



## Study the chemical and sensory properties for some types of pastries fortified with sweet lupine powder

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### Abstract

The study aimed to raise the nutritional value of some manufactured products by adding sweet lupine seeds powder with wheat and replacement rates reaching ( 4.5 , 8.5 , 12.5 % ) The results have been showed that the chemical composition was studied The protein content in bread manufacture increased with increase of concentrations of sweet lupine powder, As it reached highest amount when concentration 12.5 % with value reached 16.43 % while fat also recorded a noticeable increase as replacement rates increased . As for the value of the ash, it ranged between 1.92-3.89 % while the fibers didn't register a significant difference in their content with increasing percentages. While the value of carbohydrates decreased as the percentage of replacement increased, and this decrease was more severe at concentration 12.5 % . It was also noted that there is in the content of protein, ash and fiber when adding sweet lupine powder with different concentration. The evaluation of the sensory properties shoed an improvement in color, shape and smell at concentration 4.5 and 8.5 % compared to the standard sample, while the sensory evaluation of freshness showed adiscrepancy in the values between the concentrations . The highest value of freachness was recorded when concentrating 8.5%. This indicates that the best concentration used is approximately 8.5 % from sweet lupine powder.

**Keywords:** Lupine seeds, Digestion efficiency, Protein concentrate.

### Introduction

Problem of food in the world has arisen because of the economic changes that have taken place in recent years and the emergence of many diseases that affect the animals of protein production of sheep, cattle and chickens. World health organizations have called for integrated health food, especially food that provides protein from non-traditional sources (Bugis, 2009). Therefore, we find the urgent need to use agricultural crops containing vegetable protein and improve the work of studies and research on the suitability as a healthy food integrated by strengthening food products (Al-Bitar & Hussain, 1999 ). In order to reach a food product containing high-value protein and requires that the material used in the consolidation is easy to absorb and benefit from the body, and must be constant during the stages of preparation, packaging, storage and circulation. It is also required that the substance does not cause undesirable changes Where by the consumer. One of the agricultural crops used to strengthen many food products was the consolidation of the lupines seed powder, which gave a positive and active role in some food products in terms of increasing the protein content and

increasing the protein digestion rate (Al-Khafaji, 2007). Lupines of the annual herbs belonging to the legume, and used boiled and boiled as food, and leaves were used as animal feed there are two types of lupines: white lupines, It is a sweet lupines, scientifically known as *Lupinus albus*, and the smaller lupines, the bitter lupine, scientifically known as *Lupinus luteus*, which is similar to bitter and sweet lupines in terms of the proportion of fiber and essential nutrients such as carbohydrates, proteins, However, bitter lupine loses some nutrients, minerals and antioxidants during the soaking period (Al-Jadaili and Hamida, 2003). The benefits of lupines enhance the immune system, protect cells from damage, promote bone density, protect against constipation and nervous colon, and promote the growth of beneficial bacteria in the intestines; it also promotes the metabolism of fats, proteins and carbohydrates. Eating the lupines as a snack, especially in the first three months, provides the body with enough folic acid to protect the fetus from neural tube defects, lowering blood sugar and cholesterol levels. It protects against atherosclerosis, heart disease, strokes, and helps the body adjust blood pressure. Lupine settle is used as an enema to

eliminate the abdominal worms. Treatment of incontinence. Strengthens and strengthens nerve function. Protects against large bowel cancer, Lupine settle is used to treat scabies, eczema, and dermatitis. The lupines fat treats the eczema of the intractable ( Erbas etal, 2005 ; A.O.A.C , 2008 ).

### Materials and Methods

This study was carried out at college of agriculture, Dept of food Sciences, Tikrit university, where the following materials were used in the implementation of research.

**Sweet lupine flour:** Sweet lupine beans were obtained from local market of salah al-din governorate, , the grains were ground using an electric grinder to obtain sweet lupine flour into a fine powder.

