



HUMMUS CONSUMPTION PREFERENCES AMONG DIETETICS STUDENTS

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Abstract

Dry legumes constitute the ninth of twelve main food groups in human diet. They are a valuable source of proteins, dietary fiber, and minerals needed for the proper functioning of the body. The average protein content in legume seeds ranges from 20% to 35%. In recent years, due to the growing trend for plant-based diets, chickpeas have gained popularity, especially in the form of Middle Eastern hummus. 51.7% (N = 31) of respondents in the study were first-year graduate students of dietetics, and the majority of respondents (78.3%; N = 47) admitted they ate hummus. When asked about reasons for hummus consumption, the respondents' most frequent answer was "It's tasty" (66.7%; N = 40). With regard to taste the most frequently consumed type of hummus was natural hummus, selected by 38.2% (N = 23) of respondents. 81.7% (N = 49) of respondents believed that hummus is an important source of protein when following a vegetarian diet. Finally, the respondents evaluated the best and the worst hummus brands by considering such sensory characteristics as color, texture, smell, and taste. The vast majority of surveyed dietetics students included hummus in their diet, and most of them chose hummus because of its taste.

Key words: hummus, nutritional value, taste preferences

Introduction

Proper nutrition is one of foundations of a healthy lifestyle. To bring about the desired health effects a good diet must be balanced in terms of nutrients, vitamins, minerals, and consist of a variety of food products. It is a good idea to include foods from all twelve food groups in a balanced diet. The ninth group comprises dry legume seeds, which include peas, beans, soybeans, lentils, chickpeas, and broad beans. Dry legumes are not only a valuable source of protein - the biological value of which can be compared to protein of animal origin - but also dietary fiber, calcium, phosphorus, iron, magnesium, and B vitamins [1, 2]. Legumes are believed to be an essential part of plant-based diets. The protein content in legume seeds ranges from 20% to 35% [3]. In accordance with the recommendations of the National Center for Nutritional Education and

the National Institute of Public Health in the form of a Healthy Nutrition Plate, legumes are included in the same group as high-protein animal products such as meat, eggs, fish, and dairy products, making up a quarter of the plate's volume [4]. However, due to a lower content of amino acid methionine and a higher amount of tryptophan or lysine, which are often missing in other plant products, legumes should not be consumed alone. A properly balanced plant diet should combine pods with ingredients such as cereals or nuts [5]. Legumes are essential not only in a plant-based diet, but also in a standard meat diet, due to the large number of their health-promoting properties, e.g. their proven enhancement of treatment of obesity - a growing global problem leading to other, coexisting, chronic diseases such as type II diabetes, cancer, atherosclerosis, or arterial

hypertension [6]. Part of obesity treatment is a properly balanced reduction diet, in which it is recommended to include about 130 g of legumes per day. In the case of type II diabetes, the use of legumes in the diet ensures not only a product with a low glycemic index (IG < 55) safe for diabetics, but also a reduction in postprandial blood glucose levels due to the high content of dietary fiber in these plants [3]. In recent years, due to the increasing popularity of plant-based diets, chickpeas have gained popularity, especially in the form of Middle Eastern hummus [7]. Traditional hummus consists of cooked, mashed chickpea seeds with tahini sesame paste, lemon juice, olive oil, and spices. It is usually served with bread, vegetable stalks, or falafels [5].

Aim

The aim of this study was to assess selected classic hummus brands in terms of their sensory characteristics such as color, smell, taste, and consistency as well as consumption frequency and knowledge about hummus among students of dietetics.

Materials and methods

A survey of preferences of hummus consumption was carried out in April 2022 among 60 students of dietetics, using a proprietary questionnaire and sensory evaluation of hummus. The questionnaire contained a personal data record; questions about food preferences, habits, and frequency of humus consumption; and questions about the knowledge of hummus. The second part of

the study comprised a sensory evaluation of five coded classic hummus brands purchased from different store chains:

- 505 - "Vemondo" classic hummus (Lidl);
- 405 - "Chef Select" bio hummus (Lidl);
- 305 - "Take it Veggie" hummus (Kaufland);
- 205 - "Perla" hummus (Aldi);
- 105 - "Go Vege" hummus (Biedronka).

The sensory test was carried out in a specialized laboratory of the Department of Dietetics of the Medical University of Silesia in Katowice in accordance with the requirements of the PN-ISO 8589 standard "General guidelines for designing a sensory analysis laboratory." The results were analyzed using an MS Office Excel spreadsheet.

