is safe from pollutants. Therefore, the researcher recommends conducting more research to identify the nutritional content of organic food products and compare them with traditional food products and knowing the health effects of both.

Keywords: traditional farming, organic farming, organic food, traditional food.

دراسة استهلاك المنتجات الغذائية العضوية مقارنة بالمنتجات الغذائية التقليدية

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المستخلص: هدفت الدراسة للتعرف على كمية النترات الموجودة في الأغذية المنتجة بطريقة الزراعة العضوية مقارنة بالأغذية المنتجة بطريقة الزراعة التقليدية حيث تكمن الخطورة التوسع في استخدام الأسمدة والمبيدات المحتوية على النترات بدون رقابة أو وعي سليم

مما تترك بقايا من النترات في الغذاء وخاصة الخضروات والفاكهة التي تؤكل بشكل مباشر لما لها من تأثير ضار على صحة الانسان ومدى المخاطر التي يمكن أن يتعرض لها الانسان من تناول الأغذية المحتوية على النترات في تركيبها كما تم جمع بيانات باستخدام استبيان اتبع فيه العشوائية لعينة من منسوبي جامعة الأمير سطام بن عبد العزيز بلغ عددها (279) خلال شهور رجب وشعبان ورمضان لعام 1443 هـ بنسبة (18، 6) من مجموع أفراد العينة، ولتحقيق الأهداف تم الاعتماد على المنهج الوصفي والكمي لجمع البيانات، تم تحديد عينات اكثر استهلاكا للأفراد من الأغذية المنتجة بالزراعة التقليدية ونفس الأصناف من الأغذية المنتجة بالزراعة العضوية وتحليل العينات معمليا وتشير نتائج التحليل المعملي إلى نسبة النترات الموجودة في الأغذية المنتجة بطريقة تقليدية كانت بمتوسط 621.78 بينما في الأغذية المنتجة بطريقة عضوية كانت بمتوسط 359.05 وتشير نتائج الاستطلاع للعينة أن (89.6%) من إجمالي عينة الدراسة كان مؤهلهم العلمي بكالوريوس فما أعلى و(95.3%) الدراسة كانت جنسيتهم سعودية، كما تشير إلى أن آراء افراد الدراسة حول معنى المنتجات العضوية بأن الأسمدة الطبيعية هي المستخدمة في زراعة المنتجات العضوية ويليها عدم الاعتماد على المبيدات الحشرية ثم تجنب استخدام الهرمونات، أما عن طريقة التعرف على المنتجات العضوية تبين أن (32%) تعرفوا على المنتجات العضوية من خلال التلفزيون، وأن (22%) عن طريق السوق، أما دوافع الشراء للمنتجات العضوية انها كانت ذات جودة عالية بنسبة (23%)، بينما (49%) أنها صحية،، بينما (10%) يعتقدون انها خالية من التلوث، والأفراد اللذين تحصلوا على المنتجات العضوية من خلال السوبرماركت بنسبة (55%)، وأن (15%) من خلال محلات ثمار، وأن (13%) من المزارع مباشرة والأفراد الذين يفضلون شراء المنتجات المحلية التقليدية بنسبة (17%)، بينما (57%) يفضلون شراء المنتجات المحلية العضوية، وأن (4%) يفضلون المنتجات المستوردة التقليدية، وأن (22%) يفضلون المنتجات المستوردة العضوية، تشير النتائج بزيادة استهلاك المنتجات العضوية قد يرجع لتجنب المواد الضارة الموجودة في المنتجات التقليدية والحصول على الغذاء الصحي الآمن من الملوثات، لذلك يوصي الباحث بإجراء المزيد من الأبحاث للتعرف على المحتوى الغذائي للمنتجات الغذائية العضوية ومقارنتها بالمنتجات الغذائية التقليدية ومعرفة الآثار الصحية لكل منهما.

الكلمات المفتاحية: الزراعة التقليدية، الزراعة العضوية، الغذاء العضوي، الطعام التقليدي.

Introduction.

The agricultural methods were described as organic despite the use of chemicals for traditional agricultural products which led to the excessive use of chemical fertilizers and pesticides in plant nutrition and pest resistance to the emergence of many environmental and nutritional problems, the most important of which are the deterioration of soil fertility, water and air pollution with chemical fertilizers and pesticides, in addition to contamination of food products with elements. Pesticides harmful to human health, Farah Ayuni Shafiea*and Denise Rennieb (2012, Ministry of Environment and Agriculture 2019).

In response to nutritional problems, animal manure, cover crops, crop rotations, and pest controls all lead to a better agricultural system. This method was called organic farming and organic food products. Several articles on organic products were published to educate and encourage people to consume organic food, and the demand for it increased. To avoid environmental damage caused by food contamination with pesticides (French Food Safety Agency 2021, and Ellis and et al 2006, WHO, 2013, 2014)

Several studies showed that the poor use of hormones, chemical fertilizers, and pesticides in traditional agriculture has led to an increase in consumers' awareness and interest in food safety and quality in the Kingdom of Saudi Arabia which has led to decision makers' interest in producing healthy food with high quality, using modern and advanced agricultural systems in line with the increased demand for healthy food products. Therefore, financial resources were devoted to developing the organic

sector, with the benefit of international bodies with experience in this field (WHO, 2015, Ministry of Environment and Water, 2020, and Food and Agriculture Organization 2021, Joris Aertsens, 2009).

The study (Hammoud, 2019) showed that the productivity of the organic food crop is higher than its traditional counterpart, and that the control costs in organic agriculture are lower than the costs of control in conventional agriculture.(

Fertilizers and pesticides containing nitrates were used without supervision which left residues in food such as grains and vegetables. Therefore, it is necessary to monitor the quantities used of pesticides containing nitrates or nitrites to monitor food crops and examine them to ensure that they are free of nitrogenous compounds residues because they are considered an indicator to judge the presence of harmful nitrogen fertilizers in food products. (Lunn and Theobald, 2006, Reganold and Wachter 2016).

