



**Methodology Article**

# Assessment of Knowledge About Effects of Coconut Oil on Human Health Among Students of Hail University

Yomna Ali Moustafa Marzok Elkhateeb<sup>1,2,\*</sup>, Salma Bashir Alrashidi<sup>2</sup>,  
Ebtesam Hdeeb Alshammary<sup>2</sup>

<sup>1</sup>Microbial Chemistry Department, Genetic Engineering and Biotechnology Division, National Research Centre, Giza, Egypt

<sup>2</sup>Clinical Nutrition Department, College of Applied Medical Sciences, University of Hail, Hail, Kingdom of Saudi Arabia

**Email address:**

Yomna\_moustafa@yahoo.com (Y. A. M. M. Elkhateeb), yomnaelkhateeb3@gmail.com (Y. A. M. M. Elkhateeb),

y.elkhateeb@uoh.edu.sa (Y. A. M. M. Elkhateeb)

\*Corresponding author

**To cite this article:**

Yomna Ali Moustafa Marzok Elkhateeb, Salma Bashir Alrashidi, Ebtesam Hdeeb Alshammary. Assessment of Knowledge About Effects of Coconut Oil on Human Health Among Students of Hail University. *International Journal of Biomedical Science and Engineering*. Vol. 7, No. 3, 2019, pp. 68-74. doi: 10.11648/j.ijbse.20190703.12

**Received:** August 15, 2019; **Accepted:** September 9, 2019; **Published:** September 25, 2019

---

**Abstract:** For several years, Consumers were made to believe that coconut oil is deleterious to health as it would block the arteries and cause heart disease. In recent years Coconut oil is receiving attention as a Functional food oil and its consumption has dramatically risen. Coconut oil has been claimed to have beneficial effects on health. There are rarely published studies from Saudi Arabia exploring the awareness about benefits or risks of coconut oil. The objective of the present work is to evaluate the knowledge of students of Hail University about the effects of coconut oil on health with a comparison between females (scientific and Literary College) and males (scientific and Literary College). Also, this report aims to review the available literature about benefits and risks of coconut oil consumption and highlight its positive effects on health. Results of the present study was concluded that students of University have a moderate knowledge about effect of coconut oil on human health but the knowledge of female students more than male students. Comparison between students of scientific College and Literary College in level of knowledge about healthy importance of coconut oil show a none significant difference in all questions. The present work concluded that coconut oil is the best oil for health and reported the need to increase the knowledge of students about beneficial of coconut oil by distributing booklets or by health education program to highlight its positive effects on health and correct their thinking that coconut oil is harmful.

**Keywords:** Coconut Oil, Benefits of Coconut Oil, Risks of Coconut Oil, Antimicrobial Property, Antioxidants Property

---

## 1. Introduction

Coconut have used by tropical countries from the tree which known as *Cocos Nucifera*. This tree known as the "Tree of Life" In Philippines. It has many nutritional and medicinal properties and has gained new found interest in western medicine. In India and China Coconut oil used as food, as cosmetic and to cure illness as far back as 4,000 years ago. However, for several years, consumers were believed that coconut oil is bad to human health because it accumulates in arteries causing heart disease. Coconut oil is now receiving attention as a functional food oil and its consumption has

dramatically risen in recent years especially, virgin coconut oil (VCO). [1-4]

### 1.1. Coconut Oil Properties

Coconut oil is the best oil in the world for food, medicine and cosmetic due to the following properties:

#### 1.1.1. Saturated Fatty Acids (SFAs)

Recent research found that the highest percentage of SFAs present in Coconut oil is a good property and added advantage to it to be healthy. Due to this property coconut oil is not normally hydrogenated, stabilized and not replaced by

oxygen atom which create bad free radicals for human health. [5-7]

### 1.1.2. Medium Chain Fatty Acids (MCFAs)

Coconut oil has 62% of MCFAs so that it broken down without pancreatic enzyme. It absorbed into the intestine and enters the liver where it is burned into energy. Consequently, all consumed food containing coconut oil are catabolized to release energy without conversion to fat. [5-7]

### 1.1.3. Antimicrobial Property

Lauric acid, capric acid, caprylic acid, and caproic acid are the Medium Chain Fatty Acids present in coconut oil. In the body, they transformed into monolaurin, monocaprin, monocaprylin, and monocaproin which are monoglycerides. These compounds kill pathogenic microorganisms and provide immunity especially during the first six months of life. [8-10]

