Evaluation of Several Genetic Structures of Bread under Glutamic and Arginine Spraying Conditions for Yield and Quality Traits

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Abstract

Experiment was designed to determine the effect which were sprayed with a combination of glutamic acid and Arginine (Glutamic 0 + Arginine 0 and Glutamic 200 mg L-1 and Arginine 200 mg L-1 and Glutamic 100 mg L-1 + Arginine 100 mg L-1 , Glutamic 100 mg L-1 + Arginine 200 mg L-1 , Glutamic 200 mg L-1 + Arginine 100 mg L-1 and Glutamic 200 mg L-1 + Arginine 200 mg L-1), on nine bread wheat genotypes ((Al-Fayyad, Mawaddah, Buhouth 22, Babylon 113, Gemmayzeh 9, Giza 164, Sakha 61, Sakha 95, and Misr 3), For yield characteristics, specific weight, protein percentage, wet gluten percentage, dry gluten percentage and sedimentation value,By us a randomizing complete block design with a split-plot system, where the primary plots included combinations of glutamic acid and arginine and the secondary plots included genetic combinations, the main plots included combinations of glutamic acid and arginine, The results showed a significant superiority of the entered genetic structures (Gemmayzeh 9 and Misr 3) over the rest of the genetic structures in the characteristics of yield and specific weight, the genetic structure of Gemmayzeh 9 was outweighed by giving the highest averages (6.25) ton h-1 and (79.57) kg Hctoliter-1, As for the genetic make-up of Misr3, a significant superiority was observed for the traits percentage of protein, percentage of wet gluten, percentage of dry kidney and sedimentation value with averages of (13.20, 36.02, 12.14 and 13.20) % respectively, And the spray treatment exceeded (200 mg l-1 glutamic acid + 200 mg l-1 arginic acid) for all the traits studied, As for theinteraction between the two factors of the study, As the genetic structure of Misr 3 recorded a significant superiority over the rest of the genetic structures for the characteristics of the percentage of protein, the percentage of dry gluten and the sedimentation value by giving it the highest values in order (13.20, 13.50 and 29.06)%, and thus it is possible to pay attention in the future to these two input structures with their replanting in seasons and sites to see the extent of their stability within the conditions of the region .

Keywords: wheat, genetic structures, spraying with glutamic acid and arginine, yield and quality .

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.Introduction

Iraq, which is rich in its agricultural environments and fertile lands, as it is one of the most important countries in the production of bread wheat (Triticum aestivum L.), which is considered one of the most important and most cultivated agricultural crops, as the rate of cultivated land for the year 2021 reached (9,464,225) dunums with a productivity rate of 4,233,714 tons according to statistics [1], Iraq is facing many consequences for this crop, which has led to a deterioration in its quality and a decrease in its productivity per unit area compared to world production. Most of the problems are concentrated in the variety and post-planting processes, in addition to the physical and chemical properties of the soil and environmental stresses such as drought and lack of water, Newly developed local wheat varieties in Iraq are also characterised by low protein and chloten content, which affects the ability to produce bread, as the functional quality of flour depends on gluten proteins, that the percentage of protein and its quality is an important criterion in classifying wheat varieties due to its importance in the quality of the final product [2.[

Therefore, attention focused on the new varieties of high-yielding wheat, the use of scientific methods in crop management, and the adoption of an integrated system in adding foliar nutrients that help increase production, improve its quality, reduce economic costs and preserve the environment [3]. The use of nutrients such as amino acids is one of the important basic requirements to achieve qualitative improvement and increase the rate of production per unit area, and these acids reduce the amount of fertiliser used and plants have the ability to produce amino acids, but they need to consume large amounts of energy, when spraying amino acids or some of them on the leaves, this leads to providing energy that leads to building amino acids especially in critical times that the plant goes through. [4. [