The study (Magkos et al, 2006) showed that eating organic foods helps to avoid harmful pesticides, and (Farah Ayuni and Denise Rennieb, 2012) added that it has an impact on life and makes individuals feel food security and may help in treating many contemporary diseases, and he also explained that the causes to buy organic foods is to avoid chemical)2021, Jaris and et al) .residues (53%) and eat healthy foods (55%)

As C.S Williamson in 2007 showed that organic fruit and vegetables consumption are in increase yearly to avoid the pollutants and harmful substances, the reasons why the consumers may choose to buy organic food differs from consumers to consumers, some of them have the perception that organic food is safer or more nutritious than conventional produced food.

Beate Goetzke also shows in his research 2014 a sample of 555 German consumers at two levels the cognitive emotional and the behavioral level that shows that although health is important for both functhional food and organic food consumption, were influenced by different perspective of health, orgabic food consumption influenced by overall holistic healthy lifestyle.

Also Anne Lise Brantsaeter Et Al in 2016 showed the consumer preference for organic food compared with conventional produced food, the difference between them is in fever of organic food including indication of beneficial health effect. Organic food contains lower pesticide residue exposure than do conventionally produced food.

Research problem:

This study aimed to identify the measurement of nitrates in some foods produced by the organic farming method and compare them with their counterparts from foods produced by the traditional farming method, and to identify the extent of the presence of nitrates in foodstuffs where the danger lies in the expansion of the use of fertilizers and pesticides containing nitrates without proper supervision or awareness which leaves residues of nitrates in food, especially vegetables and fruits that are eaten directly because they have a harmful effect on human health in general, and to ensure that food is free of residual

nitrogen fertilizers, and the extent to which community members accept organic foods and how to identify and obtain them from shops.

Research objectives:

1- Measuring the level of nitrates in organic food products and conventional food products
2- Poll the respondents' opinions to know the organic food products and the traditional food products
3- Knowing the motives for buying organic products
4- Knowing where to get food products
5- The reason for preferring to buy organic products
6- Identifying the preferred types of organic food products compared to traditional food products.

Research methods and tools:

Research Methodology: In achieving its objectives, the research relied on the analytical and descriptive method for its relevance to the study nature to study and analyze the phenomena to find out the internal and external correlations between them and other phenomena (Al-Assaf, 2003). The t-test for the average of one sample T-test, and the research relied on the field research method to study and analyze the data and it was obtained in the field through a regular random sample to collect the initial data from the university's employees

Research limitations:

1- The human limitions: the employees of Prince Sattam bin Abdulaziz University, including faculty members, administrative staff, and students of the university in Al-Dilam governorate where a sample of (279) and (1500) were selected. It was taken into account that the sample is representative of all employees of the governorate. The questionnaire was distributed using electronic style.
2- Spatial limitations: the study was applied and data was collected for the female employees of Prince Sattam bin Abdulaziz University, including faculty members, administrative staff, and university students in Al- Dilam Governorate.
3- Time limitations: the data were collected in the month of Rajab, Sha'ban, and Ramadan for the year 1443 AH

Data collection tools:

The researcher relied on the quantitative analysis to estimate the percentage of nitrates in the IDAC laboratories to estimate the percentage of nitrates in the selected organic food products (zucchini, cauliflower, and potatoes) and their counterparts of the conventional products. Data was also collected through a questionnaire as the main study tool. The questionnaire was presented to the faculty members in the research unit. The scientific study at the university is to identify the congruence of the study

domains objectives. The five-point Likert scale was used, and the scale scores (from 1 to 3) were distributed so that the respondent showed whether he disagreed very much, agreed, or agreed to some extent.

Internal consistency and stability of the study tool:

The stability of the study tool means: to what degree does the scale give close readings every time it is used, or what is the degree of its consistency, and continuity when repeated use at different times and on different sample members, and the researcher after applying the questionnaire to the study sample to ensure internal consistency by calculating the Pearson correlation coefficient to find out the internal validity of the questionnaire where the correlation coefficient was calculated between the degree of each of the questionnaire items with the total score of the domain to which the item belongs, omitted from the element to which it belongs. The researcher used the Cronbach Alpha coefficient to measure the stability of the study tool where it was identifying the stability of the variables individually and then the stability of the main domains of the questionnaire, as well as calculating the corrected correlation coefficient, and this was calculated for each of the study domains, as shown in the following table:

Table No. (1) Psychometric analysis of the first domain items

Correlation Coefficient of the domin	Item Number	Correlation Coefficient of the domin	Item Number
0.493**	1	0.493**	1
0.652**	2	0.652**	2
0.688**	3	0.688**	3
0.687**	4	0.687**	4
0.653**	5	0.653**	5
0.470**	6	0.470**	6
0.612**	7	0.612**	7
0.633**	8	0.633**	8
0.651**	9	0.651**	9
0.432**	10	0.432**	10
0.514**	11	0.514**	11
0.663**	12	0.663**	12
0.594**	13	0.594**	13
0.595**	14	0.595**	14
0.658**	15	Cronbach's alpha coefficient	
0.541**	16		
0.642**	17		
0.854**	18		
0.654**	19		
0.781**	20		
Cronbach's alpha coefficient			

** Significant at the significance level 0.01.

It is clear from Table (1) that all the vocabulary components of the domain (meaning organic products- preferred varieties of organic and traditional products) contribute to increasing the stability of this domain 0.866-0.956 which is high. It indicates that the domain has a high degree of stability. The table also showed that all the correlation coefficients between the vocabulary components of the domain (the meaning of organic products) and the total are positive and statistically significant at the significance level of 0.01 or less which indicates that all the domain items have a high degree of sincerity that ranged between (0.432 to 0.781).

