

Survey of Nutritional Education for Students of Faculty Education Nujran Based on Supplemented Food Products with some Vegetables Peels and Study the Chemical and Storage Properties of Product

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ABSTRACT

This study was carried out to Nutritional education for students of faculty education Nujran based on supplemented food products with some vegetables peel and study the chemical and storage properties of product, also supplemented some food products with different levels of vegetables peel " eggplant peel" to raise the nutritional value and improvement storage properties of product. The paper explained a basic problem showed in the lack of awareness many people for healthy benefits of vegetables peels, especially eggplant peel, so this showed in the importance of study in raising awareness of food for healthy benefits of vegetables peels. I used sample of students of faculty education numbered (30 students), them Ages ranged between (19-24) years old to educate them nutritionally, the results of food education revealed that, the best results were showed in the after measure of food education, it was respectively (80.3 % and 55.1%), then I offered them two types of food products (Bread and Patton Salee) to evaluate it sensory evaluation , the result was obtained that, supplemented Patton salee was acceptable for supplemented bread from where (taste, color, flavour, pores, textures and overall acceptability) and the best results was showed in supplement Patton salee with lower level of eggplant peel (5%), Which it were respectively (9.00 , 9.00 , 9.80 , 9.20 , 9.20 and 46.2) as compared to supplemented bread with (5%) eggplant peel (8.60 , 8.33 , 8.80 , 8.60 , 8.40 and 42.73). The results of chemical composition revealed that, with increasing level of eggplant peel in Patton salee increased proteins, fat, crude fiber, Ash, vitamins, mineral and rare compounds" Total flavonoids, Total phenols and Total antioxidants". And the results of storage properties were explained improvement in the storage properties of vitamins, minerals and rare compounds of supplemented sample with 5% of eggplant peel (stored for 0 day) as compared to control sample and supplemented sample (stored for 20 days). In general, adding vegetables peels to food products improved nutritional value and period of storage of vitamins, minerals and rare compounds. **Conclusion:** The results of nutritional education appeared improvement in after measure, sensory evaluation of supplement Patton salee with (5%) eggplant peel more than supplement bread with the same level, chemical composition referred that, Supplemented Patton Salee with different levels of eggplant peel was recorded significant increasing in proteins, fats, crude fiber, ash, vitamin B complex, vitamin C and minerals, also rare compounds. But it was recorded significant decreasing in carbohydrates and moisture, this means that, eggplant peel is considered as a good sources of protein, crude fiber, ash, vitamins, minerals and phytochemicals on account of their important roles in human nutrition and health, also improvement in storage properties for vitamins, minerals and rare compounds of supplemented sample with (5%) eggplant peel (stored for 0 day).

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INTRODUCTION

Nutrition has a big impact on health, including major diseases such as heart disease, osteoporosis, and cancer [33]. Although awareness of nutrition varies in different parts of the world, many people do not know exactly how many servings of fruits, grains, vegetables, and fats they are eating [44]. The goal is to support awareness of nutrition and suggest potential dietary changes [1]. Awareness of federal nutrition programs and use of the nutrition facts label are associated with reduced risk for obesity and increased intake of fruits and

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vegetables. Relationships between nutrition programs, use of food labels and risk for overweight and obesity have rarely been evaluated in adolescents [46]. Association between Nutritional Awareness and Diet Quality: Evidence from the Observation of Cardiovascular Risk Factors in Luxembourg (oriscav-lux) study [3]. The need for effective nutritional education for young consumers has become increasingly apparent given their general food habits and behaviour, particularly during adolescence. Aims to analyse the interaction between young consumers' food preferences and their nutritional awareness behaviour [50]. An investigation into school children's knowledge and awareness of food and nutrition. With the diet and exercise behaviours of UK school children showing little improvement over recent years, the need for dietary change is clearly indicated. This study aimed to assess the nutritional knowledge and understanding of primary school children in order to identify the most effective format for future nutrition messages [35]. Results from the National Diet and Nutrition Survey (NDNS) for Young People [29]. Indicate the potential for both under and over nutrition within subgroups of children in the UK [14]. A dietary supplement is intended to provide nutrients that may otherwise not be consumed in sufficient quantities. Supplements as generally understood include vitamins, minerals, fiber, fatty acids, or amino acids, among other substances. U.S. authorities define dietary supplements as foods, while elsewhere they may be classified as drugs or other products [77, 28]. Most supplements should be avoided, and usually people should not eat micronutrients except people with clearly shown deficiency [31]. Those people should first consult a doctor [85]. An exception is vitamin D, which is recommended in Nordic countries [72]. The intended use of dietary supplements is to ensure that a person gets enough essential nutrients [25]. Dietary supplements should not be used to treat any disease or as preventive healthcare. An exception to this recommendation is the appropriate use of vitamins [6]. Dietary supplements are unnecessary if one eats a balanced diet. Supplements may create harm in several ways, including over consumption, particularly of minerals and fat soluble vitamins which can build up in the body [97]. Vegetables are considered essential for well balanced diets since they supply vitamins, minerals, dietary fiber, and phytochemicals. Each vegetable group contains a unique combination and amount of these phytonutrients, which distinguishes them from other groups and vegetables within their own group. In the daily diet vegetables have been strongly associated with improvement of gastrointestinal health, good vision, and reduced risk of heart disease, stroke, chronic diseases such as diabetes, and some forms of cancer [81, 41, 27, 42, 51, 48]. Vegetables make up a major portion of the diet of humans in many parts of the world and play a significant role in human nutrition, especially as sources of phytonutrients: vitamins (C, A, B1, B6, B9, E), minerals, dietary fiber and phytochemicals [84, 20, 100]. Vegetables as rich sources of vitamins, minerals, and fibers, and also have beneficial antioxidative effects [102]. Fruits and vegetables are valuable sources of minerals [68], and diets rich in fruits and vegetables are also linked to decreased risk of diseases (diabetes and cancer) [11]. Malnutrition is of major concern for many tropical developing countries. Iron deficiency anemia, for example, affects one-third of the world's population [55]. A high vegetable diet has been associated with lower risk of cardiovascular disease in humans [70]. Low vegetable intake, in unbalanced diets, has been estimated to cause about 31% of ischaemic heart disease and 11% of stroke worldwide. According to the 2007 World Health Report unbalanced diets with low vegetable intake and low consumption of complex carbohydrates and dietary fiber are estimated to cause some 2.7 million deaths each year [19].

Vegetable and fruit peels have advantages over other herbal extracts, as they are easily identifiable, commonly used by people rich in various bioactive compounds, and some of their compounds have been characterized in terms of their chemical structures and biological properties through use of structure activity relationship. Additionally, peels are usually considered waste, so they are obviously cost effective [32, 78]. Some phytochemicals of vegetables are strong antioxidants and are thought to reduce the risk of chronic disease by protecting against free radical damage, by modifying metabolic activation and detoxification of carcinogens, or even by influencing processes that alter the course of tumor cells. All the vegetables may offer protection to humans against chronic diseases, and vegetables in all their many forms ensure an adequate intake of most vitamins and nutrients, dietary fibers, and phytochemicals which can bring a much needed measure of balance back to diets contributing to solve many of these nutrition problems. Vegetable contains a unique combination of phytonutrients, a great diversity of vegetables should be eaten to ensure that individual's diet includes a combination of phytonutrients and to get all the health benefits [37, 48, 94, 100]. Among these vegetables is brinjal or eggplant (*Solanum melongena* L). Brinjal or eggplant (*Solanum melongena* L). Is an important tropical as well as subtropical vegetable crop, mostly used for different types of recipes. Also have a medicinal property which most important for human health [23]. According to FAO, production of Brinjal is highly concentrated, with 90% of output coming from five countries. China is the top producer (58% of world output) and India is second (25% of output), followed by Egypt, Iran, and Turkey. Overwhelming epidemiological and clinical evidences strongly points to the role of oxidative stress in increasing lipid peroxidation, ultimately resulting in etiology of several non transmissible chronic diseases [4, 61]. Dietary antioxidants (ascorbic acid, α -tocopherol, β -carotene, lycopene and phenolic) found abundantly in fruits and vegetables, neutralize the reactive oxygen species, thus reducing lipid peroxidation and damage to cellular organelles. Among dietary antioxidants, phenolics are considered to be key health promoting compounds with several biological effects including

