Tomato Handling Practices Among Housewives

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ممارسات تداول الطماطم بين ربات البيوت

تسبي محمد رشاد لطفي، نيفين فهمي محمد عجمي، اميره احمد احمد شتيوي، عائشة أنيس عبد الوهاب ابوشحته

أجريت هذه الدراسة لمعرفة تأثير التداول المنزلي والتخزين على سمات الجودة فى الطماطم ومنتجاتها. ولتحقيق ذلك تم عمل استبيان على عينة من ربات البيوت من مناطق مختلفة من مدينة الإسكندرية. حجم العينة 150 ربة منزل. تمت مقابلتهم حول البيانات الديموغرافية الاجتماعية (العمر ، والحالة الاجتماعية ، ومستوى التعليم ، والدخل الشهري ، وعدد الأطفال وحالة العمل). السلوك الشرائي (طرق مختلفة لاستهلاك الطماطم ، والتعامل معها ، والمحافظة عليها ، والتعامل مع الطماطم الطازجة المشتراة في المنزل ومناولة المنزل وتخزين الطماطم). الخصائص العضوية المفضلة عند شراء ودراسة التعامل مع المنزل. وأظهرت النتائج أن 93٪ من النساء الأميات يغسلن الطماطم بالماء ، 46. 3٪ من الطالبات الجامعيات يستخدمن الخل في غسل الطماطم ، هناك تأثير مقبول ومعنوي وقوي للمستوى التعليمي على كيفية تجفيف الطماطم بعد غسلها قبل استخدامها. وبالتالي ، نوصي باتباع ممارسات تداول الطعام المناسبة (بما في ذلك الغسيل والتجفيف) قبل استخدام الطماطم في المعالجة.

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ABSTRACT

This study was done evaluate handling practices of tomato and its products among housewives. To achieve that, a questionnaire was done on a sample of housewives from different parts of Alexandria city. Sample size as 150 housewives. They were interviewed about Socio demographic data (age, marital status, education level, monthly income, number of children and work status) purchasing behavior (different ways of tomato consumption, handling, and preservation, handling of purchased fresh tomato at home and home handling and storage of tomato). Organic properties which are favorite when buying and studying home handling. The results showed that 93 % of illiterate women wash tomatoes with water ,46. 3%of university women use vinegar in washing tomatoes, There is an acceptable, significant and strong effect for educational level on how tomatoes are dried after washing before being used. Thus, we recommend that proper food handling practices (including washing and drying) should be followed before using tomatoes in processing.

1. INTRODUCTION:

Tomato is a member of the Solanaceae family **(Petro – Turza, 1987)**. It can be consumed either fresh or processed in the form of tomato products **(Toor and Savage, 2005)**. Tomato (*Solanum Lycopersicum L.*) is one of the world's most important vegetables, with an estimated total production of about 159.347 million tons in 2011 **(FAO, 2011)**. It is the second most widely consumed vegetable after potato **(Lugasi *et al.*, 2003)**. Tomato processing industry has made tremendous advances, developing many forms of tomato-based foods, such as sauces, ketchup, puree, pastes, soups, juices and juice blends, and canned tomatoes either whole or in diced, sliced, quartered or stewed form.

Tomatoes are low in calories and a good source of Vitamin A and C **(Parnell *et al.*, 2004)**, minerals (potassium, phosphorus, sulphur, magnesium, calcium, iron, copper, and sodium) **(Viškelis *et al.*, 2005)**. The regular consumption of tomatoes and tomato products has been correlated to a reduction the risk of contracting various types of cancer and cardiovascular diseases. This positive effect is attributed to the antioxidants present in tomatoes **(Borguini and Torres, 2009)**. It considered to be a source of carotenoids, in particular lycopene and phenolic compounds **(Pinela *et al.*, 2012)**.

Tomatoes have been linked to foodborne illness caused by Salmonella bacteria. Tomatoes can be contaminated by bacteria from soil, water, and animal sources. Contamination from human sources may occur before, during, or after harvest, right up to the point of consumption. Bacteria on the tomato's skin can be transferred to its internal flesh during cutting or slicing. For this reason, it is important to wash hands with soap and water before and after preparing food, and that to use clean equipment, utensils, and cutting surfaces. Tomatoes should be washed before cutting. After washing, the stem scar and the surrounding area should be cut away and discarded ~~before~~ slicing or chopping the tomato. The use of soap or detergent is neither recommended nor approved for washing fruits and vegetables because they can absorb detergent residues **(Parnell *et al.*, 2004)**.