Statistical methods used in data analysis:

To achieve the study objectives and analyze the data collected through the study tool from the field side, the statistical package for social sciences (SPSS) were used.

- Frequencies and percentages were calculated to identify the personal and functional characteristics of the study sample vocabulary and to determine its vocabulary responses to the main items included in the study tool.
- The arithmetic mean and the standard deviation: to find out how high or low the study sample's responses (the average of the items), knowing that it is useful for arranging the study items according to the highest weighted arithmetic average.
- The Pearson correlation coefficient was used to find out the degree of correlation between each of the study questions.
- The researcher used the Cronbacha Alpha coefficient to test the stability of the study tool.

Research methodology.

1- Samples of food produced using the organic farming method were taken from fruit shops and corresponding samples of food produced by the traditional farming method (organic potatoes, traditional potatoes, organic zucchini, traditional zucchini, organic cauliflower, and traditional cauliflower). They were analyzed in Edak laboratories to identify the level of nitrate residues used during farming as insecticides.

2- The level of nitrates in vegetable samples was estimated by the ultraviolet spectrophotometric screening method as follows:

a. The aqueous extract of the vegetable samples was obtained and diluted with sulphanilic acid to form a diazonium compound with nitrate, then adding the phenephthylamine compound to form a red and pink color.

b. (63.1) gm of potassium nitrate was weighed in a quantity of distilled water and supplemented to 1 liter, then 2 ml of chloroform was placed for preservation, and the volume of the solution was 1000 mg/liter.
c. Standard solutions were made by taking 100 ml of the previous solution and supplementing it to 1000 ml with different concentrations by taking 50 ml, adding 1 ml of hydrochloric acid, and shaking it well.
d. The absorption is measured at 220 and 275 nm, as the absorption at 220 nm is for both nitrates and dissolved organic materials, while the absorption is 275 nm for organic materials only.
e. In the case of solutions, the researcher multiplies the absorption reading at 275 by 2, then subtract it from the absorption reading at 220, and the result is the absorption of nitrates only. A graph is made to determine the reading for nitrates compared to standard solutions.
f. The nitrate is chromatically estimated using a spectrophotometric chromatograph.

3- A questionnaire was made to survey the opinions of a sample that included some members of Prince Sattam bin Abdulaziz University, and they were selected randomly consisting of (279) from the study community, which consisted of 1200 people, and the dimensions of the questionnaire are:

First: Personal data included education, nationality, practical status, age, monthly income

Second: The meaning of organic products from the point of view of the sample members which included some questions to explore the respondents' opinions.

Third: How to identify food products?

Fourth: Motivations for buying organic products.

Fifth: The place to get food products.

Sixth: The reason for preferring to buy organic products.

Seventh: What are the preferred types of organic food products compared to traditional food products?

Results and discussion:

First: the results of laboratory analysis of samples

Table (2) results of the measurement of nitrate in some organic and traditional products

Food Item	Nitrate content in traditional products	Arithmetic mean	Standard deviation
zucchini	161.7	87.37	194.41
cauliflower	60.8	120.83	189.94
Potatoes	39.6	150.85	223.78
Total	262.1	359.05	608.13

Correlation coefficient: 0.999

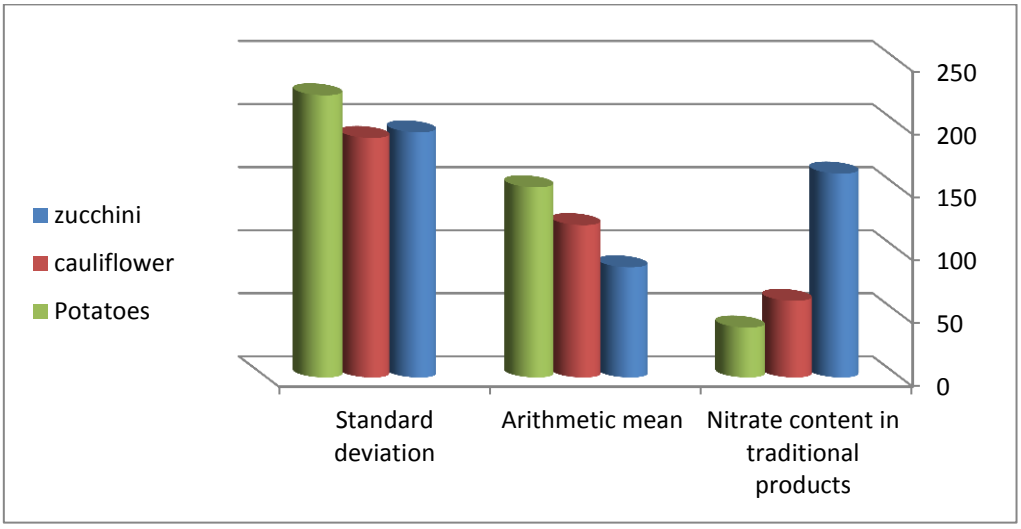

Figure No (1) Results of the measurement of nitrate in some organic and traditional products

Table (3) Results of nitrate measurement in some organic and traditional products

Food Item	Nitrate content in traditional products	Arithmetic mean	Standard deviation
zucchini	309.5	154.46	135.37
cauliflower	94.2	205.76	223.78
Potatoes	59.7	251.66	285.459
Total	463.4	621.783	644.61