antibacterial, anti-inflammatory, antiallergic, hepatoprotective, antithrombotic, antiviral, anticarcinogenic and vasodilatory actions [30]. Increasing understanding and awareness of the beneficial health effect of phenolics in human diet has led to hectic research on plant foods rich in plant phenolics [60]. Eggplant commonly known as aubergine, melanzana, garden egg, brinjal, or patlican is an economically important crop of tropical and subtropical regions. Eggplant (*Solanum melongena* L.) is an important source of phenolic and flavonoid compounds both of which are powerful antioxidants. The major phenolic compounds found in eggplant include Ncaffeoylputrescine, 5-caffeoylquinic acid, and 3-acetyl-5-caffeoylquinic acid. In addition, trace quantities of flavonols, namely, quercetin-3- glucoside, quercetin-3-rhamnoside, and myricetin-3-galactoside are also reported in its pulp [60]. From 120 vegetables, evaluated for antioxidant activity, eggplant ranked among the top ten for superoxide scavenging activity. Flavonoids isolated from eggplant exhibit potent antioxidant activity against chromosomal aberrations induced by doxorubicin [89]. Phenolic extracts of eggplant possess high α -glucosidase inhibitory activity and moderate to high angiotensin I-converting enzyme inhibitory activity [56].; suggesting its possible role in management of type 2 diabetes and hypertension. Wild species of *Solanum* particularly *paniculatum* and *fastigiatum* have been extensively used in folk medicine for their protective effects on the liver and antisecretory gastric properties [88]. Eggplant is an important source of plant derived nutrients available throughout the year and popular among the poor, identification of genotypes with higher nutrients could be beneficial, particularly for poor consumers [23].

Eggplant (*Solanum melongena* L. $2n = 24$) is an economically important crop of Solanaceae family grown mostly in tropical and temperate regions of the world [86]. It is popularly called as brinjal in India its place of origin and is also called as Eggplant in the USA and Aubergine in Europe. Although a native of India eggplant is also cultivated in Japan, Indonesia, China, Bulgaria, Italy, France, the United States and many African countries [91]. The nutritional benefit of eggplant varies according to its type. The nutritional composition depends upon the species. The overall shape, size and color are the same. An eggplant being rich in calcium is advised to people deficient in calcium. The composition of minerals is vital for the formation of bones. One of the interesting facts about eggplants is, it contains traces of nicotine. The limit is absolutely safe for body. Due to low calories in eggplants, they are considered healthy for people on a weight loss diet. If you want to absorb the nutrition completely, just eat it raw [65]. *Solanum melongena* is a common and popular vegetable crop grown in the different parts of Iran and is a common vegetable on Iranian diet. The shape of fruit varies from ovoid, oblong, obovoid, or long cylindrical. Its composition has been recorded as per 100 g of edible portion is Calories 24.0 Kcal, Moisture content 92.7%, Carbohydrates 4.0%, Protein 1.4g, Fat 0.3 g and vitamins 130 g. Bitterness in eggplant is due to the presence of glycol alkaloids which are of wide occurrence in plants of Solanaceae family. It may contain certain medicinal properties because medicinal uses of eggplant have been reported. For example, white eggplant is good for diabetic patients. It can cure toothache if fried eggplant fruit oil is taken. It has also been recommended as an excellent remedy for those suffering from liver complaints and asthma [52]. Eggplant can be consumed raw, boiled, cooked stuffed. It can be used in variety of preparations like soups, pickles [9]. It is a good source of vitamins and minerals. It is low in calories and high in potassium and so could be used to control diabetes, hypertension and obesity [91]. Eggplant has chemicals that can cause digestive upset if eaten raw, so is usually cooked. It can be grilled, stuffed, roasted, served in soups and stews and on kebabs, and used in curries and stir-fries. Eggplant is nutritious, being low in calories, fat, sodium and is a nonstarchy fruit that is cooked as a vegetable. It contains a large volume of water. It is good for balancing diets that are heavy in protein and starches. It is high in fiber and provides additional nutrients such as potassium, magnesium, iron, folic acid, vitamin B6 and A [17,101]. Superoxide anion radical scavenging and iron chelating activities of Nasunin a major component of anthocyanin pigment in eggplant peels were demonstrated by electron spin resonance [74]. Anthocyanin from eggplant protected mice against cyclophosphamide mutagenicity in vivo [10]. Eggplants are members of the Solanaceae (Night shade) family, classing them as relatives to tomato, green pepper and tobacco. It has been reported that eating eggplant lowers blood cholesterol, helps counteract detrimental blood effects of fatty foods and clears toxic heat from the body. Eggplant is used to relieve pain, hypertension, stomach ulcers, colitis, constipation, bleeding hemorrhoids, swellings, and tumors. Eggplant is reported to have an adverse effect on people suffering with rheumatoid arthritis and osteoarthritis. No controlled studies have been done to substantiate the above claims of the eggplant. That the eggplant contains Solasodine glycosides that are now used for the treatment of skin cancers. It has solutions for the treatment of skin cancers and it produces glycoalkaloids which are extracted and purified then incorporated into the cream, Curaderm BEC5, which is applied to a skin cancer resulting in the complete removal of all cancer cells without affecting normal cells and healing of the treated lesion with exceptional cosmetic results [12]. A recent study confirms hepatoprotective effects of several eggplant varieties in hepG2 lines [2]. There are also many reports on the health benefits of eggplant. The research on the antioxidant activity of eggplant with different assays was reported by [40]. [96]. Carried out a systematic examination of the phenolic acid content of the fruit flesh of seven commercial eggplant cultivars. Optimized extraction of phenolic acids from eggplant by different solvents mixtures [59], and the relationship between phenolic content and antioxidant activity of eggplant pulp. However, information concerning the antioxidant activity and phytochemical composition of

eggplant according to parts except peel and pulp is unavailable. In this study, the antioxidant activity and phenolic contents of five different parts (calyx, leaf, peel, pulp, and stem) of eggplant extracted by two different solvents (70% ethanol and water) were evaluated [91]. [92]. During the last years there has been an increased demand for fruits and vegetables having a higher content in nutraceutical compounds [36, 54]. In this respect, breeding programmes for improving the content of bioactive compounds in fruits and vegetables are becoming more important for public and private breeders [18]. Phenolic compounds present in fruits and vegetables are raising an increased interest due to their multiple beneficial effects for human health, which in many cases is derived from their high antioxidant activity [15,16]. Furthermore, many of the phenolic compounds have a great thermal stability and therefore are not lost after cooking [26]. However, increasing the content in phenolics in fruits and vegetables may lead to browning and a consequent loss of quality [98]. Eggplant is considered as a model vegetable crop for the improvement of nutraceutical quality. CGA has displayed antioxidant, anticarcinogenic, anti-inflammatory, antiobesity, cardioprotective, neuroprotective, and analgesic effects [79]. The main phenolic compound of eggplant is chlorogenic acid (CGA), which is a hydroxycinnamic acid with multiple beneficial properties for human health [67, 96]. Anthocyanins, an important group of naturally occurring pigments of red and/or purple colored fruits, are the main phenolic compounds in eggplant peel [79]. Nasunin, a major component of anthocyanin pigment of eggplant, was isolated from the eggplant peels, and its antioxidant activity was evaluated [43, 74].