### 1.1.4. Antioxidants Property

Vitamin E, phytosterols and phenolic compounds are antioxidants present in coconut oil and give it antioxidant property. These compounds prevent the formation of free radicals which are harmful to health. [11]

## 1.2. Health Benefits of Coconut Oil

### 1.2.1. Heart Disease

Recent Studies found that taking coconut oil improve total, LDL and HDL cholesterol levels which are the risk factors of heart disease. Saturated fats of Coconut oil increase "good" HDL cholesterol and convert "bad" LDL cholesterol into a less harmful form. Addition of coconut oil to diets increases the high-density lipoprotein (HDL - good cholesterol) which protect against heart disease and improves cholesterol levels. [12-17]

### 1.2.2. Cancer

Coconut oil plays an important role in preventing cancer. It protects the body from harmful effect of free radicals due to its content of antioxidants. It protects from cancer-causing pathogens or their toxins due to its content of antimicrobial agents. It inhibits the growth of cancerous cells and increasing immunity of the body. [18-20]

### 1.2.3. Diabetes

Recent studies found that, Coconut oil has several roles in preventing diabetes. Coconut oil in the diet reduces glycemic index of the food, regulates the level of blood sugar and stimulates insulin action. [21-23]

### 1.2.4. Obesity

Coconut oil has high percentage of MCFAs so that it does not need breaking down by enzyme before absorption into the intestine. It utilized as fuel in metabolic reaction in the liver and stimulating metabolism to remove excess body fat. It helps in breaking down of fat stored in the body into energy through a process known as thermogenesis thus the saying, "Eat Fat - Look Thin". [24]

### 1.2.5. Coconut Oil and Oral Health

Recent studies found that, Coconut oil has strong effect in reducing plaque and decay which caused by *Streptococcus mutans*. Through massaging coconut oil on gums for 10 minutes a day, for at least three weeks. [25-26]

### 1.2.6. Coconut Oil and Healthy Skin

Coconut oil helps reduce the appearance of wrinkles and fine lines giving skin a healthier appearance. [27]

### 1.2.7. Coconut Oil and Alzheimer

Alzheimer is a neurological disorder in which memory loss and cognitive decline occurs because of death of brain cells. Recent study suggested that the saturated fat of coconut oil reduce symptoms in Alzheimer's disease patients. Because it provides the brain with ketones which are an alternate source of energy for malfunctioning brain cells. [28-29]

### 1.2.8. Coconut Oil and Thyroid Function

Coconut oil reduces inflammation leading to hypothyroidism and hyperthyroidism. It stimulates metabolism and increases the rate of food breakdown to release energy through regulation of thyroid gland. [25-26]

The objective of the present work is to evaluate the knowledge of students of Hail University about the effects of coconut oil on health with a comparison between females and males. Also, this report aims to review the available literature about coconut oil and highlight its positive effects on health.

## 2. Materials and Methods

The study design was a cross-sectional survey and was conducted during first semester 2018-2019 at Hail University. The questionnaires were distributed to 200 students (100 students from female campus and 100 from male campus) for answering. The questionnaire was designed as shown in Table 1 which included questions related to the objectives of study.

Answered questionnaires were later downloaded for statistical analysis to compare degree of knowledge between female and male. Also, comparison between scientific and human colleges.

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) software and Mstat-c Program. Descriptive statistics and ANOVA (One Way analysis) for the parametric variables and non-parametric variables were tested by Chi-square tests. [30-31]

## 3. Results and Discussion

**Table 1.** Reliability analysis Cronbach's Alpha without (Var. 7 – Sex - Specialization).

Cases	%
Valid	100.0
Excluded	0.0
Total	100.0
Cronbach's Alpha	N of Items
0.768	20

The first table is the Reliability Statistics table for output.

This gives Cronbach's alpha coefficient. If the score is over 0.7 for high internal consistency means the Reliability of output. In this case, N of Items= 20 and  $\alpha = 0.768$ , which shows the questionnaire is reliable.

**Table 2.** Characteristics of participants.

Variable	Range	Minimum	Maximum	Mean	Std. Deviation
Age in years	9	17	26	21.56	1.643
Weight in kg	85	43	128	69.35	17.008
Length in cm	66	123	189	165.06	10.165

Table 2 show that mean of age was  $21.56 \pm 1.643$  year, mean weight was  $69.35 \pm 17.008$  kg and height was  $165.06 \pm 10.165$  cm.

