Use of some hydrocolloids to improve the quality of Iraqi bread (Simon) product

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ABSTRACT

In this study, the most widely Russian wheat was used in Iraqi which similar to the characteristics of most of the cultivated Iraqi cultivars for use in this study. The chemical composition, rheological properties were estimated using modern and old technical. The aim of this work to study the effect of some hydrocolloids to improve the characteristics of Iraqi bread (Simon). Conduct a survey of the most important hydrocolloids used in bakery processing (pectin, carrageenan, sodium alginate, xanthan gum, guar gum and carboxy methylcellulose) to choose the best and add it to some bakery products. The best percentage of selected hydrocolloids was chosen according to the previous study of the sensory evaluation. Use of the hydrocolloids (xanthan gum, carrageenan and guar gum) and choose the best ratios for the hydrochlorides mentioned 0.75%, for carrageenan and guar gum, and 0.2%, for xanthan gum, based on sensory evaluation and economic assessment tests. Iraqi bread (Simon) was manufactured with the addition of some hydrocolloids in the above mentioned percentages. Quality attributes of iraq bread (Simon) were evaluation by chemical analysis, microbial safety tests, strength tests for product tests were carried out at the beginning of manufacturing and during storage at room temperature 25±2°C until the product begins to corrupt.

The obtained results showed that the using some hydrocolloids were improvement in the technological characteristics of iraqi bread product under study, the most important is to increase the shelf life to 8 days compared to products manufactured in the Egyptian and Iraqi market that the validity period approximately exceed three days. Therefore, recommend to use the following hydrochlorides (xanthan, carrageenan and guar gum) in the commercial range in the manufacture of product.

Key words: Iraqi bread (Simon); hydrocolloids; chemical composition; microbiological examination; improvement.

Introduction

In month June 2017 the United States Department of Agriculture (USDA) estimates that the World Wheat Production 2017/2018 will be 739.53 million metric tons, around 1.71 million tons more than the previous month's projection.Wheat Production last year was 754.1 million tons. This year's 739.53 estimated million tons could represent a decrease of 14.57 million tons or a -1.93% in wheat production around the globe. While wheat production in month June 2017 Egypt: 8,100,000 and Iraq: 4,025,000 (Values in Metric Tons) (USDA, 2017).

Improvers are preparations intended to simplify the production of baked goods, to compensate changes in processing properties due to fluctuations in raw materials and to improve the quality of bakery products. They are made from cereal products such as starch, malt, ...etc, different sugars, dairy products such as powdered milk, soy flour, with or without additives (preservatives, fruits, acids, phosphates, thickening agents, ...etc), depending on the relevant application. The substances used for improvers are often also components found in the food product that is being made with these improvers.

Improvers have been used for more than 100 years to support the full development of the bread flour properties and to balance the natural differences in baking behavior. But they became of real importance when the production of baked goods was streamlined and the quality was improved and standardized (Boulos, 2005). Alternative names for bread improvers that may be encountered in the baking industry include: Dough conditioners, a specific reference to the fact that the material addition changes dough rheology and processing aids, that implies a similar function to dough conditioners and oxidizing agents, that implies a more specific role concerned with the formation of the gluten network in the dough and additives, more commonly applied to specific ingredients and concentrates, similar to an improver but with a greater range of ingredients present (e.g. fat, sugar and salt) and commonly used at higher rates of addition Cauvain and Young (2001).

The term bread improver is used to embrace a wide range of materials that can be added to wheat flour and dough in order to improve some aspect of dough behavior and final bread quality. The use of the term is common and most often applied to the addition of several ingredients at low levels blended with a 'carrier', a material that may or may not have functional properties but that aids dispersion and provides a more conveniently handled composite material (Cauvain, 2017). Bread improvers encompass a large group of dough additives that serve to alter the handling properties of dough or the sensory properties of bread or both. Its designs are

constantly changing to meet the rapid advance in food ingredient technology and demand for higher quality bakery products. Bread improvers provided better gas retention, resulting in lower yeast requirements, shorter proof time and larger finished product volume. It also improved tolerance to variations in the quality of flour and other ingredients, and gave drier dough that can be mechanically processed more easily and have greater resistance to abuse (Bashir, 2006).

Iraqi bread (simon): The most important problems of the manufacture and production of Iraqi bread (simon) and the world's bread is the problem of the great economic waste, which is due primarily to the phenomenon of glaciation (Bread Staling). The production of bread from hydrocolloids addresses many of the basic problems in the bread industry and reduces the enormous economic losses during manufacturing and conservation

The aim of this study was to study the effect of some hydrocolloids to improve the characteristics of Iraqi bread (Simon) and investigate improving quality of Iraqi bread (Simon) of Russian wheat flour (72% ext.), through using hydrocolloids (xanthan gum, carrageenan and guar gum).

Materials And Methods

Materials:

Wheat flour: Medium Russian wheat flour (*Triticum aestvium*) (72% ext.) without any additions (control) season 2016), was obtained from the Crown Mills Company, 6th of October, Giza, Egypt.

Baking Ingredients: compressed yeast, sugar, corn oil, were obtained from Hyper market, new Giza, Egypt.

Hydrocolloids: Pectin (E440), Carrageenan (E407), Sodium Alginate (E400), Xanthan Gum (E415), Guar Gum (E412) and Carboxy Methyl Cellulose (E466) were obtained from Chemitec International Company, Cairo, Egypt.

Technology methods:

Production of pan bread with adding some hydrocolloids using Russian wheat flour to choose the best hydrocolloids and the best ratio:

The dough method for pan bread production was carried out according to the method described by (AACC, 2002) which summarized as follows: The blends of 1000g wheat flour (72% ext.) and hydrocolloids as shown in Table (I).

Table I. Adding some hydrocolloids with using Russian wheat flour (72% ext.):

Treatment No.	Blends
Control	Russian wheat flour (without any additions).
1.	Russian wheat flour + 0.5% Carboxy methyl cellulose .
2.	Russian wheat flour + 0.5% Pectin .
3.	Russian wheat flour + 0.5% Sodium alginate.
4.	Russian wheat flour + 0.5 % Xanthan gum.
5.	Russian wheat flour + 0.2 % Xanthan gum.
6.	Russian wheat flour + 0.8 % Xanthan gum.
7.	Russian wheat flour + 0.5 % Carrageenan .
8.	Russian wheat flour + 0.25 % Carrageenan .
9.	Russian wheat flour + 0.75 % Carrageenan .
10.	Russian wheat flour + 0.5 % Guar gum .
11.	Russian wheat flour + 0.25 % Guar gum .
12.	Russian wheat flour + 0.75% Guar gum .