Correlation coefficient: 0.999

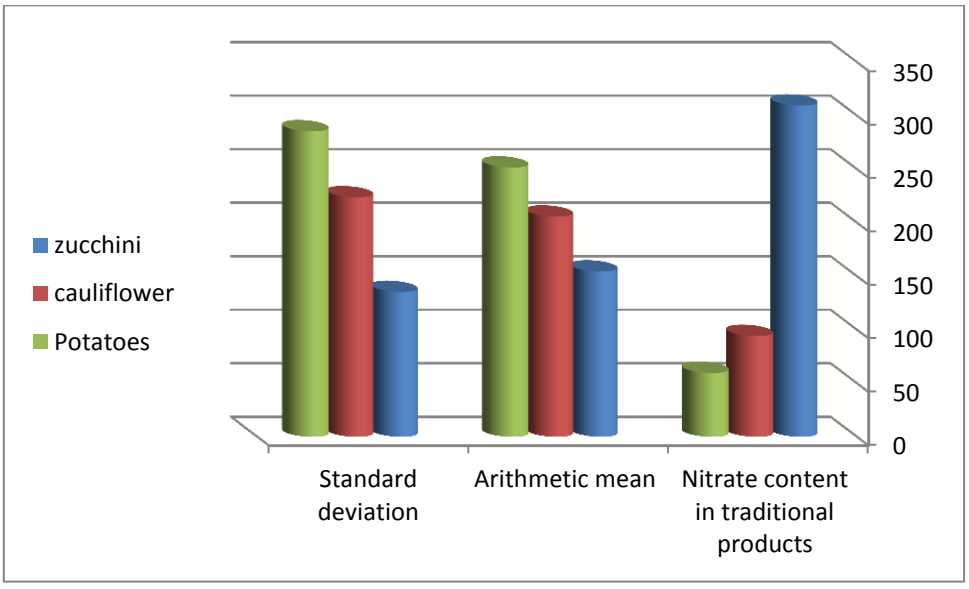

Figure (NO 2) Results of nitrate measurement in some organic and traditional products

It is clear from Tables 2, and 3 and figure 1 and 2 that when comparing the amount of nitrate present in food products using the traditional farming method, it was much greater than the amount of nitrate present in food products produced using the organic farming method. Samples for food produced

by the organic farming method compared to food produced by the traditional farming method based on the percentage of nitrates in the items that were identified and analyzed in the laboratory. It is converted in the body to nitrite and with enzymatic reactions during or activity of microorganisms, whether in food or in the human digestive system, where nitrous acid and the resulting nitrogen oxides are formed, as it binds with the amine group of the dehydrogenase enzyme in the microbial cell, forming nitrous amine which is considered a carcinogen. (Nielsen and Lund, 2005), (WHO, 2004), (Joris et al., 2021), and (Yue et al., 2008) indicated that organic foods contain half the amount of nitrate compared to the amount of nitrate in traditional foods, and that organic farming can produce high-quality foods, including antioxidant phytonutrient contents (Cramar et al., 2009) and that organic foods Characterized by taste, flavor, texture, and good appearance (Faidon et al., 2003), (Chen, 2009), (Nielsen and Lund, 2005), and (L. J., Levison, et al., 2016). ** Significant at the significance level 0.01.

Second: The results of the questionnaire analysis are as follows:

The following is a presentation of the primary data of the study sample that pertains to personal information, and then categorize them as follows:

First: A study of the correlation between future variables and the consumption of organic products for Saudi women: Educational status:

Table No. (4) shows the educational status

Scientific degree	frequency	Ratio
Institue	6	2.2
Bachelor	250	89.6
Master	8	2.9
Doctorate	15	5.4
Total	279	100

It was found through the study results that (89.6%) of the total study sample had a bachelor's degree, while (5.4%) had a doctorate, followed by a master's degree (2.9%), and finally, (2.2%) of the total study sample had an academic qualification from an institute. ** Significant at the significance level 0.01.

Nationality: Table No. (5) shows the nationality

Nationality	frequency	Ratio
Saudi	266	95.3
Non-Saudi	13	4.7
Total	279	100

The study results showed that (95.3%) of the total sample were Saudis, while (4.7%) were non-Saudis.

Practical status: Table No. (6) shows the practical status

Practical status	frequency	Ratio
Employee	229	82
Non-employee	50	18
Total	279	100

It was found through the study results that (82%) of the total sample was from the category of employees, while (18%) was from the category of non-employees. ** Significant at the significance level 0.01.

Age: Table No. (7) shows the age

Age categories	frequency	Ratio
Less than 20 years	27	9.5
From 20 – 25 years	198	71.1
More than 25 years	54	19.4
Total	279	100

It was found through the study results that (71.1%) of the total study sample were aged 20-25 years, while (19.4%) were more than 25 years old, and finally, it was found that (9.5%) of the total study sample were aged less than 20 years. ** Significant at the significance level 0.01.

Monthly income: Table No. (8) shows the monthly income

Monthly income	frequency	Ratio
From 2000 – 5000	174	62.4
From 5000 – 10000	83	29.7
More than 10000	22	7.9
Total	279	100

It was found that (62.4%) of the total sample had a monthly income of 2000-5000 Riyals, while (29.7%) had a monthly income of 5000-10000 Riyals, and finally, it was found that (7.9%) of the total sample of the study had a monthly income more than 10, 000 Riyals,

The frequencies, percentages, arithmetic averages, standard deviations, and ranks were calculated for the study members' responses to the questions of the dimension, and the results of the organic products meaning dimension came as in the following table.