Anthocyanins of eggplant peels were extracted. The level of anthocyanin was 158.00ppm. These compounds were administered to rats fed on hypolipidemic diet daily from 8 weeks by stomach tube. The data of the aforementioned measurements indicated that the administration of eggplant peels anthocyanin significantly decreased ($P < 0.05$) the levels of serum total cholesterol, low-density lipoprotein cholesterol, very low-density lipoprotein and triglyceride and increased ($P < 0.05$) that high-density lipoprotein cholesterol in this model. The antioxidation experiments showed that displayed potent antioxidant effects against the DPPH radical and reducing power of anthocyanin. Generally, results obtained indicate that eggplant peels may become important as a cheap and noticeable natural source of compounds with health protective potential, which can be used in pharmaceutical and fatty food [62]. On the other hand, requires free radicals for immune system responses. However, an overload of these molecules had been linked to certain chronic diseases of heart, liver and some form of cancers [80]. Human body contains anti-free radical defense system, which includes antioxidant enzymes like catalase, peroxidase and superoxide dismutase and antioxidants like ascorbic acid and tocopherol [75]. The word anthocyanin derived from two Greek words: antho, which means flowers and cyanine, which means dark blue [39]. Anthocyanin is generally accepted as the largest and most important group of water soluble pigments in nature [34]. They are responsible for the blue, purple, red and orange colors of many fruits and vegetables. Also a lot of studies have shown that Anthocyanin may have potential effects in reducing the risk of cardiovascular diseases and cancers by antioxidant, anti-inflammatory and chemo protective properties [57]. In addition the Anthocyanin possess potent inhibition effects on the epidermal growth factor receptor [99] and neuroprotective effects on the Pc12 cells exposed to hydrogen peroxide in vitro and on cerebral ischemic damage in vivo [49]. Determination of antioxidant activity of Anthocyanin from of eggplant peels and to indicate which of them can become a new source of natural antioxidant for food, nutraceutical and pharmaceutical industries, peels of eggplant (*Solanum melongena*) were screened for their in vitro antioxidant activity. Also, evaluate the possible beneficial effect of antioxidant on hyperlipidemia using an experimental model induced by high fat diet [5]. An antioxidant (free radical scavenger) is a compound that inhibits or delays the oxidation of substrates even if the compound is present in a significantly lower concentration than is the oxidized substrate. These free radical scavenger help in preventing stress induced disease such as melanoma, cardiac disorders, diabetes mellitus, inflammatory and neurodegenerative diseases, cancer [47, 69]. Fruits and vegetables constituent important sources of antioxidants and minerals for the human diet [58]. To detect to ailments and diseases associated to mineral deficiencies [93]. Because of their benefits for the health, the selection and development of varieties with improved composition is an increasingly important breeding objective in vegetable crops [82]. Storage of food for a period from a long time in the air may be affect micronutrients especially vitamins, mineral and rare compounds such as antioxidants, total phenols and total flavonoids. So adding or supplemented with vegetables peel will increase stored period for foods. Food is stored by almost every human society and by many animals. Storing of food has several main purposes: Storage of harvested and processed plant and animal food products for distribution to consumers, Enabling a better balanced diet throughout the year, Reducing kitchen waste by preserving unused or uneaten food for later use, Preserving pantry food, such as spices or dry ingredients like rice and flour, for eventual use in cooking and Preparedness for catastrophes, emergencies and periods of food scarcity or famine [83]. The safe storage of food for home use should strictly adhere to guidelines set out by reliable sources, such as the United States Department of Agriculture. These guidelines have been thoroughly researched by scientists to determine the best methods for reducing the real threat of food poisoning from unsafe food storage [63].

Freezer temperature should be maintained below 0°F. Food should never be thawed at room temperature; this increases the risk of bacterial and fungal growth and accordingly the risk of food poisoning. Once thawed,

food should be used and never refrozen. Frozen food should be thawed using the following methods [64]. The United States Department of Agriculture, Food Safety and Inspection Service publish recommended storage times for refrigerated food. Drying is the traditional and oldest method of processing okra to reduce the water activity and improve the keeping quality [24]. Investigation effect of Drying Methods and Storage on the Physicochemical Properties of Okra. The results showed that blanching followed by oven or sun drying decreased the moisture, vitamins A and C concentrations but increased the, protein, ash, iron, zinc, calcium and magnesium contents of the okra fruits. However, the oven dried okra samples were higher in these constituents than the sun-dried okra sample. The viscosity and moisture content of the samples decreased during storage, regardless of the storage conditions. However, the blanched and oven-dried okra samples packaged in air-tight container and stored in dark, cool place, retained more of its chemical constituents and viscosity than the other stored samples [21]. Study of nutritional value and effect of cooking, drying and storage process on some functional properties of *rhynchophorus phoenicis*. Results showed that the proximate composition fluctuated in samples with a protein content of 67.09 % for larvae flour. The moisture content recorded for this insect was about 60%. The ash and carbohydrate contents of defatted flours were 2.7% and 17.56% respectively. The hyperbolic kinetics of dehydration showed that the sun was a slow process of dehydration (6 days were required for the complete elimination of water) while the electric drying at 50°C and smoking were relatively rapid processes of dehydration [38].

MATERIALS AND METHODS

Materials:

Thirty (30) students of faculty education, their ages ranged between (19-24) years to apply the nutrition education program and sensory evaluation of some supplemented food products with vegetables peel such as "eggplant peel".

The measure of food education or nutritional awareness program (before and after).

Sensory evaluation form included measures (taste, color, flavour, pores, textures, overall acceptability).

Sample of white wheat flour extraction (70-72%) was obtained from supper market from Cairo – Egypt to make some supplemented foods products with different levels of eggplant peel (5%, 10% and 15%) such as (Bread and Patton salee).

Sample of vegetables Peel (eggplant peel) was dried by sun or in oven at 200 °C for 1 h. and powdered. Experimental food products (Bread and Patton sale).

Methods:

Preparation of students and nutritional education programme:

Work nutritional education program or nutritional awareness for students faculty education their ages ranged between (19-24) years old for food awareness of healthy Benefits of vegetables peels especially eggplant peel, this programme included the concept of education and nutrition education, available nutrients in vegetables peels, especially eggplant peel, How take advantage of vegetables peels and use it in some food products. On the other hand, improvement sensory properties and to raise nutritional value of food products also improvement the storage properties of foods. It was also work of a questionnaire included some phrases of Nutritional education of vegetables peels, especially eggplant peel, and distributed to a sample of the number of students (30 students) their ages ranged between (19-24) years old, this measure was applied before and after on students and take their opinion in this questionnaire to find the difference in results of before and after measure.

Preparation of eggplant peel:

Fresh eggplant tubers were obtained from local market from Egypt in May 2015. The tubers were washed by water and peeled using kitchen vegetable peeler. The peels were dried in a hot air oven at 200 °C for 1 h, it grinded in blender to get powder and it were stored at -18 °C until used.

Drying eggplant peel carried out by different methods. Samples were dried sun drying or oven drying or solar drying methods according to [53]. investigated two types of food products such as (Bread and Patton Salee) supplemented with different levels of eggplant peel (5%, 10% and 15%) and it was evaluated sensory evaluation where as students from where (taste, colour, flavour, texture, pore and overall acceptability), Patton Salee sample was recorded good results in sensory evaluation more than bread sample, then the group of Patton salee divided into three main groups. The first main group is consisted of control group (non supplemented) of Patton salee, the second main group is consisted of supplemented Patton Salee with different levels of eggplant Peel (5%, 10% and 15%) and stored for (0 day) and the third main group is consisted of supplemented Patton salee with different levels of eggplant Peel (5%, 10% and 15%) and stored for (20 days).

Preparation of wheat flour with dried eggplant peel:

Adding different levels of dried eggplant peel (5%, 10% and 15%) to (100 gm) wheat flour extraction (70%-72%) and mixture it with little of water and adding the other contents to make Patton Salee product and then, this group divided as followed.

The second main group is divided into three subgroups are as followed: The first subgroup is consisted of supplemented Patton salee with (5%) eggplant peel, The second subgroup is consisted of supplemented Patton salee with (10%) eggplant peel, the third subgroup is consisted of supplemented Patton salee with (15%) eggplant peel and the supplemented group with (5% eggplant peel) stored for (0 day). The third main group is divided to three subgroups are as followed: The first subgroup is consisted of supplemented Patton salee with (5%) eggplant peel, The second subgroup is consisted of supplemented Patton salee with (10%) eggplant peel, The third subgroup is consisted of supplemented Patton salee with (15%) eggplant peel also the supplemented group with (5% eggplant peel) stored for (20 days). And these samples were evaluated sensory evaluation through students from where (taste, color, flavour, texture, pore and overall acceptability) compared to the control sample"non supplemented".

Proximate Chemical Composition:

Chemical analysis of macronutrients (proteins, fats, carbohydrates, Ash, Moisture and crude Fiber) and micronutrients (minerals):

Evaluate the nutritional value of raw material (flour and eggplant peel) and food product (supplemented Patton salee with different levels of eggplant peel (5%, 10% and 15%) to study the chemical composition such as (proteins, fats, carbohydrates, Ash, Moisture, crude Fiber ,vitamins and minerals and rare compounds such as (total phenol, total flavonoids and total antioxidants) .

Proteins, fats, carbohydrates, Ash, moisture, crude Fiber and minerals contents were determined according to the method described in the [7].

Chemical analysis of micronutrients (Vitamins):

Vitamin B complex (B1, B2, B3, B6, B9 and B12) contents were determined according to [95, 90].

Chemical analysis of rare compounds:

Rare compounds such as (Total flavonoids, Total Phenols and Total antioxidants) contents were determined according to [45, 7and 13].

Analysis of storage properties of vitamins (B complex and vitamin C):

Evaluate vitamins and minerals, also rare compounds such as (Total flavonoids, Total Phenols and Total antioxidants) after stored for period (0 and 20 days) to study storage properties of supplemented Patton salee with (5%) eggplant peel, because this level was acceptable from where sensory evaluation (taste, colure, flavour, texture, pore and overall acceptability).

Vitamin B complex (B1, B2, B3, B6, B9 and B12) contents were determined according to [95, 90].

Analysis of storage properties of minerals:

Minerals contents were determined according to the method described in the [7].