Glutamic acid is a non-essential amino acid, also known as glutamate, which helps to maintain the required level of osmotic pressure in the cells and protects the plant in the event of increased salt concentrations. It also acts as an osmotic equilibrator in guard cell cytoplasm, This improves the process of opening and closing stomata, as well as working on the formation of the chlorophyll molecule and its use in the construction of carbohydrates and its contribution to increasing plant growth and dry weight. In other words, it increases the plant's ability to absorb and balance the necessary elements, thus supporting growth and increasing yield [5]. As for arginic acid, it is an aliphatic acid, symbolised by Arg, and is considered to be a protein amino acid that the body cannot synthesise, and in plants it is found in structural proteins, but in small quantities that do not meet the plant's needs [6]. It is considered to be one of the most important elements for plant growth and is involved in many physiological processes such as growth, cell division and protection against ageing, as it is a precursor of amines and formed in plant plastids using certain enzymes found in plants [7], It works by inhibiting the enzymes responsible for producing ethylene, which are activated when the plant is exposed to salt and drought stress[8]. For easy absorption of arginine acid, it works on the one hand to reduce the percentage of abscisc inhibiting the growth and division of cells in the plant and on the other hand to increase the biosynthesis

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of gibberelin acid and auxins, thus working arginine to increase cell division and expansion [9]. Based on the above, the aim of the current study is to find the best level of glutamic acid and arginine sprayed on different genetic structures of bread wheat for the yield and quality qualities.

.2Materials and Methods

A field experiment was conducted during the winter agricultural season (2022-2023) at the Sayada site in Kirkuk Governorate - Agricultural Research and Experiment Station .(of the Faculty of Agriculture - University of Kirkuk (44.42° E and 35.16° N). The sandy clay soil characteristics are shown in Table (1

Table 1. Some physical and chemical characteristics of the experimental soil before planting.

No.	Feature	Value	Unit
		The first season 2020- 2021	
1	Soil (PH)	7.4	\
2	Electrical conductivity (Ec)	2.72	DC .M^{-1}
3	Organic matter (O.M)	0.89	gm kg^{-1} soil
4	Avaliable Nitrogen N)	27	
5	Avaliable phosphorus (P)	7	mg kg^{-1} soil
6	Avaliable potassium (K)	145	
7	Sand	560	
8	Silt	372	gm kg^{-1}
9	Clay	68	
10	Calcium carbonate CaCo3	24	\
11	Calcium sulphate CaSo4	12	\
12	O.M	0.89	\
13	Soil texture	sandy loam	\

The soil was analysed in the laboratory of the Soil Department, Faculty of Agriculture, University of Tikrit, and before planting, the soil was cultivated by two vertical tillage operations with disc combs (24 discs), smoothing, levelling and modifying the soil and creating shoulders between the boards. A complete random sector design was applied using a split-plot system with three replicates, Where the glutamate and arginine acid combinations are arranged in the main plates (Glutamic 0 + Arginine 0 and Glutamic 200 mg L-1 and Arginine 200 mg L-1 and Glutamic 100 mg L-1 + Arginine 100 mg L-1 ,

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Glutamic 100 mg L-1 + Arginine 200 mg L-1 , Glutamic 200 mg L-1 + Arginine 100 mg L-1 and Glutamic 200 mg L-1 + Arginine 200 mg L-1), While genotypes were randomized within secondary panels and details are shown in table (2). Seed was applied at a rate of 160 kg h-1. Phosphate fertiliser (DAP) was applied in one application at planting only at a rate of 320 kg h-1 Urea fertiliser (46% N) was applied in two applications at a rate of 200 kg h-1, The first application after the branching phase and the second application during the feeding phase [10]. The seeds of the genetic structures of wheat were sown manually on (23.11.2002) and the germination irrigation was given directly and then repeated irrigation depending on the soil moisture and whenever necessary, in addition to the service operations spraying of pesticides (2 - 4 D). The process of harvesting the genetic structures was carried out on (11.5.2002) after the appearance of signs of maturity of the crop and the maturity of the ears and their yellow colour

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Table 2. Names, numbers, and source of genotypes used in the study.

Seq	Genotypes	Proportion	Sources
1	Al-Fayyad	(ACSAD 875 // URES *2 / PRIS)	Certified/Prof. Dr. Jassim Mohammed Aziz Al-Jubouri
2	ALMawaddah	ATHS / NEEV 133	Certified/Seed Inspection and Certification Department/Kirkuk
3	Buhouth 22	CMSS96Y03236M-050M-040M-020M-050sy-IM-0Y /2011	Certified/Seed Inspection and Certification Department/Kirkuk
4	Babylon 113	Atomic Energy Organization / Dr. Muhammad Abdel Khaleq MEXIPAK/R23	Certified / Seed Inspection and Certification Department / Center
5	Gemmayzeh 9	Entrance from Republic of Egypt	Certified/Agricultural Research Station/Kafr El-Sheikh
6	Giza 164	Entrance from Republic of Egypt	Certified/Agricultural Research Station/Kafr El-Sheikh
7	Sakha 61	Entrance from Republic of Egypt	Certified/Agricultural Research Station/Kafr El-Sheikh
8	Sakha 95	Entrance from Republic of Egypt	Certified/Agricultural Research Station/Kafr El-Sheikh
9	Misr 3	Entrance from Republic of Egypt	Certified/Agricultural Research Station/Kafr El-Sheikh