Table (9) shows the study sample's responses on the items related to the first dimension items

	items		Agree Strongly	Agree somewhat	Agree	Arithmetic mean	Standard deviation	General attitude
2	Natural fertilizers are used in the cultivation of organic products.	F	129	119	31	2.31	0.67	1
		%	46.2	42.7	11.1			

	items		Agree Strongly	Agree somewhat	Agree	Arithmetic mean	Standard deviation	General attitude
4	Organic products protect against diseases.	F	129	105	45	2.30	0.73	2
		%	46.2	37.6	16.1			
6	Not rely on pesticides to grow organic products.	F	138	85	56	2.29	0.78	3
		%	49.5	30.5	20.1			
9	The consumption of beef and sheep raised on farms is under control and follow-up.	F	129	100	50	2.28	0.75	4
		%	46.2	35.8	17.9			
7	Avoid using hormones in growing organic products.	F	134	89	56	2.28	0.77	5
		%	48	31.9	20.1			
5	Organic products are free of contaminants.	F	123	107	49	2.27	0.74	6
		%	44.11	38.4	17.6			
12	The consumption of eggs of chickens raised in closed farms is monitored and monitored.	F	120	112	47	2.26	0.72	7
		%	43	40.1	16.8			
11	The consumption of chicken meat raised in closed farms under supervision and follow-up.	F	117	111	51	2.24	0.74	8
		%	41.9	39.8	18.3			
14	Organic products are free of antibiotics.	F	113	103	63	2.18	0.77	9
		%	40.5	36.9	22.6			
1	The knowledge of the organic products' concept.	F	95	89	95	2	0.82	10
		%	34.1	31.9	34.1			
10	Consumption of chicken meat raised on farms in open spaces.	F	87	94	98	1.96	0.81	11
		%	31.2	33.7	35.1			
13	Consumption of eggs of chickens raised on farms in open spaces.	F	70	117	92	1.92	0.75	12
		%	25.1	41.9	33			
8	Consumption of beef and sheep raised in the wild freely in open spaces.	F	79	94	106	1.90	0.81	13
		%	28.3	33.7	38			
3	Chemical fertilizers are used in the cultivation of organic products	F	39	69	171	1.53	0/73	14
		%	14	24.7	61.3			

It is clear from the above table No. (9) that the knowledge of the organic products meaning dimension includes (14) items, all the study members' responses indicated (agree, to somewhat agree) concerning their arithmetic averages, where the arithmetic averages range from (2.35 to 1.53). These

averages fall into the second and third categories of the triple scale categories, and through the results, it is clear that the study members' opinions about the organic products meaning from the respondents' point of view are summarized in the following, in order according to the approval averages. ** Significant at the significance level 0.01.

- Item No. (2) which is (Natural fertilizers are used in the cultivation of organic products) ranked first among the items related to the meaning of organic products dimension from the respondents' point of view, with a degree (agree) and arithmetic mean (2.31) and a standard deviation (0.67).
- Item No. (4), which is (Organic products protect against diseases.) ranked second among the items related to the meaning of organic products dimension from the respondents' point of view, with a degree of (agree) with a mean of (2.30) and a standard deviation of (0.73).
- Item No. (6) which is (not rely on pesticides in the cultivation of organic products.) ranked third among the items related to the axis of the meaning of organic products from the respondents' point of view, with a degree (agree) and a mean of (2.29) and a standard deviation of (0.78).
- Item No. (9) which is (the consumption of beef and sheep raised on farms under supervision and follow-up.) ranked fourth among the items related to the axis of the meaning of organic products from the respondents' point of view, with a degree of (agree) with a mean of (2.28) and a standard deviation of (0.75).
- Item No. (8) which is (the consumption of meat of cattle and sheep raised in the wild freely in open spaces.) came in the penultimate rank among the items related to the axis of the meaning of organic products from the respondents' point of view, with a degree (agree to some extent) and arithmetic mean (1.90) and deviation normative (0.81).
- Item No. (3) which is (chemical fertilizers used in the cultivation of organic products.) ranked last among the paragraphs related to the meaning of organic products dimension from the respondents' point of view, with a degree (agree to some extent) and with arithmetic mean (1.53) and a standard deviation (0.72).

How do identify organic products?

Table No. (10) shows the method of knowledge

	Frequency	Ratio
Television	116	32
Workplace	28	8
Colleagues	27	7
Market	82	22
Other	115	31

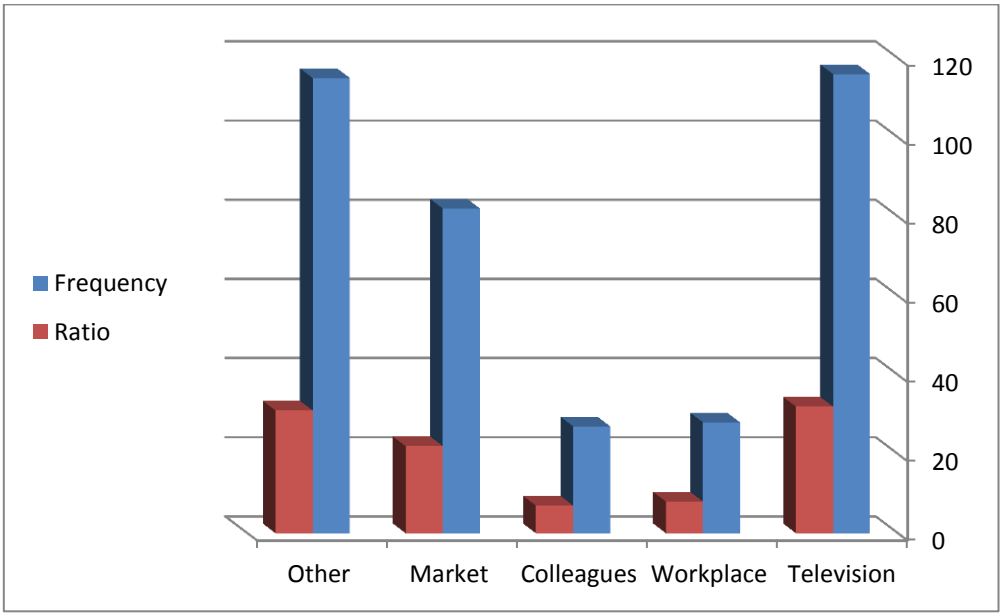

figure No. (3) shows the method of knowledge

The study results showed that (32%) had known the organic products through television, (8%) through the workplace, (7%) through colleagues, and (22%) through the market, while (31%) through other ways. ** Significant at the significance level 0.01.