Analysis of storage properties of rare compounds:

Rare compounds such as (Total flavonoids, Total Phenols and Total antioxidants) contents were determined according to [45, 7, 13].

Statistical analysis:

The obtained data were Statistical analyzed using computer (programme of Statistical analysis system" SAS"). The results were expressed as mean \pm standard deviation"SD" and tested for significance using one way analysis of variance "ANOVA" test. And least significant difference "LSD" tests at a probability $P < 0.05$, according to [8] a value of $P < 0.05$ was considered to be statistically significant.

RESULTS AND DISCUSSION

Mean and percentage of the before and after measure of nutrition education:

Data in table (1) and figure (1). Presented the mean and percentage of before and after measure of nutrition education of faculty education students "Home Economics department." The mean of value of before measure of nutrition education was recorded a low value (55.085), and the percentage of it was (55.1%), but The mean value of after measure was recorded a high value (80.323) and the percentage of it was (80.3%).In the end the results was showed increasing in the after measure of nutrition education compared to the before measure of

nutrition education. These results agree with those of [35, 29]. Also [1] whose mentioned that the goal is to support awareness of nutrition and suggest potential dietary changes [46]. Whose Reported that awareness of federal nutrition programs and use of the nutrition facts label are associated with reduced risk for obesity and increased intake of fruits and vegetables. Relationships between nutrition programs use of food labels and risk for overweight and obesity [77, 28]. Said that dietary supplement is intended to provide nutrients that may otherwise not be consumed in sufficient quantities. Supplements as generally understood include vitamins, minerals, fiber, fatty acids, or amino acids, among other substances [85]. Reported that most supplements should be avoided, and usually people should not eat micronutrients except people with clearly shown deficiency [31]. Mentioned that those people should first consult a doctor. And [60]. Reported that Increasing understanding and awareness of the beneficial health effect of phenolics in human diet has led to hectic research on plant foods rich in plant phenolics.

Table 1: Mean and Percentage of the before and after measure of nutrition education of faculty education students "Home Economics department."

after measure of nutrition education	before measure of nutrition education	Mean Percentage %
80.323	55.085	Mean
80.3%	55.1%	Percentage%

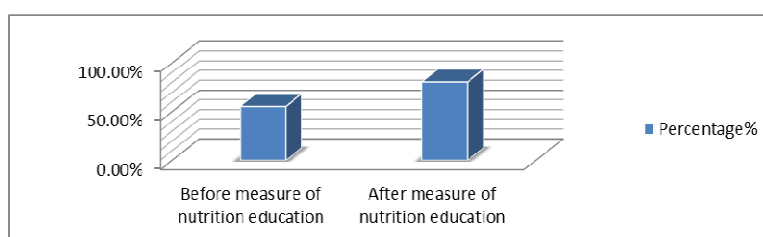


Fig. 1: Mean and Percentage of the before and after measure of nutrition education Of faculty education students "Home Economics program.

Mean and least significant difference (LSD) of sensory evaluation of control sample and supplemented samples of Bread with different levels of eggplant peel (5%, 10% and 15%):

Table (2). Showed the mean and least significant difference (LSD) of sensory evaluation of control sample and supplemented samples of Bread with different levels of eggplant peel (5%, 10% and 15%). The results in this table revealed that, the mean values of sensory evaluation (taste, color, flavour, pores textures and overall acceptability) decreased gradually with increasing the levels of eggplant peel as compared to control of bread. Data in table (2). Referred to, there are significant differences at the level of (0.05) in the sample of bread (control sample and supplemented samples), and this mean, there are significant different between the four groups of bread (control sample and supplemented samples with 5%, 10% and 15% eggplant peel) in the sensory evaluation (taste, color, flavour, pores textures and overall acceptability). Also these differences were showed that, the best result was for the group of high mean. Which the mean values of taste were respectively (9.56, 8.60, 7.80 and 6.80) and The values of LSD at (0.05) of taste were (0.324), the mean values for color were respectively (8.40, 8.33, 7.40 and 5.80) and values of LSD of color were (0.210), the mean of values for smell or odor were respectively (9.67, 8.80, 8.00 and 7.20) and values of LSD of smell were (0.405), the mean values for pores were respectively (9.40, 8.60, 7.80 and 6.80) and values of LSD of pores (0.348) and the mean values for texture were respectively (9.90, 8.40, 7.20 and 6.20) and values of LSD of texture (0.297). And this mean, there are significant different at 0.05 for supplemented samples with different levels of eggplant peel (5%, 10% and 15%) as compared to control sample. In the end, the best results in the sensory evaluation were obtained in the lower level of eggplant peel (5%) as compared to control sample of bread (non supplemented), which the result at level (5%) eggplant peel respectively (8.60, 8.33, 8.80, 8.60 and 8.40) and the control sample recorded results in the same sensory evaluation respectively (9.56, 8.40, 9.67, 9.40 and 9.90).

Table 2: Mean and least significant difference (LSD) of Bread samples (control and supplemented).

Mean of Sensory Evaluation Samples(Bread)	Taste	Color	flavour	Pores	Texture	Overall acceptability
Control	9.56	8.40	9.67	9.40	9.90	46.93
5%	8.60	8.33	8.80	8.60	8.40	42.73
10%	7.80	7.40	8.00	7.80	7.20	38.2
15%	6.80	5.80	7.20	6.80	6.20	32.8
LSD at 5%	0.324	0.210	0.405	0.348	0.297	2.19

Values are expressed as mean \pm SD.

Significant at $p < 0.05$ using one way ANOVA test.

LSD: Least significant difference.

Mean and least significant difference (LSD) of Patton Salee samples (control and supplemented):

Data in the table (3). Showed that, there are significant differences at the level of (0.05) in the sample of Patton salee (control sample and supplemented samples with different levels of eggplant peel 5%, 10% and 15%), and that mean, there are significant different between the four groups of Patton salee (control sample and supplemented samples) in the sensory evaluation (taste, color, flavour, pores, texture and overall acceptability). And the values of LSD of the same of sensory evaluation were respectively (0.1968, 0.340, 0.379, 0.1968, 0.1968 and 1.01). Also these differences referred that, the lower and medium levels of eggplant peel (5% and 10%) were obtained improvement of the sensory evaluation as compared to the control sample "non supplemented". Which the mean values in sensory evaluation for the supplemented sample with lower level of eggplant peel (5%) were respectively (9.00, 9.00, 9.80, 9.20 and 9.20), but the mean values in the same sensory evaluation for the supplemented sample with medium level of eggplant peel (10%) were respectively (8.40, 8.80, 9.20, 8.20 and 8.20) as compared to the control sample, which it were respectively (10.00, 10.00, 10.00, 10.00 and 10.00). And the best results in the sensory evaluation were for the supplemented sample of Patton salee with lower level of eggplant peel (5%) as compared to control sample.

In generally, With comparison between the data presented in table (3) were showed that, supplemented Patton salee with different levels of eggplant peel (5%, 10% and 15%) was better than the product of bread in the total mean values of sensory evaluation, which it were respectively (9.80, 8.76, 7.88 and 6.84) as compared to the product of bread (9.39, 8.55, 7.64 and 6.56) and the best result in the sensory evaluation was showed in supplement Patton salee with lower level of eggplant peel (5%), it was (8.76) as compared to control sample (9.80).

Table 3: Mean and least significant difference (LSD) of Patton Salee samples (control and supplemented).

Mean of Sensory Evaluation Samples (Patton Salee)	Taste	Color	flavour	Pores	Texture	Overall acceptability
Control	10.00	10.00	10.00	10.00	10.00	50
5%	9.00	9	9.80	9.20	9.20	46.2
10%	8.40	8.80	9.20	8.20	8.20	42.8
15%	7.733	7.8	8.6	7.2	7.20	38.533
LSD at 5%	0.1968	0.340	0.379	0.1968	0.1968	1.01

Values are expressed as mean \pm SD.

Significant at $p < 0.05$ using one way ANOVA test.

LSD: Least significant difference.

Chemical composition of White flour extraction (70-72%) and eggplant peel of (protein, carbohydrate, fat, moisture, crude fiber, ash, vitamins, minerals and rare component).