#### Search Methods:

##### 1- Prepare Iraqi bread :

Iraqi bread was prepared, and the ingredients added were as follows, according to the method mentioned by ( Hayman, etal,1998) as follows :

- Add wheat flour 100% with an extraction rate 72%, yeast 5.9%, Sugar 1.6 %, batter 1gm, Salt 1.2%.
- Mix these ingredients together well until ingredients became homogenized and form a cohesive dough.
- Left dough of la;f an hour to rest, then form and bake the bread at 230°C.

Iraqi bread was made using wheat flour with sweet lupine flour and in ( 4.5%, 8.5% and 12.5 % ) .

##### 2- Prepare Burger ( as a product ) :

Prepare burger using the following ingredients :

Minced chicken meat 83%, Salt 10%, Garlic 1.5%, black pepper 0.100, Rusk 4%, 6 Starch 0.3 , Water 11-13 .

These dry ingredients were mixed with each other and adding an amount of water for the purpose of the consistency of the burger dough. Then Dough was cooled in refrigerator for half an hour, then it

was cut and eaten into circular pieces according to the method described by ( aleson etal, 2005 ).

#### Chemical Tests:

##### 1- Protein determination :

Determine protein using childahil device according to A.O.A.C, 2008 .

##### 2- Fat determination:

Determination of fats using soxhlete, using an organic solvent petroleum ether.

##### 3- Ash determination:

Determine of ash according to method contained in A.O.A.C, 2008.

##### 4- Carbohydrates determination:

Determination was by summing proportion of all ingredients ( protein, fat, ash, fiber – 100 ).

**Sensory Test:** Sensory test were conducted by a group of 15 people to determine Color, taste, flavor, consistency and general acceptance according to the method mentioned Larmond,(1997). A scale from 1 to 9 was used to express the desire to prefer the taste sample.

### Results and Discussion

Table 1 show chemical properties of sweet lupine seeds and its products in moisture, protein, fat, ash, and carbohydrates. The content of the lupine seeds (the original sample and then the fat was recorded as humidity (12.64%, 11.42%, 9.3%). Differences were observed in the protein content of the lupinese seed powder and its products (protein concentrate and fat soluble). The highest was recorded in the protein isolates (46.05%) while the lowest fat was recorded. The fat content in the lupines seed powder (the original sample) recorded the highest value of both the protein concentrate and the lipid fraction (3.10%, 0.80%). The protein concentrates also gave the highest value in the ash content (2.13%) from the lupines seed powder for the original sample and the fat extract. The study also confirmed that the proportion of carbohydrates in the fat-free was the highest compared to the concentrate of the original protein sample, as the value in the loose (3.57%) and this is consistent with what he said ( Gaultier & Pageat ,2003).

**Table (1) Chemical properties of sweet lupine seeds and its products.**

Sample	Humidity%	Protein%	Fat%	Ash %	Carbohydrates
The original lupine seeds powder	11.42	33.37	3.10	1.54	50 57
Protein concentrate	12.64	46.05	2.9	2.13	36.28

Table (2) show the effect of adding the lupinese seed powder as an alternative to wheat grain flour with different extraction rates (4.5, 8.5, 12.5%) on

chemical properties of kerosene. From the results shown, we conclude the following:

The results showed an increase in percentage of protein by adding seeds of lupines seeds. Highest value was recorded when adding powder of these seeds by 12.5% as it was 16.48% compared to the standard sample 12.22% followed by the treatment by 8.5% and 4.5%. It was also noticed that there was no difference between standard baking bread and the Kaiser bread treated with different treatments in fat ratio in kerosene bread, which is supported by lupines seeds powder by 8.5% compared to the standard sample and other treatments. It was also found that there was an increase in ash percentage by increasing the addition of thyme seed powder. Highest was the addition of thyme seeds powder by 12.5%, where it was (3.89%) compared to the

standard sample and other factors which were (2.81% and 3.25% 8.5%). It was also noticed that percentage of fiber was increased by adding the lupines seed powder. Highest value was recorded when adding the powder of these seeds by (12.5% to 2.95%) compared to the standard sample of 2.26% followed by the treatment by (8.5% and 4.5%). The results also showed significant differences in carbohydrate content, Carbohydrate decrease with addition of sweet lupine because of it high percentage of protein and fiber as shown in its chemical composition . A decrease in carbohydrate content was observed with the addition of lupines powder, the highest being 4.5% (72.83%) compared to the standard sample.