**Table 3.** Responses of Students for coconut oil questionnaire.

The question	The answer	The number	%	$\chi^2$ at $\alpha=0.05$	$\chi^2$ at $\alpha=0.01$	$\chi^2_c$	P Value																																																																																																																																																																																																																													
1-Did you have information about kinds of coconut oil?	Yes	40	37.0	3.84*	6.63**	7.26	< 0.01																																																																																																																																																																																																																													
	NO	68	63.0					2-Do you think that coconut oil is useful for health?	Yes	96	88.9	3.84*	6.63**	65.33	< 0.01	No	12	11.1	3-Do you have the ability to use it in eating instead of vegetable oils?	Yes	45	41.7	3.84	6.63	3.00	> 0.05	No	63	58.3	4-What do you think of coconut oil for health?	Useful	54	50.0	3.84	6.63	0.00	> 0.05	I don't know	54	50.0	5-Do you care when buying oil that to be free of chemicals?	Yes	72	66.7	3.84*	6.63**	12	< 0.01	No	36	33.3	6-Do you use coconut oil?	Yes	60	55.6	3.84	6.63	1.33	> 0.05	No	48	44.4	7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01	- Cosmetic	65	60.2	-both	12	11.1	I don't use it	27	25.0	8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01	No	29	26.9	9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**
2-Do you think that coconut oil is useful for health?	Yes	96	88.9	3.84*	6.63**	65.33	< 0.01																																																																																																																																																																																																																													
	No	12	11.1					3-Do you have the ability to use it in eating instead of vegetable oils?	Yes	45	41.7	3.84	6.63	3.00	> 0.05	No	63	58.3	4-What do you think of coconut oil for health?	Useful	54	50.0	3.84	6.63	0.00	> 0.05	I don't know	54	50.0	5-Do you care when buying oil that to be free of chemicals?	Yes	72	66.7	3.84*	6.63**	12	< 0.01	No	36	33.3	6-Do you use coconut oil?	Yes	60	55.6	3.84	6.63	1.33	> 0.05	No	48	44.4	7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01	- Cosmetic	65	60.2		-both	12	11.1					I don't use it	27	25.0	8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01	No	29	26.9	9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5	
3-Do you have the ability to use it in eating instead of vegetable oils?	Yes	45	41.7	3.84	6.63	3.00	> 0.05																																																																																																																																																																																																																													
	No	63	58.3					4-What do you think of coconut oil for health?	Useful	54	50.0	3.84	6.63	0.00	> 0.05	I don't know	54	50.0	5-Do you care when buying oil that to be free of chemicals?	Yes	72	66.7	3.84*	6.63**	12	< 0.01	No	36	33.3	6-Do you use coconut oil?	Yes	60	55.6	3.84	6.63	1.33	> 0.05	No	48	44.4	7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01	- Cosmetic	65	60.2		-both	12	11.1					I don't use it	27	25.0	8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01	No	29	26.9	9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5												
4-What do you think of coconut oil for health?	Useful	54	50.0	3.84	6.63	0.00	> 0.05																																																																																																																																																																																																																													
	I don't know	54	50.0					5-Do you care when buying oil that to be free of chemicals?	Yes	72	66.7	3.84*	6.63**	12	< 0.01	No	36	33.3	6-Do you use coconut oil?	Yes	60	55.6	3.84	6.63	1.33	> 0.05	No	48	44.4	7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01	- Cosmetic	65	60.2		-both	12	11.1					I don't use it	27	25.0	8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01	No	29	26.9	9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																							
5-Do you care when buying oil that to be free of chemicals?	Yes	72	66.7	3.84*	6.63**	12	< 0.01																																																																																																																																																																																																																													
	No	36	33.3					6-Do you use coconut oil?	Yes	60	55.6	3.84	6.63	1.33	> 0.05	No	48	44.4	7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01	- Cosmetic	65	60.2		-both	12	11.1					I don't use it	27	25.0	8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01	No	29	26.9	9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																																		
6-Do you use coconut oil?	Yes	60	55.6	3.84	6.63	1.33	> 0.05																																																																																																																																																																																																																													
	No	48	44.4					7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01	- Cosmetic	65	60.2		-both	12	11.1					I don't use it	27	25.0	8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01	No	29	26.9	9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																																													
7-Would you prefer to use it in:	-food	4	3.7	7.81*	11.34**	81.41	< 0.01																																																																																																																																																																																																																													
	- Cosmetic	65	60.2																																																																																																																																																																																																																																	
	-both	12	11.1																																																																																																																																																																																																																																	
	I don't use it	27	25.0																																																																																																																																																																																																																																	
8-Do you think that coconut oil is different from other oils?	Yes	79	73.1	3.84*	6.63**	23.15	< 0.01																																																																																																																																																																																																																													
	No	29	26.9					9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05	No	53	49.1	10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																																																																														
9-Is coconut oil used in cooking?	Yes	55	50.9	3.84	6.63	0.04	> 0.05																																																																																																																																																																																																																													
	No	53	49.1					10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05	No	64	59.3	11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																																																																																									