Results

60 respondents took part in the survey: 96.7% (N = 58) were women, and 3.3% (N = 2) were men. 51.7% (N = 31) of respondents were first-year graduate students of dietetics, the remaining 48.3% (N = 29) were first-year undergraduate students. Most respondents (78.3%; N = 47) ate hummus.

The analysis of hummus consumption frequency in consideration of respondents' sex, showed that most respondents (28.3%; N = 17) ate hummus "Several times a month". The least selected consumption frequency options were "Once a week" indicated by 3.3% (N = 2) of study participants, and "Once a day" chosen by 1.7% (N = 1) (Fig. 1).

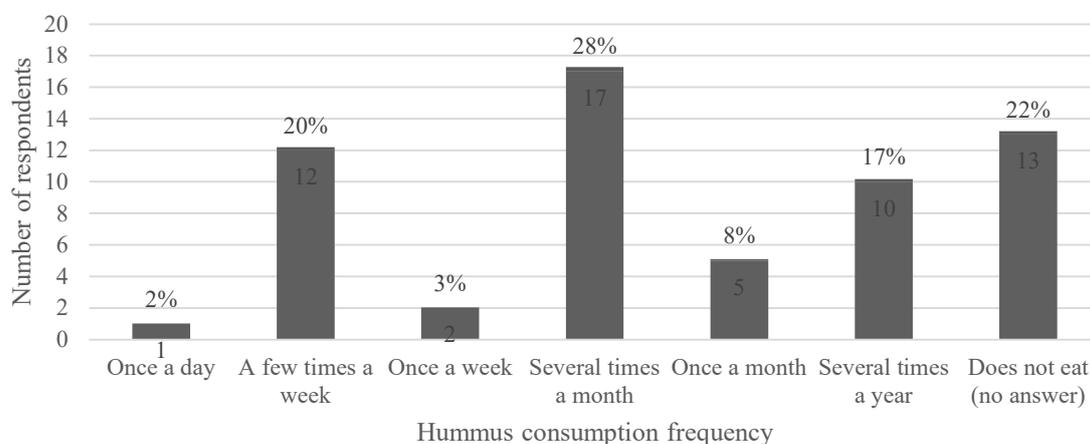


Figure 1. Frequency of hummus consumption by students participating in the survey (N = 60; 100%)

The respondents were then asked to indicate the most important characteristic of hummus for their choices. The most frequent answer was "Taste and smell", indicated by 35.0% (N = 21) of the respondents; composition was chosen by 18.3% (N = 11); and price by 15.0% (N = 9). Hummus brand was indicated only by 8.3% (N = 5), and packaging by 1.7% (N = 1) of surveyed students. 21.7% (N = 13) of respondents did not indicate any answer since they did not consume hummus (Fig. 2). Another issue raised in the survey was the reason for hummus consumption. It was a

multiple-answer question. The most frequently chosen answer was "It's tasty" indicated by 66.7% (N = 40) of students. 6.7% (N = 4) chose the answer "I don't know why I eat hummus", and 1 respondent (1.7%) chose the answer "Other" (Tab. 1). The most frequently consumed type of hummus with regard to its taste was natural hummus, selected by 38.2% (N = 23) of the respondents, while the least popular was olive hummus, preferred by 1.7% (N = 1) of the respondents. None of the respondents chose natural bio hummus as the most frequently consumed variety (Fig. 3).

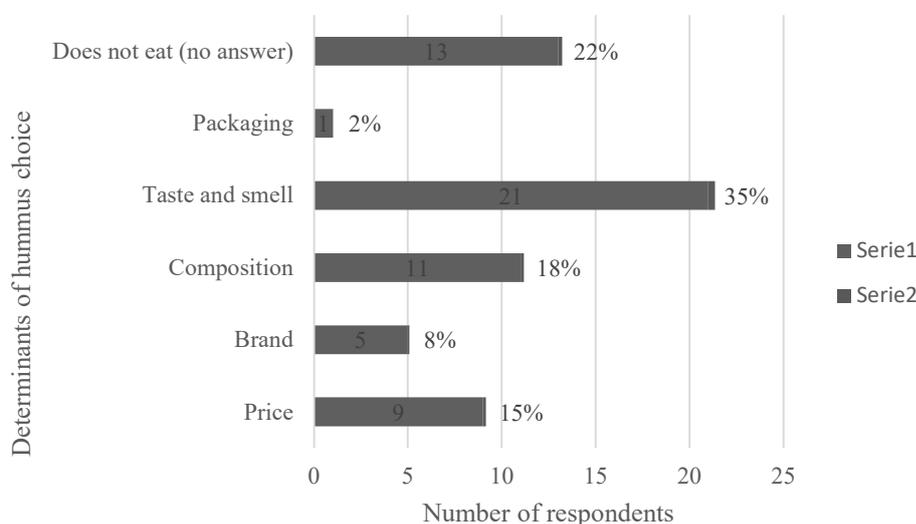


Figure 2. The most important characteristics affecting students' choice of hummus (N = 60; 100%)