I have studied the yield, the quality and the characteristics of the grain, Grain yield characteristic ton h-1 (calculated on the basis of the grain weight for the median line area of the experimental unit after harvesting, adding the grain area harvested above and then using the weight based on ton h-1 [11], The specific weight (kg hectolitre -1) is a measure of the

weight of a given volume of grain (kg hectolitre -1) as measured by the Hectolitre device [12]. In the absence of a table, calculate according to the following law: Specific gravity (kg hectolitre-1) = (weight of a quarter of a litre × 4 × 100) / 1000 and the percentage of protein (%). The percentage of protein was estimated using the Kjeldaes method for crude protein, the percentage of crude protein is calculated [13]. Using the formula: protein % = nitrogen % x 5.7%, And wet gluten (%) The wet gluten content of the wheat sample flour was calculated by the standard method [14] using the Glutomatic Gluten Index instrument, And the dry gluten content (%) was calculated as follows: After calculating the percentage of wet gluten, the sample was dried in an oven at (105) °C for four minutes in an apparatus (2020GlutorK), then weighed in a sensitive balance and the result recorded and converted into a percentage: percentage of dry gluten (%) = (weight of dry gluten/weight of flour) × 100, The sedimentation value (Zelene test ML-1) was estimated as the sedimentation value in accordance with the above method (56-60) [15]. The data were analysed according to the design used. Significant differences between means were tested by the Dunkin' polynomial test at the 5% probability level [16], using the SAS program.

.3Results and Discussions

.3.1Grain yield (ton h-1:(

The genetic structure Gemmayzeh 9 surpassed the rest of the genetic structures included in this study by giving it the highest average grain yield characteristic of (6.25) ton h-1, followed by the genetic type Misr 3 with arithmetic average of (6.15) ton h-1, while the genetic structure recorded the lowest average characteristic of (4.38) ton h-1 as shown in Table (3), The superiority of this genotype is due to its superiority in yield characteristics and its components (spike length and number of plant spikes), in addition to the genetic differentiation between the genetic structures in the efficiency of making greater use of the products of carbon construction [17,18], The results obtained with the glutamic and argini acid treatments and their combinations showed significant differences, as the combination (glutamic acid 200 mg L-1 + arginie acid 200 mg L-1) obtained the highest average trait (7.08) ton h-1 compared to the control plants, which obtained the lowest average trait (3.90) ton h-1. Spraying the leaves of the plant with amino acids at two different times during the vegetative growth period helped them to absorb them directly and this was reflected in an increase in the efficiency of carbon construction, which led to the stimulation of protein synthetic enzymes and carbohydrates and to an increase in the downstream dry matter (grain), and these results were consistent with [19,20]. The results obtained from Table (3) show that there are significant differences between the interference of the two study factors, as the genetic structures Gemmayzeh 9, Giza 164 and Misr 3 stood out under the influence of the combination (glutamic acid 200 mg L-1 + arginie acid 200 mg L-1) with arithmetic means of 7.95, 7.85 and 7.88 ton h-1 respectively, while the abundant genetic type with the comparison treatment recorded the lowest arithmetic mean of 3.00 ton h-1

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Table 3. Effect of the combination (glutamic acid and arginine) on several wheat genotypes for grain yield (tons ha^{-1}).