10-Does coconut oil enhance brain function in people with Alzheimer's?	Yes	44	40.7	3.84	6.63	3.7	> 0.05																																																																																																																																																																																																																													
	No	64	59.3					11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05	No	50	46.3	12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																																																																																																				
11-Is it related to elevated cholesterol and reduced heart disease?	Yes	58	53.7	3.84	6.63	0.59	> 0.05																																																																																																																																																																																																																													
	No	50	46.3					12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01	No	66	61.1	13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01	No	69	63.9	14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01	No	20	18.5	15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05	No	60	55.6	16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01	No	15	13.9	17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01	No	88	81.5	18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01	No	71	65.7	19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01	No	78	72.2	20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05	No	62	57.4	21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01	No	34	31.5																																																																																																															
12-Do you think it has a relationship to obesity and weight loss?	Yes	42	38.9	3.84*	6.63	5.33	> 0.01																																																																																																																																																																																																																													
	No	66	61.1																																																																																																																																																																																																																																	
13-Is it related to the control of blood glucose levels in diabetics?	Yes	39	36.1	3.84*	6.63**	8.33	< 0.01																																																																																																																																																																																																																													
	No	69	63.9																																																																																																																																																																																																																																	
14-Does coconut oil treat dry skin and promote skin health?	Yes	88	81.5	3.84*	6.63**	42.81	< 0.01																																																																																																																																																																																																																													
	No	20	18.5																																																																																																																																																																																																																																	
15-Do you think coconut oil useful for the digestive system and treat his problems?	Yes	48	44.4	3.84	6.63	1.33	> 0.05																																																																																																																																																																																																																													
	No	60	55.6																																																																																																																																																																																																																																	
16-Do you think coconut oil is useful for healthy hair?	Yes	93	86.1	3.84*	6.63**	56.33	< 0.01																																																																																																																																																																																																																													
	No	15	13.9																																																																																																																																																																																																																																	
17-It has an effective therapeutic role in the treatment of epilepsy	Yes	20	18.5	3.84*	6.63**	42.81	< 0.01																																																																																																																																																																																																																													
	No	88	81.5																																																																																																																																																																																																																																	
18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	37	34.3	3.84*	6.63**	10.7	< 0.01																																																																																																																																																																																																																													
	No	71	65.7																																																																																																																																																																																																																																	
19-Do you think that it is useful for infection control and viral resistance?	Yes	30	27.8	3.84*	6.63**	21.33	< 0.01																																																																																																																																																																																																																													
	No	78	72.2																																																																																																																																																																																																																																	
20-Does it have a therapeutic role in arthritis?	Yes	46	42.6	3.84	6.63	2.37	> 0.05																																																																																																																																																																																																																													
	No	62	57.4																																																																																																																																																																																																																																	
21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	74	68.5	3.84*	6.63**	14.81	< 0.01																																																																																																																																																																																																																													
	No	34	31.5																																																																																																																																																																																																																																	