Table 1. Reason for hummus consumption. The sum of results > 100% calculated on the basis of group size (N = 60)

Reason for consuming hummus	Percentage	Number of respondents
It's tasty	66.7%	40
It has many health properties	13.3%	8
Doctor's/dietitian's recommendation	0%	0
It is vegan	18.3%	11
It has good consistency	16.7%	10
Cultural reasons	0%	0
I don't know why I eat it	6.7%	4
Other	1.7%	1

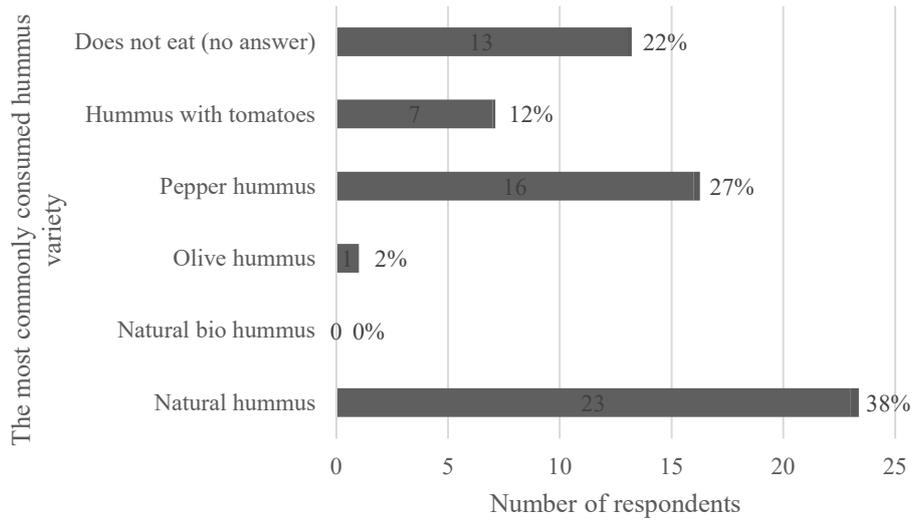


Figure 3. The most frequently consumed hummus varieties (N = 60; 100%)

The students were then asked, if they prepared hummus on their own. The largest percentage of them (66.7%, N = 40) admitted they did not prepare hummus by themselves. 25.0% (N = 15) stated that they had prepared hummus several times in their life, and 8.3% (N = 5) indicated that they often prepared hummus by themselves (Fig. 4). The respondents were also asked about the composition of classic hummus. Almost all respondents (98.3%, N = 59) replied that chickpeas were the raw material

in the production of hummus. In turn, one respondent (1.7%) replied that hummus was made from peas.

Other questionnaire items checked the students' knowledge of the region of origin of hummus. The largest number of students (40.0%; N = 24) indicated the correct answer, i.e. Middle East and North Africa, 5.0% (N = 3) indicated Japan, and 3.3% (N = 2) South America (Fig. 5).

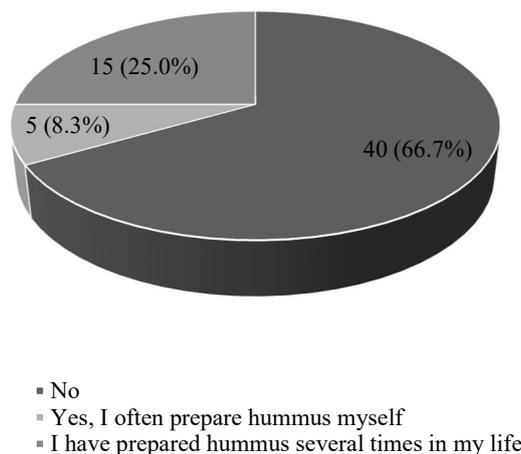


Figure 4. Self-preparation of hummus (N = 60; 100%)