On the other hand, many changes can happen in tomato during its production, transportation in addition to home handling and processing which can affect its condition and antioxidant contents. Tomatoes also are exposed to other stresses during marketing or home handling which many cause membrane damage and alter its nutrient contents. These changes result in decreasing its nutritive value as well as the total antioxidant activity of the tissues **(Ahmed *et al*., 2011)**.When tomatoes are eaten fresh, it is important to find out how home handling can reduce the insecticide residue in tomato.

The nutritional value of tomato production is a topic attracting much attention particularly regarding the effects resulting from processing and storage treatments **(Capanoglu *et al*., 2010)**.

Conversion of tomato into paste provides a way out for extended shelf life storage periods **(Jamil, 1990)**. The effect of storage temperature on physiochemical quality and quantity changes in tomatoes, varies with cultivar **(Abou-Aziz *et al*., 1976)**, exposition time and harvesting conditions During thermal treatment, several additional changes can occur which affect the appearance, composition, nutritional value, and sensory parameters in terms of color, texture, and flavor of the product **(Capanoglu *et al*., 2008)**. Therefore, the purpose of this study is to evaluate the conducted to study tomatoes consumption and home handling practices.

2. MATERIALS AND METHODS

2.1. Fieldwork

The field part was conducted to study tomatoes consumption and home handling practices of an intended accidental sample, comprising 150 housewives chosen from different districts of Alexandria city. The required data was collected from housewife's samples from November 2016 to February 2017 by an interview schedule using a special questionnaire. Validity and reliability were done according to **(El- Bahay, 1979)**.

The statistical analysis was performed to answer the–research questionnaire statistical programs for social science (SPSS 20) was used.

The following factors was determined:

1- Spearman factor to calculate correlation coefficient between some demographic properties of the sample represented in age, educational level and tomato home handling.

2- The effect factor (η2) to know the effect of age and educational level on tomato home handling. The effect value ranges from (zero -1) as said that :-

- In case of $\eta 2 \geq (0.01)$ the effect is weak.
- In case of $\eta 2 \geq (0.06)$ the effect is medium.
- In case of $\eta 2 \geq (0.14)$ the effect is stron **(Corder, and Foreman, 2009)**

3- Kruskal-Wallis Test for K independent samples. This test is alternative for One Way Analysis of Variance and this test can be used to compare the number of small independent samples. Sample number equality isn't needed. **(Alshurbeini, 2001).**

2.2. Statistical analysis

Statistical analysis of the data **(Kotz, *et al.*; 2006)** were fed to the computer and analyzed using IBM SPSS software package version 20.0(Statistical Package for Social Sciences)**.. (**Armonk, NY: IBM Corp**) (Kirkpatrick and Feeney, 2013)** Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using mean, standard deviation. Significance of the obtained results was judged at the 5% level. Analysis of variance (ANOVA) of the data was conducted and means property values were separated by the Student-Newman-Keuls (SNK) test. Differences were considered significant at $p \leq 0.05$.

3. RESULTS AND DISCUSSION

3.1. Fresh tomato handling after purchasing at home

3.1.1. Washing tomatoes before use:

It's necessary to know the activities which happen when purchasing tomatoes and how to use them at home according to home handling. **Table 1** showed. Most housewives effect housewives educational level on home handling of tomato washed tomatoes before using them with water especially the illiterate. On

the other hand, washing with water and vinegar come second for university and working housewives. Using water and a detergent wasn't preferred for all question housewives.

Wash tomatoes in clean water as recommended above. Dry them by blotting with a clean cloth or paper towels **(Henneman *et al*., 2004)**.

Zhang *et al.*, (2007) reported that washing by tap water and diluted detergent solution for cooking was necessary to decrease the concentration of the pesticide residues in cabbage.

Kaushik *et al.*, (2009) mentioned that effectiveness of washing in removing residues depends on many factors: location of the residue, the age of the residue, the water solubility of the pesticide, temperature and types of wash as well as the addition of detergent.