\* = Significant at  $\alpha 0.05$  level \*\* = Significant at  $\alpha 0.01$  level (Highly Significant)

N.S = Non-significant

In table 3, difference between answer levels for all questions from question 1 to question 21 is high significant but for questions (3, 4, 6, 9, 10, 11, 15 and 20) there is a none significant difference. Results showed that; 88.9% of

students think that coconut oil is useful for health. [32]. 66.7% of students care when buying oil to be a virgin free of chemicals; 60.2% prefer to use it in Cosmetic and 81.5% of students know that coconut oil treat dry skin and promote skin

health. This knowledge supported by a study which reported that Coconut oil can reduce the appearance of wrinkles giving skin a healthier appearance. [26]

The study represents that 86.1% of students are aware about good role of coconut oil for healthy hair; 18.5% of students have knowledge about its therapeutic effect in treatment of epilepsy. This knowledge supported by a study which concluded that Coconut oil is effective in treatment of epilepsy and Alzheimer's disease due to its contents of medium-chain triglycerides. [29] The results show that 34.3% know its effect in the treatment of psoriasis and eczema

symptoms and 36.1% of students have a background about useful role of coconut oil in controlling blood glucose level in diabetic patient. This knowledge supported by a study which reported that coconut oil in the diet reduces glycemic index of the food, regulates the level of blood sugar and stimulates insulin action [14]. In present report, 42.6% of students know that it has a therapeutic role in arthritis; 68.5% know that excessive intake of coconut oil leads to an opposite reaction and 27.8% of students know antimicrobial property of coconut oil and its ability in killing pathogenic microorganisms. [33, 34]

**Table 4.** Comparison between male and female students in degree of knowledge about beneficial of coconut oil.

The question	The answer	Gender		$\chi^2$ at $\alpha=0.05$	$\chi^2$ at $\alpha=0.01$	$\chi^2_c$	P Value
		Male	female				
1-Did you have information about kinds of coconut oil?	Yes	15	25	3.84*	6.63	.97	< 0.05
	No	39	29				
2-Do you think coconut oil is useful for health?	Yes	43	53	3.84*	6.63**	9.38	< 0.01
	No	11	1				
3-Do you have the ability to use it in eating instead of vegetable oils?	Yes	25	20	3.84	6.63	0.95	> 0.05
	No	29	34				
4-What do you think of coconut oil for health?	useful	20	34	3.84	6.63	7.26	> 0.05
	I don't know	34	20				
5-Do you care when buying oil that to be free of chemicals?	Yes	36	36	3.84	6.63	0.0	> 0.05
	No	18	18				
6-Do you use coconut oil?	Yes	20	40	3.84*	6.63**	15.0	< 0.01
	No	34	14				
7-Would you prefer to use it in:	- food	4	0	3.84*	6.63**	25.51	< 0.01
	- Cosmetic	21	44				
	-both	6	6				
	I don't use it	23	4				
8-Do you think coconut oil is different from other oils?	Yes	39	40	3.84	6.63	0.05	> 0.05
	No	15	14				
9-Is coconut oil used for cooking?	Yes	25	29	3.84	6.63	0.93	> 0.05
	No	30	24				
10- Does coconut oil enhance brain function in people with Alzheimer's?	Yes	23	21	3.84	6.63	0.15	> 0.05
	No	31	33				
11- Is it related to elevated cholesterol and reduced heart disease?	Yes	25	33	3.84	6.63	2.38	> 0.05
	No	29	21				
12- Do you think it has a relationship to obesity and weight loss?	Yes	22	20	3.84*	6.63	0.16	> 0.05
	No	32	34				
13-Is it related to the control of blood glucose levels in diabetics?	Yes	21	18	3.84	6.63	0.36	> 0.05
	No	33	36				
14-Does coconut oil treat dry skin and promote skin health?	Yes	38	50	3.84*	6.63**	8.84	< 0.01
	No	16	4				
15-do you think coconut oil useful for the digestive system and treat his problems?	Yes	23	25	3.84	6.63	0.15	> 0.05
	No	31	29				
16-Do you think coconut oil is useful for healthy hair?	Yes	41	52	3.84*	6.63**	9.37	< 0.01
	No	13	2				
17- Does it have an effective therapeutic role in the treatment of epilepsy?	Yes	17	3	3.84*	6.63**	12.03	< 0.01
	No	37	51				
18-Is it related to the treatment of psoriasis and eczema symptoms?	Yes	19	18	3.84	6.63	0.04	> 0.05
	No	35	36				
19- Do you think that it is useful for infection control and viral resistance?	Yes	22	8	3.84*	6.63**	9.05	< 0.01
	No	32	46				
20-Does it have a therapeutic role in arthritis?	Yes	24	22	3.84	6.63	0.15	> 0.05
	No	30	32				
21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	36	38	3.84	6.63	0.17	> 0.05
	No	18	16				

\* = Significant at  $\alpha$  0.05 level \*\* = Significant at  $\alpha$  0.01 level (Highly Significant)

N.S = Non-significant

Table 4 show none significant difference in answer levels between male and female students in all questions but questions number (2, 6, 7, 14, 16, 17 and 19) there is a

significant difference.