As for motives for buying organic products:

Table No. (11) shows the motive for buying organic products

	Frequency	Ratio
high quality	98	23
Healthy	208	49
Environmental Preservation	57	13
The appropriate price	14	3
Pollution-free	41	10
support local producers	7	2

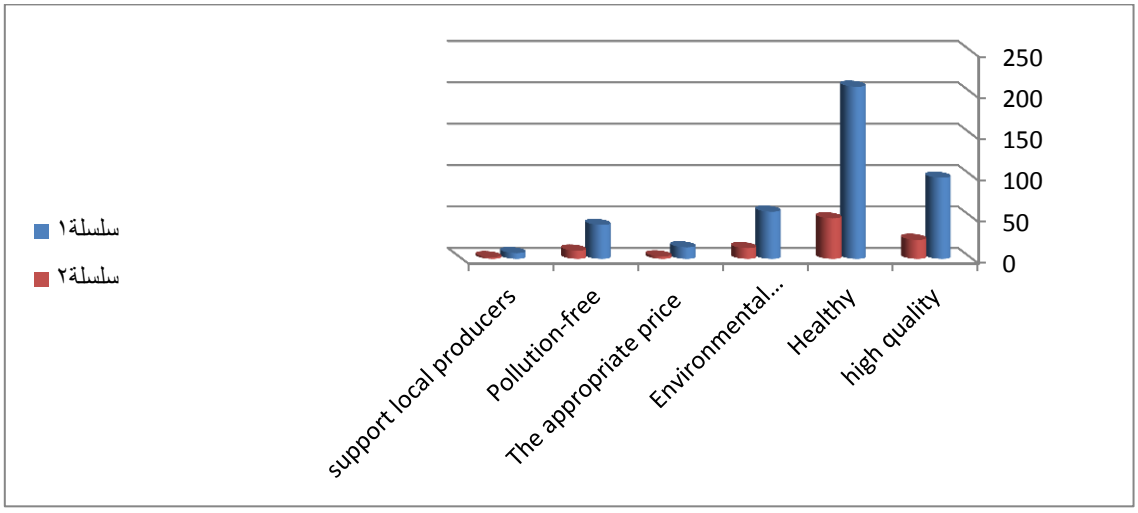

figure No. (4) shows the motive for buying organic products

The study results showed that (23%) were motivated to buy organic products that are of high quality, while (49%) of the sample were motivated to buy organic products because they were healthy, (13%) because they were environmentally friendly, and (3%) as they were reasonably priced, (10%) believe they are free of pollution, while (2%) were motivated to buy organic products by supporting local producers. ** Significant at the significance level 0.01.

As for the place of obtaining the organic products: Table No. (12) shows the place of obtaining the organic products

	Frequency	Ratio
Supermarket	196	55
Small shops (groceries)	24	7
Fruit shops	52	15
From farms directly	84	23

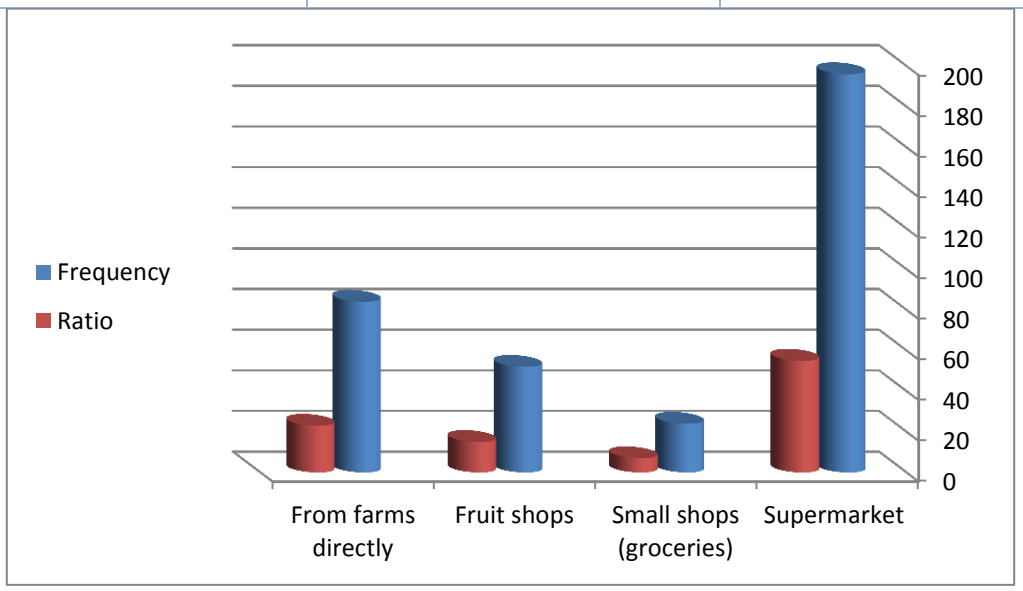

figure No. (5) shows the place of obtaining the organic products

The results showed that (55%) obtained organic products through the supermarket, while (7%) of the study sample said that they obtained organic products through small shops (groceries), that (15%) obtained organic products through fruit stores, and that (13%) get organic products directly from farms. ** Significant at the significance level 0.01.