Processing:

Production of Iraqi bread (simon) using different levels of hydrocolloids:

The dough method for Iraqi bread (simon) production was carried out according to the method described by (Al-Abdullah, 1986), which summarized as follows: The blends of 100g wheat flour (72% ext.), hydrocolloids as shown, salt (1g), yeast (1g), sugar (0.5g), oil (1.5g) and water (60g). The ingredients were mixed thoroughly by hand for one minute, then the dough was further mixed in a laboratory mixer for approximately fifteen minutes. After that the dough was put into greased fermentation bowel, and then cutted, rolled and placed in fermentation cabinet for 65 minutes at 30±1°C and 85-90% relative humidity. Then baked in an electric oven (Mac.pan) made in Italy at about 225±5°C for 10 minute. After baking loaves were separated from the metal pan and allowed to cool at room temperature before sensory evaluation.

Methods:

Chemical analysis:

Moisture, protein, ash, crude fiber, and ether extract contents, were determined according to the methods described in (AOAC, 2016). Total carbohydrates were calculated by difference.

Physical properties:

Falling number was measured on a falling number device (model 1800, Perten Instruments) according to (AACC, 2000).

Determination of wet and dry gluten:

Wet and dry gluten were determined according to falling number (Anon, 1985) using Glutomatic 2200 instrument at Rheological in Crown Mills Company, 6th of October, Giza, Egypt.

Rheological properties of dough:

Farinograph test was carried out to determine the water absorption, arrival time, dough development time, dough stability and degree of weakening according to the method described in (AACC, 2002).

Extensograph test was carried out to determine resistance to extension (BU), extensibility (mm), proportional number and energy (Cm^2) according to the method described in (AACC, 2002).

Mixolab2 test was carried out at the water absorption level determined by the Consistograph following the (AACC, 2002).

Alveograph test was carried out in an Alveograph MA 82 (Chopin, Tripetteet Renaud, France) following the Approved Method 54-30A (AACC, 2002).

Texture profile properties were determined according to (AACC, 2000).

Determination of staling test: Staling test of the Iraqi bread was determined every 0, 4 and 8 days respectively, of storage at 25±2ºC (room temperature). by Alkaline water retention capacity (AWRC%) as described by (Kitterman and Rubanthaler, 1971).

Microbiological examination:

Total viable bacterial count: Total viable bacterial count was determined using the plate count technique on total agar media according to the methodology of (APHA, 1992).

Coliform bacteria count: Examination of founding coliform group was performed the media was used violet red bile agar media. The coliform group counts were then calculated per gram of products as reported by the methodology of (APHA, 1992).

Moulds and yeasts: Moulds and yeasts were counted according to the method described by the methodology of (APHA, 1992).

Sensory evaluation of pan bread and Iraqi bread (simon) :

The sensory evaluation of Iraqi bread product was done as described by (Kralmer and Twigg, 1962). A group of graduate students and staff members in Food Technology Department Faculty of Agriculture, Moshtohor Benha University.

Statistical analysis:

ANOVA was applied on data sensory evaluation, stalling, chemical and texture experimental of Iraqi bread (simon) which were treated as data for complete randomization design by using Microsoft Excel 2010, least significant difference (L.S.D.) was calculated at 0.05 level of significance according to (Levine *et al.*, 1999).

Results And Discussion

Physicochemical properties **of Russian wheat flour:**

Physicochemical properties of Russian wheat flour is shown in Table (2). The results show that the Russian wheat flour contained 14.11% moisture, 11.04% protein, 0.92% fat, 0.9% crude fiber, 0.58% ash and 73.35% total carbohydrates. Also, wet and dry gluten were 33.60 and 11.91%, respectively. There are many reasons that affect the protein content of wheat variety such as environmental conditions, agriculture operations and fertilizing all this after the influence of a gene (Dupont and Altenbach, 2003 and Sip *et al.*, 2013). Also, fat content is one of the most components that changing depending on the varieties and extraction. The carbohydrate content of the wheat flour was difference with different varieties. Total carbohydrates are divided to fiber and available carbohydrates, which calculated by difference (El-Porai *et al.*, 2013).

Table 2. Physicochemical and some properties of Russian wheat flour (72% extraction).

Components	(%)
Moisture	14.11± 0.85
Ash	0.58±0.03
Protein	١١.04±0.74
Fat	0.92±0.01
Total Carbohydrates	٧3.35±1.78
Fiber	0.90±0.002
Wet gluten content	33.60±0.62
Dry gluten content	11.91±0.31
Falling. No (Sec)	585±5.0
Water absorption	63.6±0.27

Generally, these results of physicochemical composition of wheat flour are nearly are in agreement with the results reported by (Doweidar, 2002; Kamel, 2003; EL Rashidy, 2015 and Abd El-

Rahman, 2016). On the other hand the falling number was 585 (sec), the falling number depending on some factor such as methods of milling, environmental of storage and shelf life of flour. The falling number was high which indicated that the flour had low enzyme activity and high flour quality for making bakery products these results as mentioned by (Barrera *et al.*, 2007). The chemical composition of Russian wheat flour shown in Table(2) indicated that the flour was suitable to prepare good bakery products related to the percentage of protein and gluten. All the results indicated that the wheat flour generally represented medium strong flour.

Rheological properties of Russian wheat flour:

Concerning dough rheology it is well known that the Farinograph parameters indicate the most important properties in the dough. The rheological properties of dough have an immediate impact on functionality of dough therefore, it may be used as reliable predictors of its behavior during the baking process as well as the quality of the final product.

Effect of addition some hydrocolloids to Russian wheat flour on rheological properties:

Farinograph parameters:

The farinograph is the most universally used for physical dough testing instrument to measure the plasticity and mobility of the dough. It records the resistance dough offers to the mixing blends during a prolonged and relatively gentle mixing action at a constant temperature.