In current study, 43% of male students know that coconut oil is useful for health while for female the percentage was

53%. Results showed that 20% of male students use coconut oil while only 40% of female use coconut oil. 44% of female use coconut oil in cosmetic while only 21% of male students use coconut oil in cosmetic. Results showed that 20% of male students use coconut oil while 40% of female know use coconut oil. 50% of female know that coconut oil treats dry skin and promote skin health while only 38% of male knows this knowledge. Results also found that 52% of female students have a background about useful role of coconut oil for healthy hair while only 41% of male know this knowledge. The present study represents that 17% of male students know

that it has an effective therapeutic role in the treatment of epilepsy while only 3% of female knows this knowledge. Results of the current study found that 22% of male students know that it is useful for infection control and viral resistance while only 8% of female knows this knowledge. Published studies from Kingdom of Saudi Arabia about benefits of coconut oil are rarely. Results of the current report found that students of University have a moderate knowledge about positive effect of coconut oil on health but the knowledge of female students more than male students.

**Table 5.** Comparison between students of Scientific College and literary College in their knowledge about coconut oil.

The question	The answer	specialization		$\chi^2$ at $\alpha=0.05$	$\chi^2$ at $\alpha=0.01$	$\chi^2$	P Value
		Scientific	Literature				
1-Did you have information about kinds of coconut oil?	Yes	26	14	3.84*	6.63	5.72	< 0.05
	No	28	40				
2-Do you think that coconut oil is useful for health?	Yes	47	49	3.84	6.63	0.38	> 0.05
	No	7	5				
3-Can you use it in eating instead of vegetable oils?	Yes	22	23	3.84	6.63	0.04	> 0.05
	No	32	31				
4-What do you think of coconut oil for health?	useful	27	27	3.84	6.63	0.00	> 0.05
	I don't know	27	27				
5-Do you care when buying oil to be a virgin free of chemicals?	Yes	39	33	3.84	6.63	1.50	> 0.05
	No	15	21				
6-Do you use coconut oil?	Yes	32	28	3.84	6.63	0.60	> 0.05
	No	22	26				
7-Would you prefer to use in:	-food	1	3	3.84	6.63	1.68	> 0.05
	- Cosmetic	33	32				
	-both	5	7				
	I don't use it	15	12				
8-Do you think that coconut oil is different from other oils?	Yes	37	42	3.84	6.63	1.18	> 0.05
	No	17	12				
9-Do you use coconut oil in cooking?	Yes	23	32	3.84	6.63	3.00	> 0.05
	No	31	22				
10-Does coconut oil enhance brain function for people with Alzheimer's?	Yes	23	21	3.84	6.63	0.15	> 0.05
	No	31	33				
11- Is it related to elevated cholesterol and reduced heart disease?	Yes	26	32	3.84	6.63	1.34	> 0.05
	No	28	22				
12- Do you think it has a relationship to obesity and weight loss?	Yes	19	23	3.84	6.63	0.62	> 0.05
	No	35	31				
13-Is it related to the control of blood glucose levels in diabetics?	Yes	17	22	3.84	6.63	1.00	> 0.05
	No	37	32				
14-Does coconut oil treat dry skin and promote skin health?	Yes	42	46	3.84	6.63	0.98	> 0.05
	No	12	8				
15-do you think coconut oil useful for the digestive system and treat its problems?	Yes	22	26	3.84	6.63	0.60	> 0.05
	No	32	28				
16-Do you think coconut oil is useful for healthy hair?	Yes	45	48	3.84	6.63	0.70	> 0.05
	No	9	6				
17- Does it have an effective therapeutic role in the treatment of epilepsy?	Yes	11	9	3.84	6.63	0.25	> 0.05
	No	43	45				
18- Does it have a role in the treatment of psoriasis and eczema symptoms?	Yes	22	15	3.84	6.63	2.01	> 0.05
	No	32	39				
19-Do you think that it is useful for infection control and viral resistance?	Yes	18	12	3.84	6.63	1.66	> 0.05
	No	36	42				
20-Does it have a therapeutic role in arthritis?	Yes	20	26	3.84	6.63	1.36	> 0.05
	No	34	28				
21-Do you think that excessive intake of coconut oil leads to an opposite reaction?	Yes	36	38	3.84	6.63	0.17	> 0.05
	No	18	16				

\* = Significant at  $\alpha$  0.05 level \*\* = Significant at  $\alpha$  0.01 level (Highly Significant)

N.S = Non-significant

In table 5, difference between answer levels for all questions about beneficial of coconut oil is none significant.