**Table (2) The addition of sweet lupine seed powder has been influenced by the chemical properties of the baker's bread in different proportions.**

Samples	Protein	Fat	Ash	Fibers	Carbohydrate
Control sample	12.22	2.38	1.92	2.26	81.22
4.5%	13.96	3.43	2.81	2.36	77.44
8.5%	15.3	3.53	3.25	2.77	75.15
12.5%	16.43	3.95	3.89	2.95	72.78

Table (3) showed effect of addition of protein status as an alternative to animal protein at different rates (4.5, 8.5, 12.5%) on the chemical properties of the Barker, the results indicate the following: A slight increase in percentage of protein was observed in addition of (12.5%), which was (25.57%) compared with the standard sample (23.63%). (27.69%) compared with the standard sample (28.57%) followed by the percentages (8.5% and 12.5%), respectively (27.94% and 26.19%) respectively. Percentage of ash was increased by addition of the protein status of the lupines seed powder. Highest

percentage was the addition of the protein concentrate (12.5%) to (3.98%) compared to the standard sample (3.24%) and other treatments of 4.5% and 8.5%. As well as an increase in proportion of ash by increasing the proportion of lupine seeds as it reached (4.14%) when adding (12.5%) of lupine seeds. In terms of carbohydrate content, a decrease in its content was observed, with an increase in the addition of the protein concentrate of the lupines powder, which was less than the supported Barker sample (12.5%), reaching (39.02%) compared to the standard sample.

**Table (3) Effect of the addition of protein concentrates as an alternative to animal protein for Barker at different rates**

Control sample	Protein%	Fat%	Ash%	Fibers%	Carbohydrate%
	23.69	28.57	3.24	3.54	40.96
4.5%	24.63	27.69	3.56	3.87	40.25
8.5%	25.45	27.04	3.73	4.05	39.53
12.5%	25.67	26.19	3.98	4.14	39.02

**Sensory Evaluation of Lupine Seed Powder:** Table (4) shows Sensory evaluation of casserole bread treated with lupines seed powder as an alternative to wheat flour with extraction rate (70%) and with different percentages (4.5, 8.5, 12.5%). The results

showed high differences in sensory characteristics of the bread produced in terms of overall shape compared to the bread Standard. Results showed that there were slight difference in taste between samples treated with lupines seed powder and

standard samples. Highest percentage of sweet lupines seed powder was recorded by 4.5% (9.20%) followed by 8.5% (12.5%). As for the color, it is noticed that the addition of the standard lupines seed powder was given as a result of an approach to the comparison sample of 4.5%. In terms of smell, there was no difference between the standard sample and the samples with the proportions (4.5, 8.5, 12.5%) respectively in terms

of the degree of frost and found simple differences between the laboratory samples and the standard sample. From the above, we conclude that the addition of 4.5% -12.5% lupines seed powder has improved sensory characteristics of the keystone bread. Thus, the sweet lupines seed powder can be used to strengthen the baked goods ( A.O.A.C,2008 ; Larmond, E.(1997)

**Table (4) Sensory evaluation of casserole bread treated with lupine seed powder.**

Sample	Shape	Taste	Color	Smell	Mellowness
Control sample	9.51	9.48	8.66	8.53	9.2
Bread subsidized by 4.5%	9.33	9.2	9.33	8.76	8.89
Bread subsidized by 8.5%	9.8	8.89	9.6	8.63	9.53
Bread subsidized by 12.5%	8.83	8.1	8.12	8.86	8.33