Data in table (4). Indicated to the chemical composition of white flour extraction (70- 72%) and eggplant peel of (protein, carbohydrate, fat, moisture, crude fiber, ash, vitamins, minerals and rare component). It was obtained from table of chemical composition that eggplant peel consisted of a high rates of protein, fat, crude fiber, Ash and vitamins (B1, B2, B3, B6, B9, B12, C), which it were respectively (13.984, 3.83, 1.58, 9.11, 62.55, 121.27, 240.33, 171.65, 335.9, 60.67, 5866.48), except the rates of carbohydrate and moisture was recorded a low results, it were respectively (66.63 and 4.866) as compared to white flour, which it was recorded a high results in carbohydrate and moisture respectively (75.154 and 11.493). Wheat flour was recorded a low rate of protein, fat, crude fiber, Ash and vitamins (B1, B2, B3, B6, B9, B12, and C) as compared to eggplant peel, which it were respectively (10.314, 2.309, 0.35, 0.38, 0.00, 1.94, 41.03, 5.08, 8.31, 1.34 and 443.03). Also the eggplant peel was recorded a high rate in minerals such as (Mg, P, K, Cu and Mn), it were respectively (230.27, 63.51, 662.71, 3.94 and 20.51) as compared to wheat flour (69.96, 31.07, 264.29, 1.80 and 6.60) and this mean that, with adding eggplant peel to some food products increased both of vitamins and minerals. Also it was obtained from chemical analysis that, eggplant peel was consisted of high levels of rare compounds such as (Total flavonoids, Total phenols, and Total antioxidants), it was respectively (2119.25, 59.66 and 88.19) as compared to wheat flour, and it was recorded low levels in the same of rare compounds (17.12, ND, 21.45). In the end, this mean that, with adding eggplant peel to some foods products increased both of proteins, fats, crude fiber, Ash, vitamins, minerals and rare compounds. These results go parallel with [84, 100, 19] whose said that Vegetables make up a major portion of the diet of humans in many parts of the world and play a significant role in human nutrition, especially as sources of phytonutriceuticals: vitamins (C, A, B1, B6, B9, E), minerals, dietary fiber and phytochemicals [102]. Whose reported that Vegetables as rich sources of vitamins, minerals, and fibers, and also have beneficial antioxidative effects. Also [68] mentioned that Fruits and vegetables are valuable sources of minerals, [78, 32] said that Vegetable and fruit peels have advantages over other herbal extracts, as they are easily identifiable, commonly used by people, rich in various bioactive compounds, and some of their compounds have been characterized in terms of their chemical structures and biological properties through use of structure activity relationship. Additionally, peels are usually considered waste, so they are obviously cost effective, [52] whose reported that, eggplant composition has been recorded as per 100 g of edible portion is Calories 24.0 Kcal, Moisture content 92.7%, Carbohydrates 4.0%, Protein 1.4g, Fat

0.3 g and vitamins 130 g, [65] whose mentioned that the nutrient content of eggplant is not very exciting (per 100 g portion-cooked, boiled, drained). It is low in fat 0.23g and protein 0.83 g but does contain some fiber 2.5g, sugars 3.20g and give energy 35kcal. A search of the scientific literature shows that most interest has centred on the peels of purple eggplant. The skin gets its color from a chemical called Nasunin or more correctly delphinidin-3-(p-coumaroylrutinoside)-5-glucoside. Nasunin has been shown to have both antioxidant and antiangiogenic activities. In the field of cancer research, antiangiogenesis agents were heralded as a new way of preventing cancer cells from growing and spreading by stopping the development of new blood vessels. And [17,101]. Reported that eggplant, *Solanum melongena* L., is a popular vegetable crop grown in the subtropics and tropics. It is called brinjal in India and aubergine in Europe. The name "eggplant" derives from the shape of the fruit of some varieties, which are white and shaped similarly to chicken eggs. Eggplant has chemicals that can cause digestive upset if eaten raw, so is usually cooked. It can be grilled, stuffed, roasted, served in soups and stews and on kebabs, and used in curries and stir-fries. Eggplant is nutritious, being low in calories, fat, sodium and is a nonstarchy fruit that is cooked as a vegetable. It contains a large volume of water. It is good for balancing diets that are heavy in protein and starches. It is high in fiber and provides additional nutrients such as potassium, magnesium, iron, folic acid, vitamin B6 and A.

Chemical Composition of Macronutrients of control sample and supplemented samples of Patton salee with different levels of eggplant peel

Data in table (5) and figure (2). Showed Chemical Composition of Macronutrients (protein, carbohydrate, fat, moisture, crude fiber and ash) of control sample and supplemented samples of Patton salee with different levels of eggplant peel (5%, 10% and 15%). The rate of protein in control sample and supplemented samples with different levels of eggplant peel (5%, 10% and 15%) were respectively (10.527, 10.684, 10.707 and 11.148) respectively, these results were showed increasing in the rate of protein with increasing the level of eggplant peel as compared to control sample. But the rate of carbohydrate in control sample and supplemented samples with different levels of eggplant peel were (79.71, 76.969, 76.889 and 74.773) respectively, these results were showed decreasing in the rate of carbohydrate with increasing the level of eggplant peel as compared to control sample, this is because of the content carbohydrate in eggplant peel was low (66.63) as compared to flour (75.154). The rate of fat in control sample and supplemented samples with the same levels of eggplant peel were respectively (1.892, 2.505 and 2.949) this mean, there is increasing in the rate of fat with increasing the levels of eggplant peel as compared to control sample (0.744), while that, there is decreasing in the rate of moisture with increasing the levels of eggplant peel (7.489, 5.809 and 5.28) as compared to control sample (7.749). Crude fiber was increased with increasing the levels of eggplant peel (1.45, 2.36 and 3.58) as compared to control sample (0.14). And Ash recorded increasing with increasing the levels of eggplant peel (1.52, 1.73 and 2.27) as compared to control sample (1.13). In the end, the rates of protein, fat, crude fiber, and Ash increased with increasing the levels of eggplant peel in supplemented samples with different levels of eggplant peel, and this is because of increasing this nutrients in eggplant peel as compared to flour, but the rate of carbohydrate and moisture showed gradually decreasing in supplemented samples with different levels of eggplant peel as compared to control sample because of decreasing the rate of it in eggplant peel as compared to flour, and the best results were appeared in the supplemented sample of Patton salee with 5% eggplant peel as compared to control sample. These results go parallel with [52] whose reported that, eggplant composition has been recorded as per 100 g of edible portion is Calories 24.0 Kcal, Moisture content 92.7%, Carbohydrates 4.0%, Protein 1.4g, Fat 0.3 g and vitamins 130 g. And [65] whose mentioned that, the nutrient content of eggplant is not very exciting (per 100 g portion-cooked, boiled, drained). It is low in fat 0.23g and protein 0.83 g but does contain some fiber 2.5g, sugars 3.20g and give energy 35kcal. A search of the scientific literature shows that most interest has centred on the peels of purple eggplant. The skin gets its color from a chemical called Nasunin or more correctly delphinidin-3-(p-coumaroylrutinoside)-5-glucoside. Nasunin has been shown to have both antioxidant and antiangiogenic activities. In the field of cancer research, antiangiogenesis agents were heralded as a new way of preventing cancer cells from growing and spreading by stopping the development of new blood vessels.

Chemical composition of vitamins of control sample and supplemented samples of Patton salee with different levels of eggplant peel:

Chemical Composition of Vitamin B complex and vitamin C was showed in table (6) and figure (3). This data revealed that, the mean of values of vitamin B complex and vitamin C increased gradually in supplemented samples with different levels of eggplant peel (5%, 10% and 15%) as compared to control sample. Sample of supplemented Patton salee with (5% 10% and 15%) eggplant peel was showed increasing in vitamin B complex (B1, B2, B3, B6, B9, B12) and vitamin C. For example, supplemented sample with (5%) was recorded gradually increasing in vitamin B complex and vitamin C (13.268, 20.56, 221.62, 26.73, 54.89, 11.79 and 1118.25) as compared to control sample "non supplemented" (12.01, 0.76, 42.29, 19.60, 6.02, 1.38 and 386.59), this is because of, the values of vitamin B complex and vitamin C were high in eggplant peel (62.55) as compared to the value it in flour (0.00), and this mean that, with adding eggplant peel in the samples increase the rates of

vitamins, and the best results in composition of vitamins were obtained in supplemented sample with (15%) eggplant peel because of increasing the rates of vitamins (B complex and vitamin C). In the end, this mean that, with increasing levels of eggplant peel increased the rates of vitamins (B complex and vitamin C) in the samples, These results were in line with the results of [77,28]. Whose said that, dietary supplement is intended to provide nutrients that may otherwise not be consumed in sufficient quantities. Supplements as generally understood include vitamins, minerals, fiber, fatty acids, or amino acids, among other substances. Such data are in agreement with [31] whose reported that, most supplements should be avoided, and usually people should not eat micronutrients except people with clearly shown deficiency, [91]. Mentioned that, eggplant is a good source of vitamins and minerals. And [65]. Mentioned that the nutritional benefit of eggplant varies according to its type. The nutritional composition depends upon the species. The overall shape, size and color are the same. An eggplant being rich in calcium is advised to people deficient in calcium. The composition of minerals is vital for the formation of bones. One of the interesting facts about eggplants is, it contains traces of nicotine. The limit is absolutely safe for body. Due to low calories in eggplants, they are considered healthy for people on a weight loss diet. If you want to absorb the nutrition completely, just eat it raw.