## 4. Conclusion

Coconut oil, especially virgin coconut oil (VCO), has been

claimed to have beneficial effects on health while Partially hydrogenated coconut oil is not healthy and any manufactured foods contain it should be avoided. Benefits of coconut oil related to high content of medium-chain triglycerides (MCTs). These are easier to the body to burn off and harder to convert into stored fat. Results of the

present study was concluded that students of University have a moderate knowledge about effect of coconut oil on human health but the knowledge of female students more than male students. Comparison between students of scientific College and Literary College in level of knowledge about healthy importance of coconut oil show a none significant difference in all questions.

## 5. Recommendation

The present work reported the need to increase the knowledge of students about beneficial effect of coconut oil by distributing booklets or by health education program to highlight its positive effects on health with recommendation to use it for food, medicine and cosmetic and correct their thinking that coconut oil is harmful. The highest percentage of SFAs present in Coconut oil is a good property and added advantage to it to be healthy. All consumed food containing coconut oil are catabolized to release energy. It provide immunity and prevent the formation of free radicals which are harmful to health. Finally, coconut oil is the best oil in the world for health.

---

## References

- [1] Fife, B. 2005. Eat fat, look thin: A safe and natural way to lose weight permanently. 2nd ed., Piccadilly Books, Colorado Springs, CO, USA.
- [2] Forouhi NG, Menon RK, Sharp SJ, et al. Effects of vitamin D2 or D3 supplementation on glycaemic control and cardiometabolic risk among people at risk of type 2 diabetes: results of a randomized double-blind placebo-controlled trial. *Diabetes Obes Metab* 2016; 18: 392–400.
- [3] Laura Boemeke and Aline Marcadenti. Effects of Coconut Oil on Human Health. *Journal of Endocrine and Metabolic Diseases* (2015): 5, 84-87.
- [4] Natalia Mikołajczak. Coconut oil in human diet –Nutrition value and potential health benefits, *Journal of Education Health and sport* Vol 7, No 9 (2017).
- [5] Enig, M. G. 1996. Health and nutritional benefits from coconut oil: An important functional food for the 21st century, AVOC (ASEAN Vegetable Oils Club) Lauric Oils Symposium, Ho Chi Min, Vietnam, 25 April 1996.
- [6] Enig, M. G. 1999. Coconut: In support of good health in the 21st century. Paper presented at the 36th Meeting of APCC.
- [7] Enig, M. G. 2000. Know your fats: The complete primer for understanding the nutrition of fats, oils and cholesterol. Bethesda Press, Bethesda, MD, USA.
- [8] Dayrit, C. S. 2000. Coconut oil in health and disease: Its and Monolaurin's potential as cure for HIV/AIDS. Paper presented at the XXXVIII Cocotech Meeting, Chennai, India, 25 July 2000.
- [9] Narong Chomchalow. Health and Economic Benefits of Coconut Oil Production Development in Thailand. *AU J. T.* (2011): 14 (3): 181-187.
- [10] Oyi AR. Formulation and antimicrobial studies of coconut (Cocos nucifera linne) oil. *Res J Appl Sci Eng Technol.* 2010; 2 (2): 133-137.
- [11] Nevin KG, Rajamohan T. Effect of topical application of virgin coconut oil on skin components and antioxidant status during dermal wound healing in young rats. *Skin Pharmacol Physiol* 2010; 23, 6: 290-7.
- [12] Chomchalow, N. 2008a. How can coconut oil prevent heart disease? CDCOT Technical Bulletin No. 1/2551. CDCOT, Bangkok, Thailand (in Thai).
- [13] C. S. Fox, S. H. Golden, C. Anderson et al., "Update on prevention of cardiovascular disease in adults with type 2 diabetes mellitus in light of recent evidence: A scientific statement from the American Heart Association and the American diabetes association," *Diabetes Care*, vol. 38, no. 9, pp. 1777–1803, 2015.
- [14] J. Orsavova, L. Misurcova, J. Vavra Ambrozova, R. Vicha, and J. Mlcek, "Fatty acids composition of vegetable oils and its contribution to dietary energy intake and dependence of cardiovascular mortality on dietary intake of fatty acids," *International Journal of Molecular Sciences*, vol. 16, no. 6, pp. 12871–12890, 2015.
- [15] R. P. Mensink, Effects of Saturated Fatty Acids on Serum Lipids and Lipoproteins: A Systematic Review and Regression Analysis, World Health Organization, Geneva, Switzerland, 2016.
- [16] Surarong Chinwong. Daily Consumption of Virgin Coconut Oil Increases High Density Lipoprotein Cholesterol Levels in Healthy Volunteers: A Randomized Crossover Trial. Volume 2017, 8 pages *J Evidence-Based Complementary and Alternative Medicine*.
- [17] Wendy M. Gans and Gail P. A. Kauwell. Coconut Oil: A Heart Healthy Fat? *UF/IFAS Extension*. February 2017.
- [18] Anon. 2006. Cancer and virgin coconut oil. <<http://salaswildthoughts.blogspot.com/2006/10/cancer-virgin-coconut-oil.html>>
- [19] Chomchalow, N. 2009b. How can coconut oil reduce your weight? CDCOT Technical Bulletin No. 2/2552. CDCOT, Bangkok, Thailand (in Thai).
- [20] Kohlmeier, L.; Simonsen, N.; van 't Veer, P.; Strain, J. J.; Martin-Moreno, J. M.; Margolin, B.; Huttunen, J. K.; Fernández-Crehuet Navajas, J.; Martin, B. C.; Thamm, M.; Kardinaal, A. F.; Kok, F. J. 1997. Adipose tissue trans fatty acids and breast cancer in the European Community multicenter study on antioxidants, myocardial infarction, and breast cancer. *Cancer Epidemiology, Biomarkers and Prevention* 6 (9): 705-10, September.
- [21] Chomchalow, N. 2009c. How can coconut oil prevent diabetes? CDCOT Technical Bulletin No. 3/2552. CDCOT, Bangkok, Thailand (in Thai).
- [22] Shijna Kappally, Arun Shirwaikar and Annie Shirwaikar. Coconut Oil – A Review of Potential Applications. *journal for drugs and medicines.* (2015): 7, 149.
- [23] Walker JM, Harrison FE. Shared neuropathological characteristics of obesity, type 2 diabetes and Alzheimer's disease: impacts on cognitive decline. *Nutrients.* 2015; 7 (9): 73327357.