The farinograph was used to study the hydration and mixing characteristics of that resultant dough under investigation.

The farinograph characteristics of flour and flour containing different levels of hydrocolloids are shown in Table (3).

Water absorption of control sample was 69.5%, while it was 70.3 and 70.7% for sampls contain xanthan and carrageenan by addition percentage 0.2 and 0.75, respectively. On other hand, the water absorption of sample which contain 0.75% guar gum was 69.3%, addition by percentage 0.75%. These results are in agreement with those obtined by (Patil and Arya, 2016) he found that present study it is revealed that thepla (*Thepla* is Indian unleavened flatbread made from whole-wheat flour with added spices and vegetables) dough rheological parameters are improved by the addition of hydrocolloids providing better quality dough for better development of thepla. Dough water absorption was increased by all hydrocolloids tested.

The results in Table (3) showed that the addition of hydrocolloids were decrease the mixing time. From results presented in the same table it can be noticed also that addition of hydrocolloids the stability of dough. Increasing the stability time indicated the strong of flour and suitability of making bread. These results are in agreement with those obtained by (Ghanbari and Farmani, 2013; Zannini *et al.*, 2014; Maleki and MilaNi, 2013 and Boita *et al.*, 2016).

The result of mixing tolerance index were take the same trend as the results of stability time. On the other hand, the hydrocolloids not affected on weakening of dough. These results are in agreement with those obtained by Sharoba *et al.* (2009 and 2013).

The conclusion from this part:

Finally the results obtained from the farinograph system are always used direct of the flour to the optimum industry. The results obtained from the previous experiment have improved the flour characteristics. Therefore we recommend the users of the Russian wheat flour that is similar to most local Egyptian and Iraqi wheat, more than the use of hydrocolloids due to the susceptibility of hydrocolloids to absorb the largest amount of moisture and retention, which facilitates the process of kneading and shaping and cutting and fermentation, which increases the absorption rate and storage of moisture and delay the occurrence of the phenomenon of staling. In the products manufactured from it and also these hydrocolloids are available with a low economic value and therefore do not affect the final price on the product added to it. These foods also have no adverse side effects on human health.

Table 3. Farinograph properties of Russian wheat flour with the addition of some hydrocolloids.

Sample (No.)	Water Absorption %	Arrival time (min)	Dough Development (min)	Stability time (min)	Degree of softening (B.U)
Con*	69.5	1.0	1.5	12.0	30
Con + XN*	70.3	2.0	2.5	12.5	40
Con + Car*	70.7	1.0	2.0	19.0	40
Con + Guar*	69.3	1.5	2.0	10.5	40

*Con : Russian wheat flour (without any additions). *XN: Control + 0.2% Xanthan gum.

*Car: Control + 0.75% Carrageenan. *Guar: Control + 0.75% Guar gum.

Extensograph parameters:

The practical results obtained from the extensograph device are always based on the results of the farinograph and complementary to it. It is possible to obtain elasticity, extensibility, proportional number and energy through testing extensograph .

Results presented in Table (4) showed the effect of addition some hydrocolloids by different levels to medium flour on extensograph parameters. Data show that, the resistance to elasticity of control sample was 270 B.U. There are changes in elasticity with adding each of hydrocolloids to medium flour. The elasticity was increased gradually with increasing the percentage of adding xanthan gum, and carrageenan by 0.2, and 0.75% were increased the elasticity to 380 and 650 B.U., respectively.

Also the extensibility was 180 mm for the control sample (Russian wheat flour 72% ext.). The addition of hydrocolloids recorded the lowest decrease in sample contain xanthan gum (115mm) followed sample contain carrageenan (80mm).

Date in the same table it could be noticed also that, the addition of sample content xanthan gum at level 0.2% to Russan wheat flour (72% ext.) slightly decreased the dough extensibility except the sample contain guar gum at 0.75%. These results are very close to those reported by (Mohammadi *et al.* 2014 and Patil and Arya, 2016).

The proportional number was depending on the results of (R) and (E). So, similar relationship of proportional number (R/E) of dough was found. Data in Table (4) showed also that, excepting the additions led to increase the proportional number (R/E) of dough of Carrageenan by 0.75%. These results are in agreement with the findings of (Ghanbari and Farmani, 2013; and Zannini *et al.,* 2014).

Concerning the energy of, the sample contain carrageenan resulted in the highest value while other treatments resulted in the following decreasing from the mentioned data in Table (4). It could be concluded that the addition of hydrocolloids had a good Extensograph parameters like the sample which contain carrageenan.

Table 4. Extensograph properties of Russian wheat flour with the addition of some hydrocolloids:

Sample (No.)	Elasticity (B.U)	Extensibility (mm)	Proportional number	Energy (cm2)
Con*	270	180	1.50	80
Con + XN**	380	115	3.30	66
Con +Car***	650	80	8.13	92
Con + Guar****	230	65	3.54	28

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Mixolab2 parameters:

In Egypt, Iraq and in most countries of the world, it relied only on the known and old devices in measuring the rheological properties, namely the farinograph and extensograph systems in the judgment of the rheological properties of flour used in the manufacture of baked goods. A major development in many countries is now in the use of modern devices to measure the rheological properties of alveograph and mixolab. Therefore, in this study used the old devices in the previous part was also measuring with modern devices with the same samples under the study in order to set limits for the results of the two alveograph and Mixolab. It is possible for bakers and bakeries to rely on them as guides to guide the product to the optimum industry.

The Results presented in Table (5) showed that the effect of addition some hydrocolloids by different levels. The curve of the Mixolab2 is divided into five different stages in the first stage (C1) the values of the development of the dough show a decrease to the treatment of flour with at different hydrocolloids except for the sample which contain xanthan the rise in the second stage (C2) and its value ranged from 15.68 to 16.47 min Compared to the value of torque in the control sample 16.35 min. The third stage (C3), which is called gluten starch at this stage and the product during heating from 23.02 min in the control sample to 22.92 min of the sample which contain xanthan according to (Rosell *et al.*, 2007).