The vectors of contamination in tomatoes are still largely unknown. When washing tomatoes, it is not recommended to use detergents or soap. Fresh fruit should be washed with potable water that is changed between each batch of produce, and the washing water should be 10°F warmer than the temperature of the fruit being washed. Any surface that comes in direct contact with tomatoes should be considered as food contact, cleaned and disinfected **(U. S. Food and Drug Administration 2008).**

3.1.2. Tomato handling after purchasing and washing

Table 2 showed that housewives started preparing tomatoes after purchasing directly. The majority of them to regardless of educational level and work status stored tomatoes in the refrigerator when they are needed. 94.7 %. of studies samples (150 housewives) use tomatoes for using them after purchasing, research samples used them for making the sauce. They were about 91.1% of working women.

The majority of women used two kinds of tomatoes (sauce and frozen) were 48.7% especially the non-working. Using them for making juice was the least. Regarding leaving tomatoes for some time after using, research samples stored them in the refrigerator 89.5% **(Table 2)**

3.1.3. Tomato home handling

Ignorance of sound handling of food is common among food handler. Most food poisoning outbreaks which accrued at homes have been due to lack of knowledge on healthy food preparation, such as improper thawing of frozen foods, inadequate cooking, keeping the cooked food at room temperature for several hours and bad personal hygiene during the preparation of food **(Miladi and Musaiger, 1997).**

Food quality is affected by storing preparing or any type of food handling methods by the housewives in the home **(FAO, 1992).** As it started by **Nawar *et al.* , (1990)**. Prolonged cooking period associated with raising of temperature gives an opportunity to oxidation that to destroy vitamin C. **Table 3** showed that research samples who purchased tomatoes at the markets, put them separately in plastic bags away from other purchased products. Research results also show that housewives clean and wash the cutting boards before using them to chop tomatoes. About 87.3 % of them washed the tomatoes. before using directly. About 71.3% of research samples especially the illiterate left the tomatoes in a calendar to dry after washing.

Table 1. Relationships between the educational levels and working status with respect to washing tomato before use

	Educational levels									Work status						
	Illiterate (n=31)		Medium (n=52)		University (n=67)		Total (n = 150)		Mean (%) ±SE	Working (n = 90)		None (n = 60)		Total (n = 150)		Mean (%) ±SE
	No.	%	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
Yes	31.00	100.00	52.00	100.00	67.00	100.00	150.00	100.00	100.0^{a}±00.00	90.00	100.00	60.00	100.00	150.00	100.00	100.00^{a}±0.00
No	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{b}±00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{b}±0.00
When use type of used water																
Tap water	29.00	93.50	38.00	73.10	35.00	52.20	102.00	68.00	72.93^{a}±12.01	53.00	58.90	49.00	81.70	102.00	68.00	70.30^{a}±9.37
Vinegar	1.00	3.20	12.00	23.10	31.00	46.30	44.00	29.30	24.20^{b}±12.54	37.00	41.10	7.00	11.70	44.00	29.30	26.40^{b}±12.09
Cleaner	1.00	3.20	2.00	3.80	1.00	1.50	4.00	2.70	2.83^{c}±0.69	0.00	0.00	4.00	6.70	4.00	2.70	3.35^{c}±2.75

Values are given as mean ± standard error. Different letters in the same column of each group indicate significant differences according to Student-Newman-Keuls (SNK) test (P≤0.05)

Table 2. Relationships between the educational levels and working status with respect to the of handling tomato after buying