Best Buy Products: Table No. (13) shows the priority of products in terms of purchase

	Frequency	Ratio
traditional local	61	17
Organic local	211	57
traditional imported	16	4
organic imported	83	22

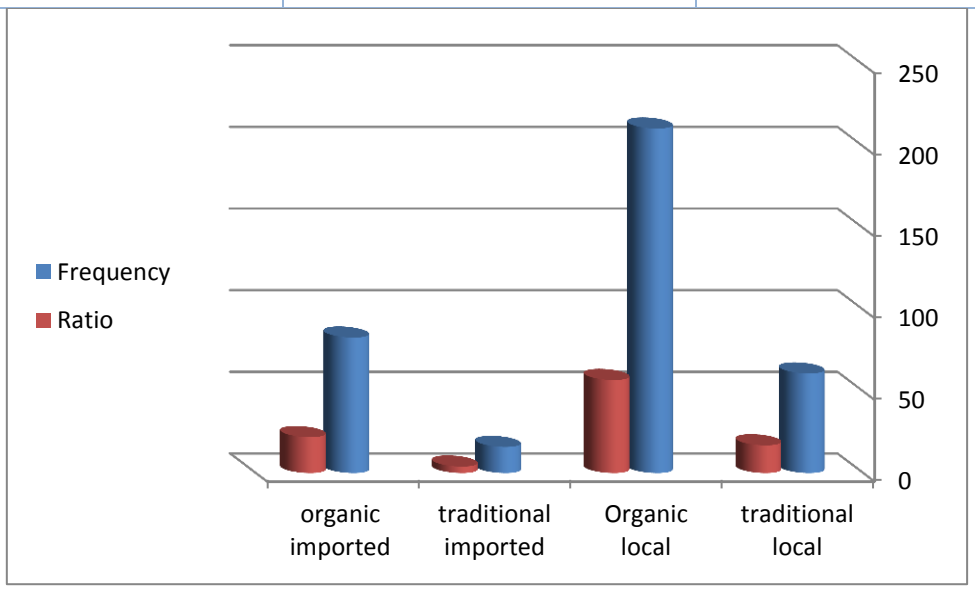

Figure Table No. (6) shows the priority of products in terms of purchase The results showed that (17%) prefer buying traditional local products, while (57%) prefer buying organic local products, (4%) prefer traditional imported products, and (22%) prefer imported organic products, ** Significant at the significance level 0.01.

As for the preferred varieties of organic and traditional products:

The frequencies, percentages, arithmetic averages, standard deviations, and ranks were calculated for the study members' responses to the questions of the dimension, and the results came about the preferred varieties of organic and traditional products as in the following table. ** Significant at the significance level 0.01.

Table (14) shows the responses of the study sample to the items related to the second dimension items

	items	Organic local		Imported organic	Non-organic local	Non-imported organic	Arithmetic mean	Standard deviation	General attitude
11	Coriander	F	209	42	25	3	3.64	0.69	1
		%	74.9	15.1	9	1.1			
6	Tomatoes	F	212	33	31	3	3.63	0.72	2
		%	76	11.8	11.1	1.1			
10	Parsley	F	210	38	26	5	3.62	0.72	3
		%	75.3	13.6	9.3	1.8			
15	Egg	F	205	41	30	3	3.61	0.72	4
		%	73.5	14.7	10.8	1.1			
19	Milk	F	206	40	28	5	3.60	0.74	5
		%	73.8	14.3	10	1.8			
5	Cucumber	F	213	26	34	6	3.60	0.78	6
		%	67.3	9.3	12.2	2.2			
12	Rocca	F	212	30	28	9	3.59	0.79	7
		%	76	10.8	10	3.2			
18	chicken meat	F	204	35	33	7	3.56	0.79	8
		%	73.1	12.5	11.8	2, 5			
7	Lettuce	F	199	44	28	8	3.56	0.78	9
		%	71.3	15.8	10	2.9			
13	Cauliflower	F	198	41	33	7	3.54	0.79	10
		%	71	14.7	11.8	2.5			
8	Carrot	F	198	41	33	7	3.54	0.79	11
		%	71	14.7	11.8	2.5			
3	cold green pepper	F	196	41	34	8	3.52	0.81	12
		%	70.3	14.7	12.2	2.9			
2	Onion	F	202	31	36	10	3.52	0.85	13
		%	72.4	11.1	12.9	3.6			
9	cabbage	F	178	57	28	7	3.52	0.77	14
		%	67	20.4	10	2.5			
20	cheese	F	188	53	32	6	3.52	0.78	15
		%	67.4	19	11.5	2.2			
4	hot red pepper	F	200	30	42	7	3.52	0.83	16
		%	71.7	10.8	15.1	2.5			
14	Broccoli	F	183	61	30	5	3.51	0.75	17
		%	65.6	21.9	10, 8	1, 8			
1	potatoes	F	191	48	31	9	3.51	0.81	18

	items	Organic local		Imported organic	Non-organic local	Non-imported organic	Arithmetic mean	Standard deviation	General attitude
		%	68.5	17.2	11.1	3.2			
16	sheep meat	F	195	38	35	11	3.49	0.86	19
		%	96.9	13.6	12.5	3.9			
17	Beef	F	189	37	45	8	3.46	0.86	20
		%	67.7	13.3	16.1	2.9			

It is clear from the above table No. (14) that the preferred categories of organic and traditional products dimension include (20) items. All the study members' responses referred to (local organic) concerning their arithmetic averages, where the averages ranged from (3.64 to 3.46) and these averages fall into the fourth category of the Quadruple Scale, whose averages range from (3.25 to less than 4), indicating a local organic cucumber.

Through the results, it is clear that the study members' opinions about the preferred types of organic and traditional products from the respondents' point of view are summarized in the following order according to the approval averages:

- The coriander ranked first among the preferred varieties of organic and traditional products from the respondents' point of view, with a degree of (local organic) with an average of (3.64) and a standard deviation of (0.69).
- Tomatoes came in second place among the preferred varieties of organic and traditional products from the respondents' point of view, with a degree of (local organic) with a mean of (3.63) and a standard deviation of (0.72).
- The parsley ranked third among the preferred varieties of organic and traditional products from the respondents' point of view, with a degree of (local organic) with a mean of (3.62) and a standard deviation of (0.72).
- Egg ranked fourth among the preferred varieties of organic and traditional products from the respondents' point of view, with a degree of (local organic) with a mean of (3.61) and a standard deviation of (0.72).
- The mutton came in the penultimate rank among the preferred varieties of organic and traditional products from the respondents' point of view, with a degree of (local organic), with a mean of (3.46) and a standard deviation of (0.86).
- The beef came in the last rank among the preferred varieties of organic and traditional products from the respondents' point of view, with a degree of (local organic) with a mean of (3.46) and a standard deviation of (0.86). ** Significant at the significance level 0.01.