In the first stage (C1), the effect of some hydrocolloids on the values of dough development and the value of torque in the second stage (C2) and in the fourth stage (C4) of 28.80 min was found in the control microcontroller sample and increased in all samples added to the hydrocolloids compared to with a control sample ranging from 28.52 to 44.90 min. The value of dough development was increased when the flour was treated with hydrocolloids and the dough development value in the control sample was decreased. In terms of consistency of dough, it was improved by treating flour with hydrocolloids. It was observed that the five different stages of the treatment of mixolab2 (C1, C2, C3, C4 and C5) were affected by the treated of flour with hydrocolloids according to (El-Maaty, 2016).

Table 5. Effect of addition some hydrocolloids to Russian wheat flour on Mixolab2 characteristics:

Sample	Control*	Con + XN**	Con + Car***	Con + Guar****
Stability (min)	8.67	9.43	9.50	4.32
Mixing	2	3	3	2
Gluten+	4	7	7	8
Viscosity	7	7	7	7
Amylase	8	8	8	8
Retro gradation	8	7	7	7
Water absorption	61.6	63.0	63.0	62.0
C1 (min)	1.12	1.32	1.10	0.95
CS (min)	8.00	8.00	8.00	8.00
C2 (min)	16.35	16.47	16.03	16.05
C3 (min)	23.02	22.92	22.92	23.17
C4 (min)	28.80	30.37	31.15	30.05
C5 (min)	45.02	45.02	45.02	45.02

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Alveograph parameters:

Results presented in Table (6) and showed that the value of resistance (P) increased significantly when treated the flour with hydrocolloids. The value of elasticity (L) was significantly reduced by treating the flour with the same concentration of hydrocolloids. The resistance to elasticity (P/L) also increased with the use of hydrocolloids, the highest value of non-formation energy (W) was found in the treated flour with guar gum. In general the treated flour with hydrocolloids resulted in an increase in the value of resistance (P), resistance to elasticity (P/L) and non-forming strength, while elasticity (L), while the treatment of flour with guar gum was increased the value of resistance (P) while the height in the ratio of resistance to elasticity (P/L) to high ratios according to (Rosell *et al.*, 2007). It is therefore concluded that the flour became suitable for the baking industry and gave a very excellent product characteristics compared to the control sample in both Iraqi bread (simon). The value of rubber (L) was decreased significantly by treated flour with hydrocolloids. Consequently, the samples are all suitable for baking. The value of resistance (P) and resistance to elasticity (P/L) was increased by 46.08 and 100.14% higher than the control sample, respectively, by adding hydrocolloids. The value of elasticity (L) decreased by a different percentage and the highest percentage of decrease was 68.29% and when treated with flour the guar gum according to (El-Maaty, 2016).

Table 6. Effect of addition some hydrocolloids to Russian wheat flour on alveograph characteristics:

Sample (No.)	P (mm)	L (mm)	W(P/L Ratio)
Con*	115	41	2.8
Con + XN**	153	39	3.92
Con +Car***	138	31	4.45
Con + Guar****	168	28	6.00

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Effect of addition some hydrocolloids on the characteristics of the Iraqi bread (Simon) product:

In this part of the study we will study the effect of the addition of selected some hydrocolloids to Iraqi bread (simon) and study all the quality attributes such as chemical analysis, microbiological, sensory evaluation, rheological properties and measure freshness tests of Iraqi bread (simon).

Effect of addition some hydrocolloids on moisture content of Iraqi bread (Simon) during storage periods at 25±2**°C.**

Chemical composition is great importance in judging the quality of the Iraqi bread (simon). The moisture content of Iraqi bread (simon) made with adding the hydrocolloids was determined, of the product at the beginning of manufacturing and after storage for 4 and 8 days at 25±2°C.

The results in Table (7) showed that the moisture content in control sample was lower than all sample, due to its retention of water. All the additives were better than the control. These results are in agreement with. (Maleki and MilaNi, 2013; Shalaby *et al.*, 2014 and Hejrani *et al.*, 2016).

Table 7. Effect of addition some hydrocolloids on moisture content of Iraqi bread (simon) during storage for different time at 25±2°C:

Treatments	Storage period (days)			Mean
	0	4	8	
Iraqi bread control: (without any additions)	32.99 ±0.11^{cA}	32.88 ±0.15^{bA}	26.68 ±0.20^{cB}	30.85 ±0.93^{c}
Iraqi bread + 0.2% Xanthan gum	33.40 ±0.14^{bcA}	30.84 ±0.13^{cdB}	27.74 ±0.26^{cC}	30.66 ±2.09^{c}
Iraqi bread + 0.75% Carrageenan	34.43 ±0.12^{abA}	32.07 ±0.15^{bcB}	30.04 ±0.16^{bC}	32.18 ±1.64^{b}
Iraqi bread + 0.75% Guar gum	32.98 ±0.17^{cA}	30.53 ±0.15^{dB}	27.99 ±0.22^{cC}	30.50 ±1.27^{c}
Mean	33.45 ±0.43^{A}	31.58 ±0.57^{B}	28.11 ±0.93^{C}	

a, b & c: There is no significant difference (P>0.05) between any two means, within the same column have the same superscript letter.
A, B & C: There is no significant difference (P>0.05) between any two means for the same attribute, within the same row have the same superscript letter.

Effect of addition some hydrocolloids on **microbiological properties of Iraqi bread (simon)** during storage periods at 25±2**°C**:

Microbiological test of bakery products is essential for judging the quality of raw materials and manufacturing conditions. This is why it is always necessary to conduct microbiological test when manufacturing new products or using new additives. In this experiment, the following microbiological tests were carried out: total bacterial count, molds and yeasts and coliform group. The results in Table (8). The total bacterial count is widely used as an indicator microbiological quality of products such as Iraqi bread (Simon). Data in Table (8) indicated that, the total bacterial count was detected in few numbers and this result was under Iraqi and Egyptian standard specification. Molds and yeasts cannot be detected, this may that molds and yeasts cannot resist for baking. The good result were found with coliform group, it were absent in all samples. These results are in agreement with (Akhtar, *et al.*, 2008 and Alhamd, 2013).

Table 8. Microbiological examination of Iraqi bread (Simon) product.