Table 4: Chemical composition of white flour and eggplant peel of (protein, carbohydrate, fat, moisture, crude fiber, ash, vitamins, minerals and rare compound).

Raw materials Nutrient value	White flour extraction (70-72%) (100g)	Eggplant peel (100g)
Protein	10.314	13.984
Carbohydrate	75.154	66.63
Fat	2.309	3.83
Moisture	11.493	4.866
Fiber	0.35	1.58
Ash	0.38	9.11
Vit.B1	0.00	62.55
Vit.B2	1.94	121.27
Vit.B3	41.03	240.33
Vit.B6	5.08	171.65
Vit.B9	8.31	335.9
Vit.B12	1.34	60.67
Vit.C	443.03	5866.48
Mg	69.96	230.27
P	31.07	63.51
K	264.29	662.71
Cu	1.80	3.94
Mn	6.60	20.51
Phenols	17.12	2119.25
Flavonoids	ND	59.66
antioxidants	21.45	88.19

Values are expressed as mean \pm SD. Significant at $p < 0.05$ using one way ANOVA test.

Table 5: Chemical composition of Macronutrients of control sample and supplemented samples of Patton salee with different levels of eggplant peel.

Samples	Control	Supplemented Paton salee with Eggplant peel		
	Paton salee	5%	10%	15%
Macronutrients				
Protein	10.527 \pm 2.00	10.684 \pm 0.110	10.707 \pm 2.00	11.148 \pm 2.00
Carbohydrate	79.71 \pm 3.00	76.969 \pm 3.002	76.889 \pm 2.031	74.773 \pm 3.230
fat	0.744 \pm 0.231	1.892 \pm 0.201	2.505 \pm 1.00	2.949 \pm 1.003
Moisture	7.749 \pm 1.012	7.485 \pm 1.003	5.809 \pm 1.100	5.28 \pm 1.021
Fiber	0.14 \pm 0.121	1.45 \pm 0.102	2.36 \pm 0.511	3.58 \pm 1.302
Ash	1.13 \pm 0.141	1.52 \pm 0.112	1.73 \pm 0.302	2.27 \pm 1.015

--Values are expressed as mean \pm SD.
-Significant at $p < 0.05$ using one way ANOVA test.

Chemical composition of micronutrients "minerals" of control sample and supplemented samples of Patton salee with different levels of eggplant peel:

Mineral composition of Patton salee "control sample" and supplemented samples of Patton salee with different levels of eggplant peels powder (5%, 10% and 15%) given in table (7) and figure (4). It was obtained that, with adding eggplant peel to food products "Patton salee" led to gradually increasing in the values of minerals (P, Mg, Mn, K and Cu). This is because of increasing the rates of these minerals in vegetables peels especially "eggplant peel" as compared to the same minerals in flour, such as the rate of (phosphorus) in eggplant peel was (63.51) while that the rate of the same mineral in flour was (31.07), and this was caused increasing the minerals in supplemented foods products with eggplant peel. The rate of phosphorus was increased gradually with increasing the levels of eggplant peel (75.52, 94.05 and 95.55) as compared to control sample

(69.16), and this is because of increasing the rate of phosphors in eggplant peel more than the rate of it in flour. Also it showed that with increasing the levels of eggplant peel increased minerals in supplemented samples as compared to control samples. These results agreement with [91] mentioned that eggplant is low in calories and high in potassium and so could be used to control diabetes, hypertension and obesity and [65]. Reported that Eggplants being rich in calcium is advised to people deficient in calcium. The composition of minerals is vital for the formation of bones. One of the interesting facts about eggplants is, it contains traces of nicotine. The limit is absolutely safe for body. Due to low calories in eggplants, they are considered healthy for people on a weight loss diet. If you want to absorb the nutrition completely, just eat it raw.

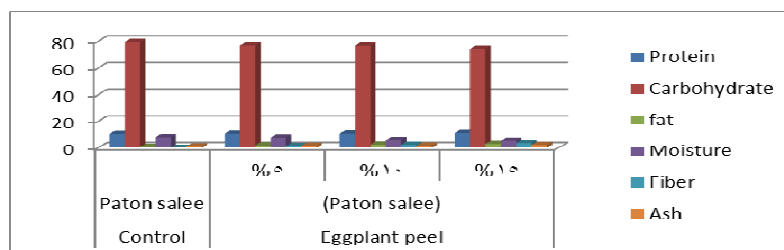


Fig. 2: Chemical composition of Macronutrients of control sample and supplemented Samples of Patton salee with different levels eggplant peel.

Table 6: Chemical composition of vitamins of control sample and supplemented samples of Patton salee with different levels of eggplant peel.

Samples vitamins	Control	Supplemented Patton salee with Eggplant peel		
	Patton salee	5%	10%	15%
Vit.B1	12.01±2.142	13.268±3.100	20.55±3.530	27.54±3.00
Vit.B2	0.76±0.232	20.56±3.310	26.13±3.321	38.38±2.032
Vit.B3	42.29±3.013	221.62±4.251	232.96±4.101	265.47±4.012
Vit.B6	19.60±2.210	26.73±3.612	51.16±3.503	55.50±2.051
Vit.B9	6.02±1.041	54.89±3.00	88.73±3.100	109.07±3.301
Vit.B12	1.38±0.301	11.79±2.150	12.26±2.402	60.67±3.021
Vit.C	386.59±4.00	1118.25±5.021	1650.06±6.120	2500.37±7.061

Values are expressed as mean ±SD.

Significant at $p < 0.05$ using one way ANOVA test.

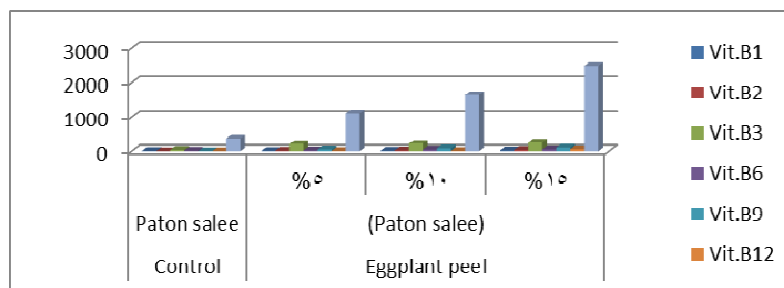


Fig. 3: Chemical composition of vitamins of control sample and supplemented samples of Patton salee with different levels of eggplant peel.

Table 7: Chemical composition of micronutrients "minerals" of control sample and supplemented samples of Patton salee with different levels of eggplant peel.

Samples Micronutrients	Control	Supplemented Patton salee with Eggplant peel		
	Patton salee	5%	10%	15%
P	69.16±3.125	75.52±3.005	94.05±4.651	95.55±3.532
Mg	71.18±3.030	78.55±2.060	98.43±3.042	106.55±3.321
Mn	0.521±0.311	8.50±2.021	14.98±2.010	18.54±2.012
K	280.95±4.005	431.77±3.042	437.38±4.033	537.16±5.116
Cu	2.862±1.003	3.236±1.011	3.60±1.011	3.61±1.011

Values are expressed as mean ±SD.

Significant at $p < 0.05$ using one way ANOVA test.

Chemical composition of rare compound" Total flavonoid, Total phenolic and Total antioxidants "of control sample and supplemented sample of Patton salee with (5%) eggplant peel:

Data presented in table (8) and figure (5). Indicated that, with adding eggplant peel to product of Patton salee increased the all of Total flavonoids, Total phenolic and Total antioxidants respectively (1.916, 71.02 and 54.82) as compared to the control sample (ND, 46.53 and 32.83). In the end, the results were obtained that, Total flavonoids, Total phenolic and total antioxidants were improved with adding eggplant peel to Patton salee, this

is because of increasing this nutrients in eggplant peel respectively (2119.25 , 59.66 and 88.19) more than the content it in flour (17.12 , ND and 21.45). These results go parallel with those of [60], whose said that, Eggplant (*Solanum melongena* L) is an important source of phenolic and flavonoid compounds both of which are powerful antioxidants, [43, 74] whose reported that, Nasunin is a major component of anthocyanin pigment of eggplant, was isolated from the eggplant peels, and its antioxidant activity was evaluated . [62]. Mentioned that, anthocyanins of eggplant peels were extracted. The level of anthocyanin was 158.00ppm. And tertiary butylhydroquinone (TBHQ) at 200ppm were investigated by 1, 1-diphenyl-2-picrylhydrozyl (DPPH) free radical scavenging and reducing power assay. Also [92]. Indicated to information concerning the antioxidant activity and phytochemical composition of eggplant according to parts except peel and pulp is unavailable. In this study, the antioxidant activity and phenolic contents of five different parts (calyx, leaf, peel, pulp, and stem) of eggplant extracted by two different solvents (70% ethanol and water) were evaluated. And [5]. Determined the antioxidant activity of Anthocyanin from of eggplant peels and to indicate which of them can become a new source of natural antioxidant for food, nutraceutical and pharmaceutical industries. Therefore, in the present study, peels of eggplant (*Solanum melongena*) were screened for their in vitro antioxidant activity. Also, evaluate the possible beneficial effect of antioxidant on hyperlipidemia using an experimental model induced by high fat diet. Also [30]. Said that Among dietary antioxidants, phenolics are considered to be key health promoting compounds with several biological effects including antibacterial, anti-inflammatory, antiallergic, hepatoprotective, antithrombotic, antiviral, anticarcinogenic and vasodilatory actions.