Handling for tomato	Educational levels									Work status						
	Illiterate (n=31)		Medium (n=52)		University (n=67)		Total (n = 150)		Mean (%) ±SE	Working (n = 90)		None (n = 60)		Total (n = 150)		Mean (%) ±SE
	No.	%	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
Start after buying directly																
Yes	22.00	71.00	42.00	80.80	48.00	71.60	112.00	74.70	74.47^{a}±3.19	71.00	78.90	41.00	68.30	112.00	74.70	73.60^{a}±4.36
No	9.00	29.00	10.00	19.20	19.00	28.40	38.00	25.30	25.53^{b}±3.19	19.00	21.10	19.00	31.70	38.00	25.30	26.40^{b}±4.36
If Yes Do you use in	(n=22)		(n=42)		(n=48)		(n=112)			(n = 71)		(n = 41)		(n = 112)		
Juice	3.00	13.60	7.00	16.70	13.00	27.10	23.00	20.50	19.13^{c}±4.11	17.00	23.90	6.00	14.60	23.00	20.50	19.25^{c}±3.82
Sauce	20.00	90.90	38.00	90.50	44.00	91.70	102.00	91.10	91.03^{a}±0.36	66.00	93.00	36.00	87.80	102.00	91.10	90.40^{a}±2.14
Frozen	5.00	22.70	11.00	26.20	18.00	37.50	34.00	30.40	28.80^{b}±4.50	23.00	32.40	11.00	26.80	34.00	30.40	29.60^{b}±2.30
Preparing	(n=6)		(n=12)		(n=21)		(n=39)			(n = 28)		(n = 11)		(n = 39)		
Juice +Sauce	3.00	50.00	4.00	33.30	4.00	19.00	11.00	28.20	34.10^{b}±9.02	7.00	25.00	4.00	36.40	11.00	28.20	30.70^{b}±4.69
Juice + Frozen	0.00	0.00	0.00	0.00	1.00	4.80	1.00	2.60	1.60^{d}±1.47	1.00	3.60	0.00	0.00	1.00	2.60	1.80^{d}±1.48
Sauce + Freezing	3.00	50.00	6.00	50.00	10.00	47.60	19.00	48.70	49.20^{a}±0.81	13.00	46.40	6.00	54.50	19.00	48.70	50.45^{a}±3.33
Juice + Sauce + Frozen	0.00	0.00	2.00	16.70	6.00	28.60	8.00	20.50	15.10^{c}±8.35	7.00	25.00	1.00	9.10	8.00	20.50	17.05^{c}±6.54
If no place of preservation	(n=9)		(n=10)		(n=19)		(n=38)			(n = 19)		(n = 19)		(n = 38)		
Outside the refrigerator	1.00	11.10	0.00	0.00	3.00	15.80	4.00	10.50	8.97^{b}±4.72	2.00	10.50	2.00	10.50	4.00	10.50	10.50^{c}±0.00
Inside the refrigerator	8.00	88.90	10.00	100.00	18.00	94.70	36.00	94.70	94.53^{a}±3.23	18.00	94.70	18.00	94.70	36.00	94.70	94.70^{a}±0.00
Outside refrigerator	1.00	11.10	0.00	0.00	1.00	5.30	2.00	5.30	5.47b^{c}±3.23	1.00	5.30	1.00	5.30	2.00	5.30	5.30^{d}±0.00
Inside refrigerator	8.00	88.90	10.00	100.00	16.00	84.20	34.00	89.50	91.03^{a}±4.72	17.00	89.50	17.00	89.50	34.00	89.50	89.50^{b}±0.00
Both outside and inside	0.00	0.00	0.00	0.00	2.00	10.50	2.00	5.30	3.50^{c}±3.52	1.00	5.30	1.00	5.30	2.00	5.30	5.30^{d}±0.00

Values are given as mean ± standard error. Different letters in the same column of each group indicate significant differences according to Student-

Newman-Keuls (SNK) test (P≤0.05)

Table 3 Percentages distribution of the research sample according to interrelationships between the educational levels and working status with respect to the handling tomato