Sample	Storage periods (days)	T . C	Molds and Yeasts	coliform group
Iraqi bread Control *	Zero Time	43×10^2	Less than 15	Not detect
Iraqi bread +XN**		35×10^2	Less than 15	Not detect
Iraqi bread +Car***		39×10^2	Less than 15	Not detect
Iraqi bread +Guar****		58×10^2	Less than 15	Not detect
Iraqi bread Control *	4	97×10^2	65×10	Not detect
Iraqi bread +XN**		113×10^2	56×10	Not detect
Iraqi bread +Car***		126×10^2	62×10	Not detect
Iraqi bread +Guar****		18×10^{2}١	61×10	Not detect
Iraqi bread Control *	8	105×10^3	95×10^2	Not detect
Iraqi bread +XN**		104×10^3	70×10^2	Not detect
Iraqi bread +Car***		138×10^3	96×10^2	Not detect
Iraqi bread +Guar****		145×10^3	97×10^2	Not detect

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.
***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Effect of addition some hydrocolloids in the Sensory evaluation **of Iraqi bread** (simon) during storage periods at 25±2**°C**:

Sensory evaluation is important criteria in evaluating quality and acceptability of Iraqi bread (simon). The sensory evaluation of Iraqi bread (simon) were evaluated for their uniformity, textures, general appearance, taste, odor, sponge, crust color, crumb color, distribution of crumb and overall acceptability. The mean values were statistically analysisd using analysis of variance and least significant difference (L.S.D). In general, Iraqi bread (simon) were significantly different from control sample for all sensory properties. The results indicated that, the addition of hydrocolloids to Russian wheat flour caused significant in Iraqi bread (simon). Data in Table (9) indicated that, the significant differences between all hydrocolloids. The obtained data indicated that the hydrocolloids are giving marked ($p\leq0.05$) improvement in all attributes compared with control samples.

Table 9. Effect of addition some hydrocolloids on sensory evaluation of produced Iraqi bread (simon) in zero time:

Samples	Characteristics								
	Textures (15)	General appearance (15)	Taste (15)	Odor (15)	Sponge (10)	Crust color (10)	Crumb color (10)	Distribution of crumb (10)	Overall acceptability (100)
Iraqi bread Control*	12.17 ±0.271 [b]	12.52 ±0.369[b]	13.00 ±0.477[a]	12.75 ±0.250 [b]	8.75 ±0.305 [a]	8.25 ±0.218 [a]	9.01 ±0.229[a]	9.08 ±0.229 [a]	87.42 ±3.276 [a]
Iraqi bread +XN**	13.50 ±0.469[a]	13.92 ±0.398[a]	13.42 ±0.468[a]	13.95 ±0.411 [a]	9.00 ±0.271 [a]	8.50 ±0.289 [a]	9.08 ±0.288[a]	9.08 ±0.260 [a]	90.17 ±2.335 [a]
Iraqi bread +Car***	13.27 [ab] ±0.449	13.33 ±0.414 [ab]	13.25 ±0.524[a]	13.83 ±0.548 [a]	9.08 ±0.260 [a]	8.83 ±0.297 [a]	9.17 ±0.271[a]	9.08 ±0.229 [a]	91.25 ±5.425 [a]
Iraqi bread +Guar****	13.13 ±0.505[ab]	13.67 ±0.414[a]	13.08 ±0.358[a]	13.83 ±0.423 [a]	9.08 ±0.288 [a]	8.75 ±0.392 [a]	9.02 ±0.313[a]	9.11 ±0.174 [a]	90.58 ±2.589 [a]
LSD	1.217	1.054	1.214	1.027	0.761	0.823	0.733	0.596	6.477

* Iraqi bread Con: Russian wheat flour (without any additions).
** Iraqi bread +XN + 0.2% Xanthan gum.
*** Iraqi bread +Car + 0.75% Carrageenan.
**** Iraqi bread +Guar + 0.75% Guar gum.

All additions of xanthan gum, carrageenan and guar gum, may be due to the characters of Russian wheat flour (72% ext.) include protein content and protein strength (Ghanbari and Farmani, 2013; Maleki and MilaNi, 2013 and El-maaty, 2016).
Addition of sample content Guar gum and sample content Carrageenan by difference addition showed improving of all attributes with treatment when compared with control were low improving, these results agree dramatically with rheological parameters, , Guar gum sample and Carrageenan sample treatment. Despite, the interference between some values for some attributes, while some other attributes shown a clear contrast between treatments such as textures and overall acceptability which stressed the advantage both of Guar gum sample and Carrageenan sample treatment. The value of the overall acceptability in the control sample was 87.42, while the sample contain xanthan, carrageenan and guar gum were 90.17, 91.25 and t 90.58 respectively.

Effect of storage periods on sensory evaluation of Iraqi bread (simon) with different addition levels of hydrocolloids:

Sensory evaluation determined some for factors for each the procedures in terms of the acceptance or rejection of some them, achieving good acceptance from consumers is the purpose of the treatments made on most of the food, this is different when the aim is a special product production of some special categories, which is nominal aim is to provide a specific product requirements while providing a kind of acceptance as much as possible. The results of sensory evaluation was distinguished by the trained arbitrators, the graduate students and the faculty members in the specified time period for the product, the results showed that there are a significant difference between treatments and the best one were hydrocolloids, treatment and the least was control sample during storage periods at 25±2ºC, when compared the most of attributes depending on mean value regardless of storage period or compared during storage period.

Textures:

Results in Table (10) showed that after four days, the textures scores given to experimental products storage in shade at room temperature (25±2ºC) showed less decreases than the corresponding samples evaluation at zero time. After eight days, samples storage exposed to shade decrease in total textures scores compared to their corresponding samples storage for four days. The storage samples exposed to shade were shown at room temperature for eight days and were further reduced at the sample contain xanthan was 5.83 and then followed by a slight gradual decrease of the corresponding samples storage for four days. There were significant differences (p>0.05) between all averages for product Iraqi bread texture at all of the samples during storage periods.