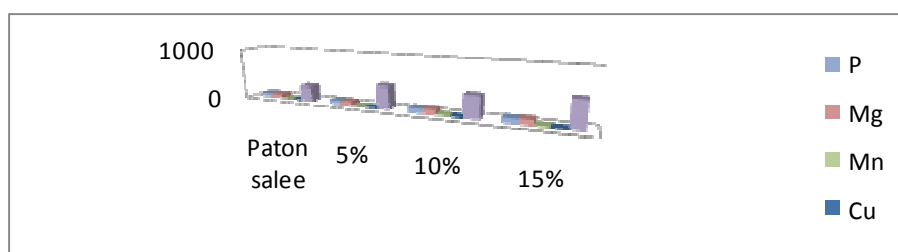


Fig. 4: Chemical composition of micronutrients "minerals "of control sample and supplemented samples of Patton salee with different levels of eggplant peel.

Table 9: Chemical composition of rare compound" Total flavonoid, Total phenolic and Total antioxidants "of control sample and supplemented sample of Patton salee with (5%) eggplant peel".

Samples	Patton salee (Control)	supplemented Patton salee with 5% Eggplant peel
Rare components		
Total flavonoids	ND	1.916±0.5
Total phenolic	46.53±3.065	71.02±3.541
Total antioxidants	32.83±1.113	54.82±2.023

Values are expressed as mean ±SD.

Significant at $p < 0.05$ using one way ANOVA test.

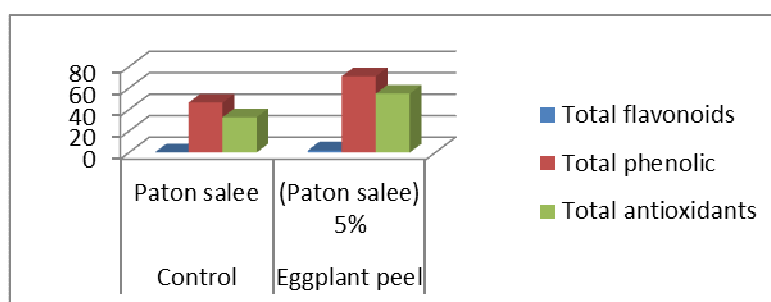


Fig. 5: Chemical composition of control and supplemented sample of Patton salee with eggplant peel of rare compound" Total flavonoid, Total phenolic and Total antioxidants".

Storage properties of Vitamin B complex and vitamin C of control sample and supplemented sample of Patton salee with (5%) eggplant peel stored for (0 day and 20 days):

The results of Storage properties of Vitamin B complex (B1, B2, B3, B6, B9 and B12) and vitamin C of control samples (stored for 0 day and 20 days) are outlined in table (9) and figure (6). The data indicates that, The values of vitamin B complex (B1, B2, B3, B6, B9 and B12) and vitamin C showed a significant increasing in Storage properties in control sample (stored group for 0 day) as compared to control sample (stored group for 20 days), it were respectively (11.60 , 2.13 , 135.62 , 26.53 , 12.51, 2.48 and 618.83) and (10.09 , 0.76 , 42.29 , 19.60 , 6.02 , 1.38 and 386.59), also the results of Storage properties in the same vitamins of supplemented

samples with 5% eggplant peel (stored for 0 day) were showed significant increase as compared to the same supplemented samples (stored for 20 days) , it were respectively (13.268 , 25.19 , 221.62 , 26.73 , 54.89 , 11.79 , 1415.79) and (12.01 , 20.56 , 152.85 , 26.64 , 28.48 , 5.81 and 1118.25) . The rate of vitamin C was higher in the all of groups as compared to vitamin B complex. In the end, data in table (9). was improved of storage properties of vitamins (B complex and vitamin C) in supplemented sample with (5%) eggplant peel and stored for (0 day) as compared to supplemented sample with the same level of eggplant peel and stored for (20 day), because of the stored group for (20 days) was left outside (At room temperature) for (20 days) before Conservation and this affected on vitamins and induced changing in vitamins, but the stored group for (0 day) preserve fresh in freeze .

Table 9: Storage properties of Vitamin B complex and vitamin C of control sample and supplemented sample of Patton salee with (5%) eggplant peel for (0 day and 20 days).

Samples Vitamins	Control sample stored for "0"days	Control sample stored for "20"days	Supplemented Paton salee with Eggplant peel	Supplemented Paton salee with Eggplant peel
	Paton salee	Paton salee	5% stored for "0"day	5% stored for "20"days
Vit. B1	11.60±2.120	10.09±2.031	13.268±3.100	12.01±2.142
Vit. B2	2.13±1.100	0.76±0.243	25.19±2.221	20.56±3.310
Vit. B3	135.62±3.054	42.29±3.013	221.62±4.251	152.85±3.331
Vit. B6	26.53±2.320	19.60±2.210	26.73±3.612	26.64±2.102
Vit. B9	12.51±2.110	6.02±1.041	54.89±3.00	28.48±3.501
Vit. B12	2.48±1.010	1.38±0.301	11.79±2.150	5.81±2.110
Vit. C	618.83±4.056	386.59±4.00	1415.79±6.564	1118.25±5.021

Values are expressed as mean ±SD.

Significant at p<0.05 using one way ANOVA test.

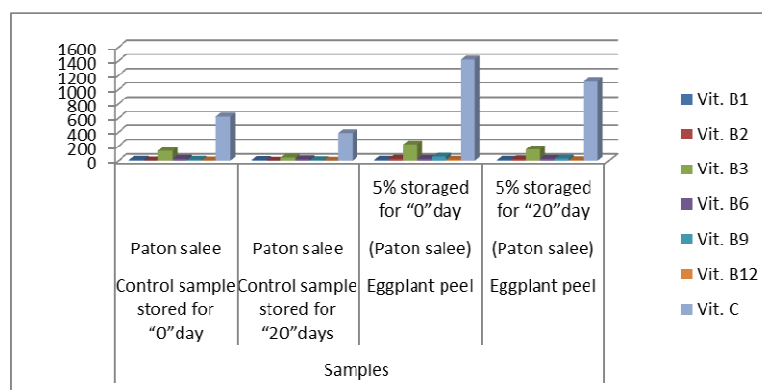


Fig. 6: Storage properties of Vitamins (B1, B2, B3, B6, B9 and B12) of control sample and supplemented sample of Patton salee with (5%) eggplant peel for (0 day and 20 days).

Storage properties of micronutrients "minerals "of control and supplemented samples of Patton salee with different levels of eggplant peel.

Data presented in table (10) and figure (7). Revealed that, there is improvement in storage properties of minerals with adding eggplant peel to food products "Patton salee" as compared to control sample "non supplemented". Such as the rate of mineral (Mg) in control sample (stored for 0 day and 20 days) was respectively (78.17 and 71.18), and the rate of same mineral in supplemented samples with (5%, 10% and 15%) were respectively (81.81 , 93.20 and 96.93) and this showed that, there are improvement in the rats of minerals with adding eggplant peel. This is because of the rates of all minerals in eggplant peel was high as compared to the rate of it in flour. And this led to Preservation and stability of minerals in food products (Patton salee). These results go parallel with [65]. Whose reported that Eggplants being rich in calcium is advised to people deficient in calcium. The composition of minerals is vital for the formation of bones. One of the interesting facts about eggplants is contains traces of nicotine. The limit is absolutely safe for body. Due to low calories in eggplants, they are considered healthy for people on a weight loss diet. If you want to absorb the nutrition completely, just eat it raw. And [71]. Investigated nutritional content of pies fortified with potato and eggplant peels and mentioned that levels of Fe, Mn, Cu, Ca, Mg, Na, K and P was higher in blends than control. Also, there was a slight variation in mineral content between blend samples.