Handling for tomato	Educational levels									Work status						
	Illiterate (n=31)		Medium (n=52)		University (n=67)		Total (n = 150)		Mean (%) ±SE	Working (n = 90)		None (n = 60)		Total (n = 150)		Mean (%) ±SE
	No.	%	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%	
When you buy tomatoes do you put it with meat and vegetables?																
Yes	9.00	29.00	11.00	21.20	22.00	32.80	42.00	28.00	27.67^{b}±3.44	29.00	32.20	13.00	21.70	42.00	28.00	26.95^{b}±4.32
Sometimes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{c}±0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{c}±0.00
No	22.00	71.00	41.00	78.80	45.00	67.20	108.00	72.00	72.33^{a}±3.44	61.00	67.80	47.00	78.30	108.00	72.00	73.05^{a}±4.32
If no where do you put it after buying?	**(n=22)**		**(n=41)**		**(n=45)**		**(n=108)**			**(n = 61)**		**(n = 47)**		**(n = 108)**		
Plastic bags	22.00	100.00	40.00	97.60	43.00	95.60	105.00	97.20	97.73^{a}±1.28	59.00	96.70	46.00	97.90	105.00	97.20	97.30^{a}±0.49
Paper bags	0.00	0.00	1.00	2.40	2.00	4.40	3.00	2.80	2.27^{b}±1.28	2.00	3.30	1.00	2.10	3.00	2.80	2.70^{b}±0.49
Do you wash and cleaning chopping bars and others tools just before use?																
Always	28.00	90.30	42.00	80.80	61.00	91.00	131.00	87.30	87.37^{a}±3.31	80.00	88.90	51.00	85.00	131.00	87.30	86.95^{a}±1.60
No	3.00	9.70	10.00	19.20	6.00	9.00	19.00	12.70	12.63^{b}±3.31	10.00	11.10	9.00	15.00	19.00	12.70	13.05^{b}±1.60
Sometimes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{c}±0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00^{c}±0.00
Do you wash fresh tomatoes before storage in the refrigerator																
Yes	14.00	45.20	22.00	42.30	39.00	58.20	75.00	50.00	48.57^{a}±4.92	46.00	51.10	29.00	48.30	75.00	50.00	49.70^{a}±1.15
No	13.00	41.90	21.00	40.40	20.00	29.90	54.00	36.00	37.40^{b}±3.80	31.00	34.40	23.00	38.30	54.00	36.00	36.35^{b}±1.60
Sometimes	4.00	12.90	9.00	17.30	8.00	11.90	21.00	14.00	14.03^{c}±1.67	13.00	14.40	8.00	13.30	21.00	14.00	13.85^{c}±0.45
How do you dry tomatoes after washing before using?																
With towels	1.00	3.20	7.00	13.50	24.00	35.80	32.00	21.30	17.50^{b}±9.69	22.00	24.40	10.00	16.70	32.00	21.30	20.55^{b}±3.17
Tissues	0.00	0.00	2.00	3.80	9.00	13.40	11.00	7.30	5.73^{c}±4.02	9.00	10.00	2.00	3.30	11.00	7.30	6.65^{c}±2.75
Leave it in colander until drying	30.00	96.80	43.00	82.70	34.00	50.70	107.00	71.30	76.73^{a}±13.73	59.00	65.60	48.00	80.00	107.00	71.30	72.80^{a}±5.92

Values are given as mean ± standard error. Different letters in the same column of each group indicate significant differences according to Student-Newman-Keuls (SNK) test (P≤0.05)