Table 10. Effect of addition some hydrocolloids on textures of Iraqi bread (simon) during storage periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Textures (15)	Iraqi bread Control *	12.17	11.58	7.58	10.44 ±0.48 ab
	Iraqi bread +XN**	13.50	10.50	5.83	9.94 ±0.581 b
	Iraqi bread +Car***	13.27	11.42	6.83	10.51 ±0.517 ab
	Iraqi bread +Guar****	13.13	11.75	7.33	10.74 ±0.513 a
	Average	13.01 ±0.175 a	11.31 ±0.144 b	6.89 ±0.172 a	
	LSD (Storage time)	0.453			
	LSD (addition levels)	0.640			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.
***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

General appearance:

Results in Table (11) showed that after four days, the general appearance scores given to experimental products storage on shade at room temperature (25±2ºC) were showed decreased than the corresponding samples evaluation at zero time. After eight days, the storage samples recorded in general appearance scores the highest reduction in the sample contain xanthan 5.25 and then followed by the all samples storage for four days. There were significant differences (p>0.05) between all averages for Iraqi bread (simon) product tested at all of the tested storage periods.

Table 11. Effect of addition some hydrocolloids on general appearance of Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
General appearance (15)	Iraqi bread Control *	12.52	11.33	5.92	9.92 ±0.603 [a]
	Iraqi bread +XN**	13.92	11.17	5.25	10.11 ±0.683 [a]
	Iraqi bread +Car***	13.33	9.42	5.92	9.56 ±0.545 [a]
	Iraqi bread +Guar****	13.67	9.83	5.75	9.75 ±0.575 [a]
	Average	13.36 ±0.152 [a]	10.44 ±0.149 [b]	5.71 ±0.161 [c]	
	LSD (Storage time)	0.903			
	LSD (addition levels)	1.277			

***Con :** Russian wheat flour (without any additions). ****XN: Control + 0.2% Xanthan gum.**

*****Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.**

Taste:

Results in Table (12) showed that after four days, the taste scores given to experimental products storage in shade at room temperature were decreased than the corresponding samples evaluation at zero time. After eight days, the storage samples recorded the highest decreases in taste scores in the sample contain carrageenan was 4.67 and then followed by the all samples compared to their corresponding storage samples for four days.

Table 12. Effect of addition some hydrocolloids on taste of Iraqi Bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Taste (15)	Iraqi bread Control *	13.00	10.83	5.58	9.80 ±0.578 [a]
	Iraqi bread +XN**	13.42	10.67	6.33	10.14 ±0.544 [a]
	Iraqi bread +Car***	13.25	10.17	4.67	9.36 ±0.640 [a]
	Iraqi bread +Guar****	13.08	11.50	6.83	10.47 ±0.482 [a]
	Average	13.19 ±0.174 [a]	10.79 ±0.132 [b]	5.85 ±0.165 [c]	
	LSD (Storage time)	0.806			
	LSD (addition levels)	1.139			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Odor:

Results in Table (13) showed that after four days, the odor scores given to experimental products storage in shade at room temperature (25±2ºC) were decreased than the corresponding samples evaluation at zero time. After eight days, the storage samples recorded the highest reduction in odor scores in the control sample was 5.08 and then followed by the all samples compared to their corresponding storage samples for four days.

Table 13. Effect of addition some hydrocolloids on odor of Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Odor (15)	Iraqi bread Control *	12.75	8.33	5.08	8.72 ±0.626 [b]
	Iraqi bread +XN**	13.95	11.83	6.50	10.76 ±0.573 [a]
	Iraqi bread +Car***	13.83	10.58	6.08	10.16 ±0.517 [a]
	Iraqi bread +Guar****	13.83	10.25	6.58	10.22 ±0.554 [a]
	Average	13.59 ±0.155 [a]	10.25 ±0.210 [b]	6.06 ±0.163[c]	
	LSD (Storage time)	0.895			
	LSD (addition levels)	1.265			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Sponge:

Results in Table (14) showed that after four days, the sponge scores given to experimental products storage in shade at room temperature (25±2ºC) were decreased than the corresponding samples evaluation at zero time. After eight days,

samples storage recorded the highest reduction in sponge scores in the sample contain xanthan was 3.92 and then followed by the all samples compared to their corresponding storage samples for four days.

Table 14. Effect of addition some hydrocolloids on sponge of storage Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Sponge (10)	Iraqi bread Control *	8.75	6.67	4.33	6.58 ±0.371 [b]
	Iraqi bread +XN**	9.00	6.33	3.92	6.42 ±0.391 [b]
	Iraqi bread +Car***	9.08	7.17	6.08	7.44 ±0.250 [a]
	Iraqi bread +Guar****	9.08	6.50	4.67	6.75 ±0317 [ab]
	Average	8.98 ±0.110 [a]	6.67 ±0.130 [b]	4.75 ±0.148 [c]	
	LSD (Storage time)	0.583			
	LSD (addition levels)	0.825			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Crust Color:

Results in Table (15) showed that after four days, the crust color scores given to experimental products storage in shade at room temperature (25±2ºC) were no great decreased than the corresponding samples evaluation at zero time. After eight days, the storage samples recorded the highest reduction in crust color scores in the sample contain xanthan was 6.33 and sample contain carrageenan was 6.83 and then followed by the all samples compared to their corresponding samples storage for four days.

Table 15. Effect of addition some hydrocolloids on Crust Color of Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Crust Color (10)	Iraqi bread Control *	8.25	7.67	7.00	7.64 ±0.197[ab]
	Iraqi bread +XN**	8.50	7.25	6.33	7.36 ±0.208[a]
	Iraqi bread +Car***	8.83	7.75	6.83	7.80 ±0.186 [ab]
	Iraqi bread +Guar****	8.75	8.08	7.25	8.03 ±0.185[a]
	Average	8.58 ±0.123 [a]	7.69 ±0.091 [b]	6.85 ±0.105 [c]	
	LSD (Storage time)	0.294			
	LSD (addition levels)	0.416			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Crumb Color:

Results in Table (16) showed that after four days, the crumb color scores given to experimental products storage in shade at room temperature (25±2ºC) were no great decreases than the corresponding samples evaluation at zero time. After eight days, the storage samples recorded the highest reduction in crumb color scores in the sample contain guar gum was 6.58 and then followed by the all samples compared to their corresponding storage samples for four days.