Storage properties of rare compound (Total flavonoids, Total phenolic and total antioxidants) of control and supplemented sample of Patton salee with (5%) eggplant peel.

Data in table (11) and figure (8). Showed storage properties of rare compound (Total flavonoids, Total phenolic and total antioxidants) of control sample (stored for 0 day and 20 days) and supplemented sample of Patton salee with (5%) eggplant peel (stored for 0 day and 20 days). The mean of values of all Total flavonoids, Total phenolic and Total antioxidants were increased gradually in the storage properties for (0 day) with adding

eggplant peel as compared to supplemented sample with (5%) eggplant peel and stored for (20 days), the mean values of total flavonoids in control sample (stored for 0 day and 20 days) were respectively (ND and ND) and supplemented samples with (5% stored for 0 day and 20 days) were respectively (3.01 and 1.916), Total phenolic in the same of samples were (71.02 , 46.53 , 182.86 and 102.04) and Total antioxidants were respectively (40.18 , 32.83 , 74.57 and 54.82). In the end the two supplemented groups with 5% eggplant peel and stored for (0 day and 20 days) were obtained improvement in the results of rare compound as compared to control sample (stored for 0 day and 20 days), and the best results in storage properties showed in the supplemented sample with (5%) eggplant peel and stored for (0 day) as compared to supplemented sample with (5%) eggplant peel and stored for (20 days), this is because of the supplemented sample with (5%) eggplant peel and stored for (0 day) was preserved fresh in the freezer , but the supplemented sample with (5%) eggplant peel and stored for (20 day) was left with outside for 20 days (At room temperature) before preservation in freezer and this led to lost the amount of rare compound. On the other hand, the rates of rare compound in eggplant peel was high as compared to flour and this led to Keeping and stability of rare compounds. These results agreement with [92]. Whose indicated to information concerning the antioxidant activity and phytochemical composition of eggplant according to parts except peel and pulp is unavailable. In this study, the antioxidant activity and phenolic contents of five different parts (calyx, leaf, peel, pulp, and stem) of eggplant extracted by two different solvents (70% ethanol and water) were evaluated. And [5]. Determined the antioxidant activity of Anthocyanin from of eggplant peels and to indicate which of them can become a new source of natural antioxidant for food, nutraceutical and pharmaceutical industries. Therefore, in the present study, peels of eggplant (*Solanum melongena*) were screened for their in vitro antioxidant activity. Also, evaluate the possible beneficial effect of antioxidant on hyperlipidemia using an experimental model induced by high fat diet.

Table 10: Storage properties of micronutrients "minerals "of control sample and supplemented samples of Patton salee with different levels of eggplant peel.

Samples	Control sample stored for "0" days	Control sample stored for "20" days	Supplemented Paton salee with Eggplant peel		
	Paton salee	Paton salee	5%	10%	15%
P	69.16±3.125	68.64±3.611	86.41±3.540	89.13±3.630	104.73±4.451
Mg	78.17±3.602	71.18±3.030	81.81 ±3.001	93.20±3.501	96.93±4.110
Mn	8.78±2.124	0.521±0.311	10.47±2.300	13.10±2.350	16.02±2.060
K	280.95±4.005	254.28±4.465	473.62±4.030	610.12±4.650	634.46±5.455
Cu	2.80±0.712	2.79±1.061	2.862±1.003	3.26±1.371	3.27±1.110

Values are expressed as mean ±SD.

Significant at $p < 0.05$ using one way ANOVA test.

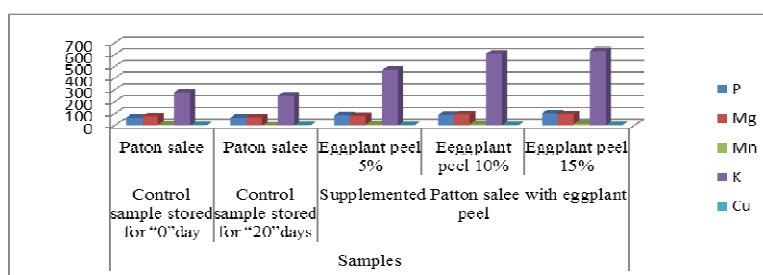


Fig. 7: Storage properties of micronutrients "minerals "of control sample and supplemented Samples of Patton salee with different levels of eggplant peel.

Generally, supplemented with eggplant peel was led to an improvement in the sensory evaluation, chemical composition of ash, crude fiber, vitamins and mineral and rare compound. From the obtained data, it could be recommended that using the lower levels of eggplant peel (5%) in food products to give the best results of sensory evaluation. And my results agreement with the results of [71]. Whose reported that, both of potato and eggplant peels are considered as two among newer sources of good protein, fiber, moisture and minerals on account of their important roles in human nutrition and health,

Conclusion:

On the basis of the above mentioned data, the after education measure were appeared improvement more than the results of the before education measure, and also the results of sensory evaluation were obtained that, supplemented Patton salee with different levels of eggplant peel was better than supplemented bread with the same levels of eggplant peel , and the best results in sensory evaluation showed in supplement Patton salee with

low level of eggplant peel (5%) more than supplement bread with the same level of eggplant peel. Supplemented Patton Salee with different levels of eggplant peel (5%, 10% and 15%) was recorded significant increasing in both proteins, fats, crude fiber, ash, vitamin B complex(B1, B2, B3, B6, B9 and B12) , vitamin C and minerals(P , Mg, Mn, K and Cu) also rare compounds such as (Total flavonoids, Total Phenol and Total antioxidants). But it was recorded significant decreasing in carbohydrates and moisture, this means that, eggplant peels are considered as a good sources of protein, crude fiber, ash, vitamins and minerals and phytochemicals on account of their important roles in human nutrition and health ,therefore, eggplant peels could be used to raise nutrient value in some food products. The results of storage properties for vitamins, minerals and rare compounds were explained improvement of supplemented sample with (5%) eggplant peel (stored for 0 day) better than control sample and supplemented sample with the same level of eggplant peel (stored for 20 day).

Table 11: Storage properties of rare compound (Total flavonoids, Total phenolic and total antioxidants) of control and supplemented sample of Patton salee with (5%) eggplant peel for (0 day and 20 days).

Samples	Control sample stored for "0"days	Control sample stored for "20"days	Eggplant peel (Paton salee) 5% stored for "0"day	Eggplant peel (Paton salee) 5% stored for "20"days
	Paton salee	Paton salee		
rare component				
Total flavonoids (mg/gm)	ND	ND	3.01±1.102	1.916±0.5
Total phenolic (mg/100gm)	71.02±3.541	46.53±3.065	182.86±4.673	102.04±3.701
Total antioxidants (%)	40.18±2.151	32.83±1.113	74.57±3.520	54.82±2.023

Values are expressed as mean ±SD.

Significant at $p < 0.05$ using one way ANOVA test.

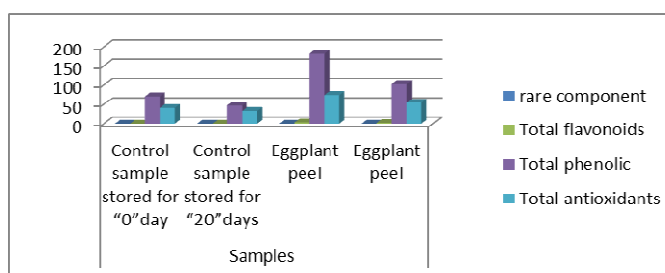


Fig. 8: Storage properties of rare component (Total flavonoids, Total phenolic and total antioxidants) of control sample and supplemented sample of Patton salee with (5%) eggplant peel.

Recommendations:

According to the obtained results, it could be recommended that:

- 1-Nutrition education programme should be encouraged to inform the public about health benefits of vegetables peels especially eggplant peel.
- 2-encourage people to eat vegetables with peel, especially eggplant peel and eat it Grilled or boiled to keep on available nutritional value in peel, because Frying causes lost nutrients in peel.
- 3- Can be improved supplemented bread taste with high levels of eggplant peel by using some stuffing such as cheese, or Jam.
- 4-Using drying vegetables peels such as eggplant peel to increase period preserving of foods.
- 5-Eating vegetables with peels because of it high in the content of vitamins, mineral and rare compounds.
- 6- Can be increasing the nutritional value of some foods by supplemented with dried vegetable peels.
- 7-Can be eat vegetables peels after drying it, grinding and using it in some bread and bakery products such as (bread, Patton salee, pizza and pies).

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