Study summary:

- (89.6%) of the total study sample had a bachelor's degree, while (5.4%) had a doctoral qualification, followed by a master's degree and their percentage (2.9%), and finally it was found that (2.2%) of the total study sample had their scientific qualification Institute.
- (95.3%) were Saudis, while (4.7%) were non-Saudis.
- (82%) were employed, while (18%) were not employed.
- (71.1%) were between 20-25 years old, while (19.4%) were more than 25 years old, and finally it was found that (9.5%) of the total study sample were under 20 years old.
- (62.4%) of the total sample of the study had a monthly income of 2000-5000 Riyals, while (29.7%) had a monthly income of 5000-10000 Riyals, and finally it was found that (7.9%) of the total sample of the study had a monthly income of more than 10000 Riyals.
- The respondents' knowledge of the meaning of organic products dimension included (14) items, all the study members' responses indicated (agree to somewhat agree), that the study members' opinions about the meaning of organic products from the respondents' point of view are summarized in the following, in order according to the averages of approval:
  - Natural fertilizers are used in the cultivation of organic products.
  - Organic products protect against diseases.
  - Not to rely on pesticides in the cultivation of organic products.
  - Consumption of beef and sheep raised on farms under supervision and follow-up.
  - Avoid the use of hormones in the cultivation of organic products.
  - Organic products are free of pollution.
  - Consumption of eggs of chickens raised in closed farms under monitoring and follow-up.
  - The consumption of chicken meat raised in closed farms is monitored and monitored.
  - Organic products are free of antibiotics.
  - The knowledge of the organic products' concept.
  - Consumption of chicken meat raised on farms in open spaces.
  - Consumption of eggs of chickens raised on farms in open spaces.
  - Consumption of meat from cattle and sheep raised in the wild freely in open spaces.
  - Chemical fertilizers are used in the cultivation of organic products.
- (32%) know the organic products through television, (8%) through the workplace, (7%) through colleagues, (22%)) through the market, and (31%) through other ways.
- (23%) were motivated to buy organic products that are of high quality, (49%) because they were healthy, (13%) because they were environmentally friendly, (3%) because they are reasonably priced, (10%) believe they are pollution-free, and (2%) because they support local producers.

- (55%) obtain organic products through supermarkets, (7%) through small shops (groceries), (15%) through fruit stores, and (13%) directly from.
- (17%) prefer buying traditional local products, (57%) prefer organic local products, (4%) prefer traditional imported products, and (22%) prefer organic imported products.
- The preferred categories of organic and traditional products dimension includes (20) items. All the study members' responses referred to (local organic) concerning their arithmetic averages, where the arithmetic averages ranged from (3.64 to 3.46), and these averages fall into the fourth category of the quadruple graduated scale categories. And whose averages range between (3.25 to less than 4) indicates a local organic option. The study members' opinions about the preferred varieties of organic and traditional products from the respondents' point of view are summarized in the following order according to the approval averages:

Coriander- tomatoes- parsley- eggs- milk- cucumber- arugula- chicken meat- lettuce- cauliflower- carrots- cold green pepper- onions- cabbage- cheese- red hot pepper- broccoli- potatoes- mutton- beef, in order.

The researcher recommends increasing the production of organic food and improving production by increasing the dry matter to increase nutrients, improve the taste and flavor of vegetables and fruits, raise awareness, develop their use, especially rich in fiber, and encourage their consumption, which limits the accumulation of nitrates in vegetables and fruits and the damages resulting from them to reach safe and healthy food. Increase consumption of organic fruits and vegetables and reduce fatty foods and sugar as ways to reduce the personal risk of diet-related diseases such as type 2 diabetes or coronary heart disease.

Discussion and recommendations.

Nitrates are substances that are naturally present in many vegetables and have been used as preservatives since the beginning of the nineteenth century. It was discovered that adding saltpeter salt mixture (inorganic nitrate salts as potassium nitrate) gives meat a distinctive flavor and taste and an attractive red color and also discourages the rancidity processes of fats that make the consumers prefer the product greatly. Nitrates are used in the production of agricultural fertilizers because of their easy solubility in water and their biodegradation at normal temperature and pressure. Several million kilograms are produced annually for the purpose of fertilizing crops. Despite the toxic effect of nitrates, they are still used in preservation, especially in food preservation such as products Cheese, meat, and fish. The toxic dose of nitrate to humans is 30-35 g/kg of body weight. Potassium nitrate causes toxicity in lower concentrations, due to water absorption in the intestine, which leads to local inflammation and diarrhea. Potassium nitrate is more toxic than sodium nitrate, and its use for five weeks interacts in the blood. With oxygen in the presence of iron-containing enzymes in cells, it also interacts with hemoglobin

in the blood and produces them rise the methaemoglobin. (Farah Ayuni Shafiea, Denise Rennieb, 2012, Denis Lairon, 2010, USA, 2016, Natl, 2016 and Ministry of Agriculture and Water, 2021)

The researcher recommends.

1- Increasing the production of organic food and improving production by increasing the dry matter to increase nutrients and improve the taste and flavor of vegetables and fruits.
2- Raising awareness and introducing organic products to be used, especially those rich in fiber.
3- Encouraging the consumption of organic products which limits the accumulation of nitrates in vegetables and fruits, and the resulting damages to reach safe and healthy food.
4- Increase consumption of organic fruits and vegetables and reduce foods rich in fatty and sugary substances to reduce personal risk of diet-related diseases such as type 2 diabetes or coronary heart disease.

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