Table 16. Effect of addition some hydrocolloids on Crumb Color of Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Crumb Color (10)	Iraqi bread Control *	9.01	7.58	7.17	7.92 ±0.191 [b]
	Iraqi bread +XN**	9.08	7.75	7.58	8.14 ±0.200 [ab]
	Iraqi bread +Car***	9.17	8.33	7.67	8.39 ±0.166 [a]
	Iraqi bread +Guar****	9.02	7.67	6.58	7.76 ±0.220 [b]
	Average	9.07 ±0.105 [a]	7.83 ±0.104 [b]	7.25 ±0.106[c]	
	LSD (Storage time)	0.295			
	LSD (addition levels)	0.417			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Distribution of crumb:

Results in Table (17) showed that after four and eight days, the distribution of crumb scores given to experimental products storage in shade at room temperature (25±2ºC) were no great decreased than the corresponding samples evaluation at zero time.

Table 17. Effect of addition some hydrocolloids on Distribution of crumb of Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Distribution of crumb (10)	Iraqi bread Control *	9.08	7.58	7.25	7.97 ±0.197 [a]
	Iraqi bread +XN**	9.08	8.25	7.25	8.19 ±0.186 [a]
	Iraqi bread +Car***	9.08	8.25	7.75	8.36 ±0.165 [a]
	Iraqi bread +Guar****	9.11	8.17	7.25	8.18 ±0.155 [a]
	Average	9.09 ±0.88 [a]	8.06 ±0.103[b]	7.38 ±0.095[c]	
	LSD (Storage time)	0.304			
	LSD (addition levels)	0.430			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Overall acceptability:

Results in Table (18) showed that after four days, the overall acceptability scores given to experimental products storage in shade at room temperature 25±2ºC) were no great decreased than the corresponding samples evaluation at zero time. After eight days, the storage samples recorded the highest reduction in overall acceptability scores in the control sample was 51.25 and the sample contain xanthan was 54.17 and the sample contain carrageenan was 55.67, compared to their corresponding storage samples for four days.

Table 18. Effect of addition some hydrocolloids on Overall acceptability of Iraqi bread (simon) during storge periods.

Sensory attribute	Blends	Storage periods (Days)			Average
		Zero time	4	8	
Overall acceptability (100)	Iraqi bread Control *	87.42	79.58	51.25	72.75 ±3.176 [b]
	Iraqi bread +XN**	90.17	84.25	54.17	76.20 ±3.0255[ab]
	Iraqi bread +Car***	91.25	82.50	55.67	76.47 ±3.030 [ab]
	Iraqi bread +Guar****	90.58	86.50	62.42	79.83 ±2.385 [a]
	Average	89.86 ±0.961 [a]	83.21 ±0.991 [b]	55.88 ±1.374[c]	
	LSD (Storage time)	2.695			
	LSD (addition levels)	3.812			

*Con : Russian wheat flour (without any additions). **XN: Control + 0.2% Xanthan gum.

***Car: Control + 0.75% Carrageenan. ****Guar: Control + 0.75% Guar gum.

Effect of addition some hydrocolloids on texture measurement (mechanical properties) of Iraqi bread (Simon) storage at 25±2**°C**:

Texture measurement is important characteristics in bakery product development, quality control, sensory testing, and process technology. Knowing how to effectively characterize the texture of a bakery product allows one to constantly improve formulations, processing methods, product stability, and shelf life. Sensory tests with (Texture properties) of bakery products have led to an advanced understanding of quality attributes. Texture is able to develop describe certain attributes unique to a specific product. Instruments are then used to generate data that reflect levels of intensity for each textural attribute.

The results in Table (19) showed the effect of Iraqi bread (simon) properties are presented as well as compared to Specific volume. The hardness is a measure of the resistance of bread to deformation. The presence of Iraqi bread (simon) contain xanthan notably was increased the hardness after four and eight days' of storage. which indicates a low degree of softness and crispness. This undoubtedly is reflected on both the dough strength and bread resistant to extension.

The different effect of some hydrocolloids, on Iraqi bread (simon) hardness must be explained by the different chemical interactions between oil., protein and starch that affect its retro-gradation suggested that interactions between the swollen starch granules and the protein network actively contribute to crumb firming, the same results were

found by (Ghanbari and Farmani, 2013; Mohammadi *et al.*, 2014; Hejrani *et al.*, 2016 and Patil and Arya, 2016).

It could be concluded that the highest improve of all texture parameters was found in the Iraqi bread (simon) contant carrageenan, followed by guar gum and xanthan sampls.

Table 19. Effect of addition some hydrocolloids on texture measurement (mechanical properties) of Iraqi bread (Simon) during storage at 25±2°C.

Para-meter	Treatments	Storage period (days)			Mean
		0	4	8	
Hardness	Iraqi bread control : (without any additions)	11.21^{bcB}	14.94^{bA}	13.98^{cAB}	13.38^{bc}
	Iraqi bread + 0.2% Xanthan gum	17.39^{aC}	23.46^{aB}	26.75^{aA}	22.53^{a}
	Iraqi bread + 0.75% Carrageenan	13.54^{abcA}	14.95^{bA}	16.15^{cA}	14.88^{bc}
	Iraqi bread + 0.75% Guar gum	15.03^{abAB}	16.98^{bA}	12.46^{cB}	14.82^{bc}
	Mean	14.29^{A}	17.58^{A}	17.33^{A}	
Cohesivenes s	Iraqi bread control : (without any additions)	0.85^{aA}	0.64^{aB}	0.65^{aB}	0.71^{a}
	Iraqi bread + 0.2% Xanthan gum	0.78^{abA}	0.57^{cB}	0.53^{bB}	0.63^{b}
	Iraqi bread + 0.75% Carrageenan	0.87^{aA}	0.64^{abB}	0.67^{aB}	0.73^{a}
	Iraqi bread + 0.75% Guar gum	0.75^{bA}	0.60^{bcB}	0.50^{bC}	0.62^{b}
	Mean	0.81^{A}	0.61^{B}	0.58^{C}	
Springiness	Iraqi bread control : (without any additions)	5.23^{cA}	4.73^{bB}	4.73^{abB}	4.90^{bc}
	Iraqi bread + 0.2% Xanthan gum	8.11^{aA}	6.06^{aB}	5.91^{aB}	6.69^{a}
	Iraqi bread + 0.75% Carrageenan	6.81^{bA}	4.81^{bB}	4.86^{abB}	5.49^{bc}
	Iraqi bread + 0.75% Guar gum	6.76^{bA}	5.33^{abB}	3.33^{cC}	5.14^{bc}
	Mean	6.72^{A}	5.23^{B}	4.70^{B}	
Gumminess	Iraqi bread control : (without any additions)	9.50^{cdA}	9.53^{bA}	9.03cdA	9.35bc
	Iraqi bread + 0.2% Xanthan gum	13.56^{aA}	13.33^{aA}	14.13^{aA}	13.67^{a}
	Iraqi bread + 0.75% Carrageenan	11.74^{abA}	9.60^{bB}	10.75^{bcAB}	10.70^{bc}
	Iraqi bread + 0.75% Guar gum	11.26^{bc}A	10.14^{bA}	6.28^{eB}	9.23^{bc}
	Mean	11.51	10.65^{2A}	10.04^{A}	
Chewiness	Iraqi bread control : (without any additions)	49.70^{cA}	45.10^{bA}	42.70^{cA}	45.83c
	Iraqi bread + 0.2% Xanthan gum	109.90^{aA}	80.80^{aB}	83.50^{aB}	91.40^{a}
	Iraqi bread + 0.75% Carrageenan	80.00^{bA}	46.10^{bB}	52.30^{bcB}	59.47^{bc}
	Iraqi bread + 0.75% Guar gum	76.10^{bA}	54.00^{bB}	20.90^{C}	50.33^{bc}
	Mean	78.93^{A}	56. 5^{B}	49.85	