**Sensory Evaluation Supported by Protein Concentrate:** Table (5) shows sensory evaluation of supported larvae in the regular concentrate of lupines as an alternative to animal protein by (4.5, 8.5, 12.5%). There were differences in the general form between the different treatments and the standard sample. The addition of the protein concentrates of lupines powder as an alternative to animal protein, 4.5% recorded a closer to the standard sample compared to other transactions (8.5, 12.5%). As for the taste, we find that there are differences between different treatments and standard sample, we find that the addition of the regular concentrate of lupines as an alternative to animal protein by (4%) has given the closest to the standard sample compared to other treatments. The

study showed that there were slight differences in color between the standard sample and the different treatments. It was found that the addition of regular concentrate of lupines as an alternative to animal protein by (8.5%) was the closest to the standard sample. In terms of smell, the value of the protein status of lupines as an alternative to animal protein (12.5%) was lower when compared to the standard sample. In terms of puffiness, there was no significant antidote between the standard sample and the various treatments in the lupine setting concentrate as an alternative to animal protein and the proportions (4.5, 8.5, 12.5%). As for the degree of palatability, the percentage (4.5%) was the highest among the transactions when compared with the standard sample.

**Table (5): Sensory evaluation of bread loaf supported by the sweet lupines powder:**

Sample	General Shape	Taste	Color	Smell	Degree of maturity	Palatability
Control	9.80	9.70	9.22	9.73	9.15	9.00
4.5%	9.53	9.35	8.35	9.50	9.27	9.13
8.5%	9.20	8.89	9.96	9.12	9.01	8.85
12.5%	9.00	8.80	9.90	8.97	9.10	8.50

## References

- A.O.A.C. (2008): Official Methods of Analysis 16th ed. Association of Official Analytical Chemists International Arlington, Virginia, U.S.A.
- Al-Bitar, Khamis Ali Hussein (1999): Al-Hakim, the family doctor for food and plant medication, Al-Safadi Press, Amman, Jordan.
- Al-Khafaji, Kamel Muhammad. (2007). The effect of planting distances between plants and their dates on growth and yield of lupine. Field Crop Science Department / College of Agriculture - University of Baghdad.
- Al-Jadaili, Afaf Abdel-Rahman: Hana, Mohamed Hamida (2003): additives to the song's pros and cons, The Arab Nile Group, first edition, Cairo,

- Arab Republic of Egypt. Mashayekh, M.; Mahmood, M. and Entezari, M. (2008) Effect of Fortification of defatted soy flour on sensory and rheological properties of wheat bread. *International J. of Food Sci. and Tech.*, 43:1693-1698.
- Aleson-Carbonell, Ll. Fernandez-lopez J.A. perez-Alvarez and V. Kuri(2005). Characterization of beef burger as influenced by various types of lemon albedo. *Innovative food science and energy technologies*, 6:247-255.
- Bugis, Batoul Abdel Rahman Hussein (2009). Fortify some food products with a sweet lupine. Master Thesis . College of Home Education and Nutrition - Umm AlQura University.
- Erbas M., Certel M., Uslu M.K. (2005): Some chemical properties of white lupin seeds (*Lupinus albus L.*). *Food Chemistry*, 89: 341–345.
- Gaultier E., Pageat P. (2003). Effects of a synthetic dog appeasing pheromone (DAP) on behavior problems during transport. In Seksel K., Perry G., Mills D. ed. *Proceedings of the 4th International Behavior Meeting*. Caloundra, Australia, Posta .
- Hayman, D.A, Hoseny, R.C. & Fambion, J.M. (1998). Bread crumb grain development during cereal chemistry. 75, 577-580.
- Larmond, E. (1997). Laboratory methods for sensory evaluation of food publication no; 1637 canda department of agriculture Ottawa. Pp:1637-1662.