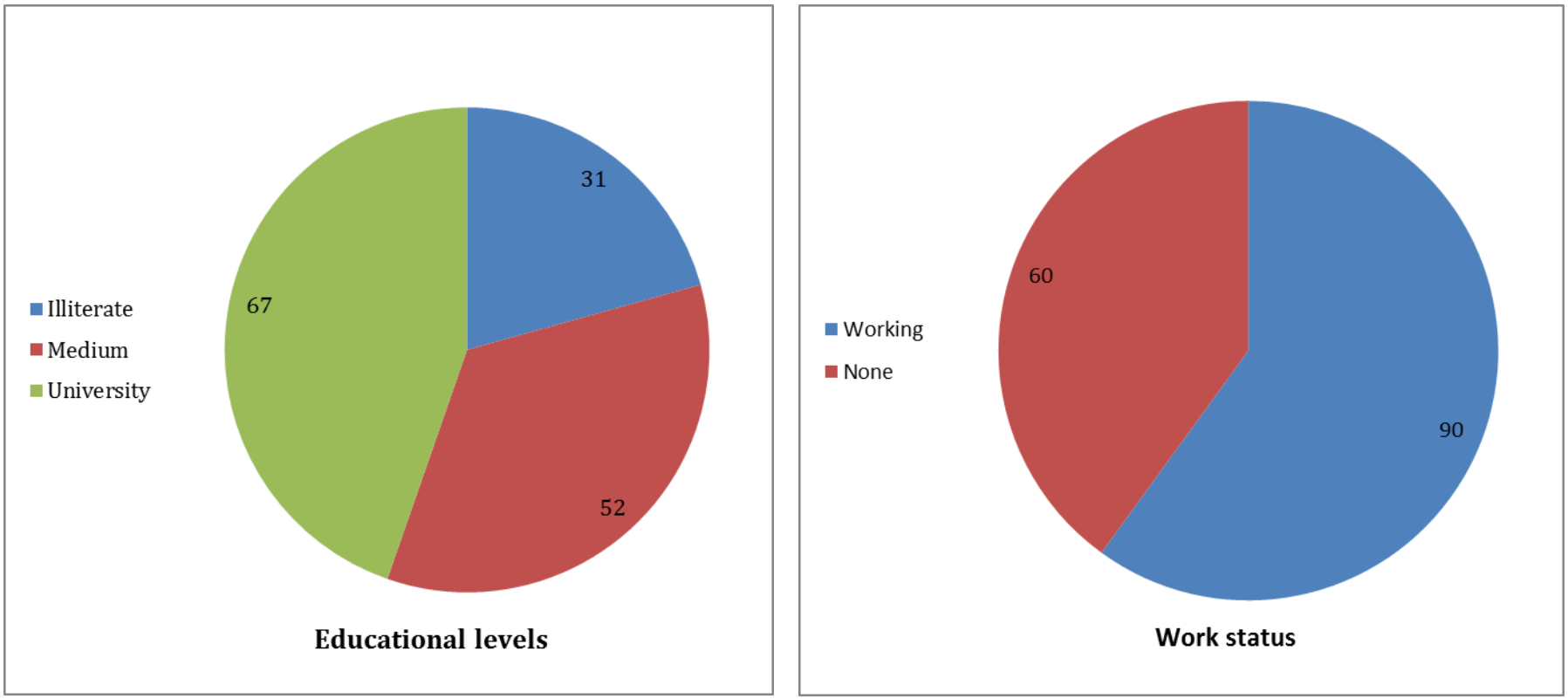

Figure (1): Distribution of studies sample according to educational levels and work status

3.2. Effect of home handling on tomato and its products.

From the previous results, it's obvious that there is an important effect of home handling on tomato and its products.

This part includes answer to questions about the research and discussing results according to the theoretical part and the previous studies. We end this part with research recommendations and suggested researches.

First, the study, in this part, depended on the statistical analysis of data to make sure that research results are accurate on a group of statistical programs for social science (**SPSS 20**) to do statistical processing by using the following statistics: -

1- Properties of the sample represented in age, educational level and tomato home handling.

2- The effect factor (η2) to know the effect of educational level and work status on tomato Spearman factor to calculate correlation coefficient between some demographic home handling. The effect value ranges from (zero -1).

3- Kruskal-Wallis Test for K independent samples. This test is alternative for (One Way Analysis of Variance) and this test can be used to compare the number of small independent samples. Sample number equality isn't needed. **(Alshurbeini, 2001).**

3.2.1 What is the effect of educational level of sample on tomato home handling?

To answer this question, Spearman factor was used to calculate the correlation coefficient between the educational level and effect of home handling. Also, the effect degree to realize the effect **R2** of educational level on tomato home handling. Results are shown in the following **table (4)**

Table (4) Effect of educational level of sample on tomato home handling

Home handling for tomatoes	Educational level		
	Correlation Coefficient	Effect Size R2	Significant for Effect Size
Do you wash tomatoes just before using them?	---	---	---
Do you prepare tomatoes only before using or leave them for some time?	-0.009	0.000	---
Do you put tomatoes with meat and other vegetables when you buy them from the market?	-0.066	0.004	simple
Do you wash chopping boards and other tools before you use them?	-0.055	0.003	simple
Do you wash fresh tomatoes before storing in the refrigerator?	-0.117	0.014	simple
How do you dry tomatoes after washing and before using?	0.412**	0.170	strong
Do you storage fresh tomatoes in the freezer?	-0.109	0.012	simple
When you frost fresh tomatoes with peels in the freezer, do you use them to make juice , sauce or ketchup?	0.111	0.012	simple
When you storage tomatoes as sauce or tomato paste, do you add spices, herbs or garlic?	0.212**	0.045	simple
Do you keep tomato products in the freezer or refrigerator as sauce, ketchup or tomato paste?	-0.021	0.000	---
How do you storage tomato products like tomato paste, ketchup and sauce in the freezer or refrigerator?	-0.104	0.011	simple