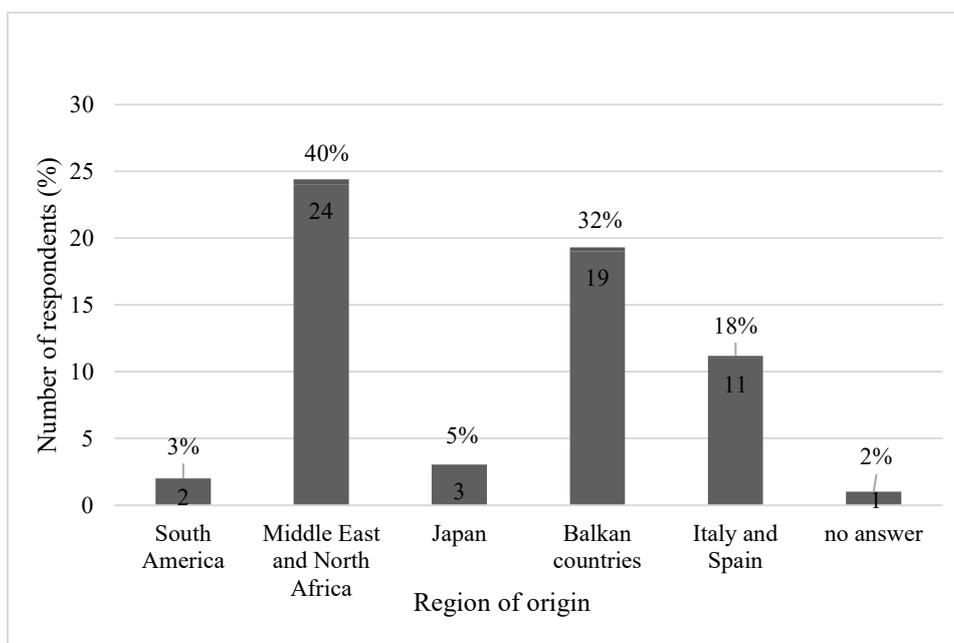


Figure 5. The region of origin of hummus according to respondents (N = 60; 100%)

The respondents were also asked about the benefits they felt from consuming hummus. It was again a multiple-answer question. Most respondents (81.7%, N = 49) believed that hummus is an important source of protein when following a vegetarian diet. The next answer in the order chosen by the students of dietetics was satiety and improvement in peristalsis (48.3%; N = 29). On the other hand, 23.3% (N = 13) considered lowering total cholesterol as a benefit. The same percentage of students (13.3%; N = 8) indicated "Methionine source" and "Better immunity, lots of vitamins, minerals," and 8.3% (N = 5) indicated "Source of calcium and vitamin D." The lowest number of respondents marked the wrong variants, i.e. "Part of an easily digestible diet", "Source of

phytic acid and antioxidants" and "Part of a low-protein diet" (Tab. 2). The 13th question of the survey checked the knowledge of hummus ingredients among dietetics students. Almost all respondents (98.3%, N = 59) knew the composition of hummus.

The four final questions of the survey assessed the food quality of hummus using sensory analysis with the sum of ranks. In terms of color, the least preferred hummus brand by respondents was the classic 'Vemondo' hummus. 20 students (33.3%) chose this hummus as the worst in terms of color. The most preferred hummus brand in terms of color turned out to be the "Chef Select" bio hummus, chosen by 18 respondents (30.0%), in the most preferred field (5th place) (Tab. 3).

Table 2. Benefits of hummus consumption. Sum of results > 100% calculated on the basis of group size (N = 60)

Benefits of consuming hummus	Percentage (%)	Number of respondents (N)
Reduction in total cholesterol	23.3	14
Important source of protein - a vegan diet	81.7	49
Source of methionine	13.3	8
Source of calcium and vitamin D	8.3	5
Satiety and improvement of peristalsis	48.3	29
Part of an easily digestible diet	5.0	3
Part of a low-protein diet	1.7	1
Source of phytic acid and antioxidants	5.0	3
Better immunity, lots of vitamins, minerals	13.3	8

Table 3. Hummus color (N = 60)

Sample	Sum of ranks (order of color quality)	
105	174	II
205	191	IV
305	176	III
405	197	V
505	165	I

Students' preferences were also evaluated regarding the consistency of hummus. The least preferred product turned out to be "Go Vege" hummus, chosen by 15 respondents (25.0%). Most students preferred the consistency of "Chef Select" bio hummus (24 respondents; 40.0%) (Tab. 4). Next, students' preferences regarding hummus smell were analyzed. According to the respondents, the "Vemondo" classic hummus was characterized by the worst smell. It was selected by slightly more than half of the respondents (32, 53.3%). The "Perla" hummus turned out to be the best hummus in terms of aroma, according to the respondents. It was chosen by 16 students (26.7%) (Tab. 5).