Effect of addition some hydrocolloids on staling **of Iraqi bread** (simon) during storage at 25±2**°C**:

Staling is a challenge for bakery products to improve dough properties and retard or delay staling property to keep bread quality high as long as possible. Staling includes all processes that occur in both crumb and crust during storage. The crust becomes soft and leathery due to diffusion of water from the crumb to the crust. They also found that, Amylopectin recrystallization is still believed to be the major cause of bread staling. There for we used some hydrocolloids to control the staling bakery products and increase the shelf life of bread. The results in Table (20) showed that the highest values in staling in the control sample at zero time were 1.546 and it became on the eight days 0.810, while the staling was lower in the sample contain carrageenan was 1.180 at zero time and became 0.902 in the eight days because the hydrocolloids retain in water then followed by a sample (Ghanbari and Farmani, 2013)

Table 20. Effect of addition some hydrocolloids on staling of Iraqi bread (simon) during storage at 25±2°C.

Treatments	Storage period (days)				Mean
	0	3	5	8	
Iraqi bread control : (without any additions)	1.55 ±0.14^{aA}	0.97 ±0.03^{bB}	0.84 ±0.07^{bBC}	0.81 ±0.05^{aC}	1.04 ±0.02^{a}
Iraqi bread + 0.2% Xanthan gum	1.29 ±0.11^{bcA}	1.18 ±0.14^{aA}	1.00 ±0.10^{aB}	0.89 ±0.09^{aB}	1.09 ±0.17^{a}
Iraqi bread + 0.75% Carrageenan	1.18 ±0.15^{cA}	1.18 ±0.10^{aA}	1.01 ±0.10^{aB}	0.90 ±0.07^{aB}	1.07 ±0.09^{a}
Iraqi bread + 0.75% Guar gum	1.32 ±0.15^{bcA}	0.95 ±0.08^{bB}	0.92 ±0.04^{abB}	0.92 ±0.06^{aB}	1.03 ±0.07^{a}
Mean	1.33 ±0.05^{A}	1.07 ±0.05^{B}	0.94 ±0.03^{BC}	0.88 ±0.02^{C}	

The Conclusions:

The results obtained are much better than the results obtained by (Shalaby *et al.*, 2014), which conducted studies on the manufacture of 4 types of Iraqi bread (Local bread, stone Simon, and Simon the ring and the French) made from flour (72% ext.) and the maximum storage period is three days while the periods of storage of the Iraqi bread (simon) product which was manufactured in this study using the hydrocolloids: (xanthan by add ratio 0.2%, carrageenan by add ratio 0.75% and guar gum by add ratio 0.75%) was reached to eight days.

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استخدام بعض المغلظات على تحسين صفات الجودة على منتج خبز (الصمون) العراقي

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تم استخدام القمح الروسي في هذه الدراسة والذي يعد اكثر الاقماح استخداما في العراق ومصر لانتاج منتجات المخابز حيث تم تقدير التركيب الكيمياوي و الخصائص الريولوجية باستخدام الاجهزة الحديثة (المكسولاب) وكذلك الاجهزة القديمة (الفارينوجراف و الاكستنسوجراف) كما تم تقدير الجلوتين الرطب ورقم السقوط للدقيق (استخلاص ٧٢%) المنتج من القمح الروسي. هدفت هذه الدراسة دراسة تأثير بعض المغلظات لتحسين صفات منتج الخبز العراقي (الصمون). حيث تم اختيار العديد من المغلظات (البكتين – صمغ الجوار – الجينات الصوديوم – كربوكسي مثيل سليلوز – كاروجينان – الزانثان) وتم اختيار افضلها و كان (صمغ الجوار – كاروجينان – الزانثان) لاستخدامها و كانت افضل نسب اضافة هي ٠.٢% للزانثان و٠.٧٥% للكاروجينان و صمغ الجوار بناءاً على اختبارات التقييم الحسي .

وتم تصنيع خبز الصمون العراقي بعد اضافة المغلظات بنسب الاضافة السابق ذكرها وتم اجراء التحليلات الكاملة الدالة على الجودة مثل التحليلات الكيميائية، اختبارات الأمان الميكروبي، اختبارات القوام، اختبارات الطزاجة للمنتج في بداية التصنيع واثناء التخزين على درجة حرارة الغرفة ٢٥°±٢م لمدة ٨ ايام .

واظهرت النتائج المتحصل عليها تحسين واضح ومعنوي (طبقاً لنتائج التحليل الاحصائي) في الصفات التكنولوجية تحت الدراسة وكان من اهم صفات التحسن هو زيادة مدة الصلاحية لتصل الى ٨ يوم بالمقارنة بالمنتج المصنع في السوق المصري والعراقي والتي كانت مدة صلاحيته لا تتعدى ثلاثة ايام بدون اضافة المحسنات. ولهذا توصي الدراسة باستخدام الى (صمغ الجوار ٠.٧٥%، كاروجينان ٠.٧٥% و الزانثان ٠.٢%) على النطاق التجاري في تصنيع منتجات المخابز.