From the previous table, we find that: -

- There is a negative significant relation at (0.01) between the educational level of research sample and how tomatoes are dried after washing and before using.
- There is a negative significant relation at (0.01) between educational level and adding spices, herbs or garlic to tomatoes when keeping as sauce or tomato paste.
- There is an acceptable, significant and strong effect for educational level on how tomatoes are dried after washing before using for research sample.

3.2.2. Are there any significant differences of tomato home handling of research sample according to variable educational level?

- To answer this question, Kruskal-Wallis Test for K independent Samples for K independent samples mark of tomato home

handling of research sample according to variable educational level **Table(5)**

Table (5): Rusults of Kruskal-Wallis Test for K independent Samples for differences in tomato home handling of research sample according to educational level (150).

Changes	Educational level	Number	Average grade	Mean "K 2"	Degrees Freedom	Level of significance
Do you wash tomatoes just before using them?	Illiterate	31	75.50	0	2	In significant
	Medium	52	75.50			
	University	67	75.50			
Do you prepare tomatoes only before using or leave them for some time?	Illiterate	31	77.84	1.109	2	In significant
	Medium	52	70.63			
	University	64	74.88			
Do you put tomatoes with meat and other vegetables when you buy them from the market?	Illiterate	31	74.73	1.989	2	In significant
	Medium	52	80.63			
	University	67	71.87			
Do you wash chopping boards and other tools before you use them?	Illiterate	31	73.26	3.089	2	In significant
	Medium	52	80.42			
	University	67	72.72			
Do you wash fresh tomatoes before storing in the refrigerator?	Illiterate	31	78.21	3.012	2	In significant
	Medium	52	81.70			
	University	67	69.43			
How do you dry tomatoes after washing and before using?	Illiterate	31	60.24	25.644	2	0.01

Results are shown in the following table (5)

- There are significant differences at level (0.01) in how tomatoes are after washing and before using of research sample according to variable educational level for the university level.

3.2 3. What is the effect of sample work status on the tomato home handling?

To answer this question, Spearman factor was used to calculate the correlation coefficient of the age and the tomato home handling. Also, the effect was used to know the effect of work status on tomato home handling. Results are shown in the following **Table (6)**

Table: (6) The effect of work status on tomato home handling

Home handling for tomatoes	work status		
	Correlation Coefficient	Effect Size R2	Significant for Effect Size
Do you wash tomatoes just before using them?	---	---	---
Do you prepare tomatoes only before using or leave them for some time?	0.129	0.017	weak
Do you put tomatoes with meat and other vegetables when you buy them from the market?	0.115	0.013	weak
Do you wash chopping boards and other tools before you use them?	0.031	0.001	weak
Do you wash fresh tomatoes before storing in the refrigerator?	0.057	0.003	weak
How do you dry tomatoes after washing and before using?	0.017	0.000	No effect
Do you storage fresh tomatoes in the freezer?	0.146	0.021	weak
When you frost fresh tomatoes with peels in the freezer, do you use them to make juice , sauce or ketchup?	0.000	0.000	weak
When you storage tomatoes as sauce or tomato paste, do you add spices, herbs or garlic?	0.201	0.040	weak
Do you keep tomato products in the freezer or refrigerator as sauce, ketchup or tomato paste?	0.167	0.028	weak
How do you storage tomato products like tomato paste, ketchup and sauce in the freezer or refrigerator?	0.149	0.022	weak

From the previous table, we find out that :-

- There are no significant differences at (0.05) in tomato home handling of research sample according to work status
- There is no acceptable or significant effect for work status on tomato home handling to the research sample.

CONCLUSION

The results of the study showed that there are no significant differences at (0.05) in tomato home handling of research sample according to work status. Also there is an acceptable, significant and strong effect for educational level on how tomatoes are dried after washing before using for research sample..

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