Another assessed characteristic of hummus was its flavor. 20 students (33.3%) chose the classic "Vemondo" hummus as the worst with regard to taste. On the other hand, 17 respondents (28.3%) considered the classic "Vemondo" hummus to have the best taste (Tab. 6). The final part of the study was the assessment of the best and the worst hummus, considering all its sensory characteristics: color, texture, smell, and taste. The least preferred hummus was the classic "Vemondo" hummus, indicated by 23 respondents (38.3%). In turn, the "Chef Select" bio hummus turned out to be the most preferred one, chosen by 15 people (25.0%) (Tab. 7).

Table 4. Hummus consistency (N = 60)

Sample	Sum of ranks (order of consistency quality)	
105	149	I
205	185	III
305	170	II
405	204	V
505	192	IV

Table 5. Hummus aroma (N = 60)

Sample	Sum of ranks (order of aroma quality)	
105	184	II
205	211	V
305	185	III
405	188	IV
505	130	I

Table 6. Hummus flavor (N = 60)

Sample	Sum of ranks (order of flavor quality)	
105	175	II
205	192	V
305	185	IV
405	173	I
505	177	III

Table 7. All sensory traits characteristics of hummus (N = 60)

Sample	Sum of ranks (order of quality of all sensory characteristics of hummus)	
105	187	IV
205	174	II
305	186	III
405	193	V
505	161	I

Discussion

Traditional hummus comes from the Middle East and the Mediterranean. Data collected from these regions show that the local populations consider chickpea dips a daily part of their diet. For example, 70% of Israelis have hummus in their refrigerators, and 90% consume it every day [8]. Among the Poles, FAO data from 2018 revealed the consumption of legumes at the level of 1.84 kg/person/year [9]. The present study showed that almost one-third of Polish dietetics students consumed hummus several times a month. In comparison, Szczybyło et al. [9] noted that 43.8% of Polish students of various majors consumed legumes several times a month, while the largest number of respondents consumed it less often. In the case of chickpeas - an imported legume in Poland - its low consumption may be due to the fact that Poles have always preferred native, traditional, and more familiar foods for generations, as confirmed by Malczyk and Kosmaty [1]. The same authors also noted that the low consumption of dry legume seeds may be caused by the insufficient knowledge of their health benefits among the Polish population [1].

Among the determinants of hummus selection by the surveyed dietetics students, the most frequently chosen one was taste. Similar results were obtained by Szczybyło et al. [9], who noted that legumes were consumed by students mainly due to their flavor (82% of respondents), and less often due to their pro-health properties or price.

The dietetics students' knowledge of health benefits of hummus consumption was correct in most cases. The most common responses were protein content, improvement in intestinal peristalsis, satiety, lowering cholesterol, and a high content of vitamins and minerals. Reister, Belote and Leidy [8] also confirmed the beneficial effects of hummus on health for the same reasons. The consumption of chickpeas at 104 g/day can reduce the total cholesterol level by an average of 0.20 mmol/l within 12 weeks, and the LDL cholesterol by 0.19 mmol/l. This effect may be caused not only by the high content of dietary fiber (5.5g in 100g of hummus on average) but also by the favorable lipid profile of chickpeas [8].

In the last part of the study, the respondents selected the worst and the best hummus product considering its characteristics, i.e. color, consistency, smell or taste, using a sensory analysis of different hummus brands from popular discount stores. According to the respondents the worst hummus brand in terms its sensory features (color, texture, taste, smell) was the "Vemondo" hummus from Lidl. The best classic hummus in terms of overall sensory quality was "Chef Select" also from Lidl. The study revealed diverse consumer tastes as indicated by heterogeneous consumer responses regarding individual sensory characteristics. This is justified because a healthy person is able to recognize five types of taste: sweet, salty, bitter, sour, and umami. The sense of taste is closely related to the sense of smell so it is affected by the presence of diseases, especially infectious and with rhinitis as well as allergies. Moreover, the perception and interpretation of smells are influenced by sex (including the phases of the female menstrual cycle), time of day, season of the year, air humidity, and genetic factors. For this reason, consumer preferences for the same food products may differ significantly [11]. Summing up, the sensory evaluation of legume-based products is a very interesting topic, unfortunately few studies have been published regarding this subject.

Conclusions

The vast majority of the surveyed dietetics students included hummus in their diets, and most of them chose hummus because of its taste. The majority of respondents did not pay attention to the composition of the selected hummus brand, and were not able to indicate the region of origin of traditional hummus. According to the respondents, the least preferred classic hummus brand was the 'Vemondo' hummus, while the most preferred hummus brand was "Chef Select." Significant differences were found in terms of hummus taste. The "Vemondo" hummus was considered both the best and the worst by the largest number of respondents.

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