- [24] D. A. Cardoso, A. S. B. Moreira, G. M. M. De Oliveira, R. R. Luiz, and G. Rosa, "A coconut extra virgin oil-rich diet increases HDL cholesterol and decreases waist circumference and body mass in coronary artery disease patients," *Nutrici<sup>o</sup>n Hospitalaria*, vol. 32, no. 5, pp. 2144–2152, 2015.
- [25] DebMandal M, Mandal S. Coconut (*Cocos nucifera* L.: *Arecaceae*): in health promotion and disease prevention. *Asian Pac J Trop Med*. 2011; 4 (3): 241-247.
- [26] Dr. Mercola. What Are the Health Benefits of Coconut Oil? May 30 (2016).
- [27] Laurene Boateng. Coconut oil and palm oil's role in nutrition, health and national development: A review. *Ghana Med J* 2016; 50 (3): 189-196.
- [28] Afar, F., & Mearow, K. M. 2014. "Coconut oil attenuates the effects of amyloid- $\beta$  on cortical neurons in vitro." *J Alzheimers Dis*. 39 (2), 233–237. doi: 10.3233/JAD-131436.
- [29] Fernanado WM, Martins IJ, Goozee KG, Brennan CS, Jayasena V, Martins RN. The role of dietary coconut for the prevention and treatment of Alzheimer's disease: potential mechanisms of action. *Brit J Nutr*. 2015; 114 (1): 1-14.
- [30] Snedecor, G. w. and W. G. Cochran (1980). *Statistical Methods*, 7th ed. Iowa State Unive. Press, Iowa, USA.
- [31] Waller, A. and D. B. Duncan. (1969). Multiple range and multiple test. *Biometrics*, 11: 1-24.
- [32] Kabara, J. J. 2000. Health oils from the Tree of Life: Nutritional and health aspects of coconut oil. *Indian Coconut J*. 31 (8): 2-8.
- [33] Shilling M, Matt L, Rubin E, et al. Antimicrobial effects of virgin coconut oil and its medium chain fatty acids on *Clostridium difficile*. *J Med Food*. 2013; 16 (12): 1079-1085.
- [34] Vysakh A, Ratheesh M, Rajmohanan TP, et al. Polyphenolics isolated from virgin coconut oil inhibits adjuvant induced arthritis in rats through antioxidant and anti-inflammatory action. *Int Immunopharmacol*. 2014; 20 (1): 124-130.