The combination / Genotype	(Glu.0 +Arg. 0) mg L^{-1}	(Glu.200 +Arg.0) mg L^{-1}	(Glu.0 +Arg.200) mg L^{-1}	(Glu.100 +Arg.100) mg L^{-1}	(Glu.100 +Arg.200) mg L^{-1}	(Glu.200 +Arg.100) mg L^{-1}	(Glu.200 +Arg.200) mg L^{-1}	Genotypes Average
Al-Fayyad	3.00 z	4.87 y	3.49 z	3.91 z	4.33 cd	5.03 wx	6.03 no	**4.38 i**
AL Mawaddah	3.90 z	5.16 uv	4.03 g	4.59 ab	4.89 y	5.32 t	6.31 jk	**4.88 f**
Buhouth 22	3.45 z	5.06 vw	3.69 i	4.19 ef	4.64 az	5.21 tu	6.21 klm	**4.63 g**
Babylon 113	3.26 z	5.02 wx	3.60 i	4.12 fg	4.55 ab	5.11 uvw	6.19 lm	**4.55 h**
Gemmayzeh 9	4.49 b	6.91 cd	5.02 wx	6.05 h	6.39 j	6.97 c	7.95 a	**6.25 a**
Giza 164	4.23 de	6.76 fg	4.91 y	5.82 qr	6.12 nm	6.79 ef	7.85 a	**6.07 c**
Sakha 61	4.16 ef	6.52 i	4.71 z	5.54 s	5.83 pqr	6.58 hi	7.60 b	**5.85 e**
Sakha 95	4.26 cde	6.66 gh	4.85 y	5.73 r	5.92 pq	6.66 gh	7.70 b	**5.97 d**
Misr 3	4.36 c	6.84 def	4.94 xy	5.93 op	6.26 kl	6.87 cde	7.88 a	**6.15 b**
Averages of combination	**3.90 z**	**5.98 b**	**4.36 e**	**5.10 d**	**5.44 c**	**6.06 b**	**7.08 a**	

*Different letters mean there is a significant difference

.3.2Specific weight (kg hectolitre-1:(

The genetic type Gemmayzeh 9 significantly outperformed all the genetic types and thus achieved the highest arithmetic mean (79.57) kg hectolitre-1, while the rich genetic type gave the lowest average trait (77.67) kg hectolitre-1.Note that there are significant effects of the study factors in the specific weight trait as shown in Table (4). This difference is due to the genetic nature of the genetic structures and the percentage of endosperm fullness, which was reflected in the variation of this characteristic, consistent with [21,22], regarding glutamic and arginine acids and their combinations, the results showed that there is a significant difference, Plants sprayed with a leaf combination (200 mg L-1 glutamic acid + 200 mg L-1 arginie acid) outperformed all combinations and had the highest arithmetic mean of 79.66 kg hectolitre-1compared to the unsprayed control plants

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which had the lowest mean of 77. kg hectolitre-1, This is due to the extent to which genetic structures respond to the combination of glutamic and arginine acids, which positively affects physiological processes and their role in increasing the synthesis of proteins, vitamins and carbohydrates and their rapid movement from source to sink, thus increasing production and improving its quality [23], and this corresponds to both [22,24]. The interaction between the genotypes and the combinations of glutamic acid and arginine was statistically and significantly significant according to the Dunkin' multiple range test, as the genetic type Gemmayzeh 9 under the influence of the combination (200 mg L-1 glutamic acid + 200 mg L-1 arginine acid) obtained the highest arithmetic mean of 81.03 kg hectolitre-1, while the lowest mean was obtained compared to the rich genotype (77.11) kg hectolitre-1

Table (4) Effect of the combination (glutamic acid and arginine) in different genetic structures of wheat on the characteristic of the specific weight (kg hectolitre-1).

The combination / Genotype	**(Glu.0 +Arg. 0) mg L^{-1}**	**(Glu.200 +Arg.0) mg L^{-1}**	**(Glu.0 +Arg.200) mg L^{-1}**	**(Glu.100 +Arg.100) mg L^{-1}**	**(Glu.100 +Arg.200) mg L^{-1}**	**(Glu.200 +Arg.100) mg L^{-1}**	**(Glu.200 +Arg.200) mg L^{-1}**	**Genotypes Average**
Al-Fayyad	77.11 d	77.85 wxy	77.30 cd	77.55 ab	77.69 ayz	77.97 tuv	78.21qrs	**77.67 h**
AL Mawaddah	77.79 xyz	78.29 pqr	77.97 tuv	78.10 stu	78.20 rst	78.63 mno	78.98 jk	**78.28 f**
Buhouth 22	77.54 cd	78.10 stu	77.74 axy	77.86 vwx	77.99 tuv	78.24 qrs	78.97 jk	**78.06 g**
Babylon 113	77.13 cd	78.17 rst	77.44 bc	77.65 abz	77.93 uvw	78.49 nop	79.17 ij	**78.02 g**
Gemmayzeh 9	78.46 nop	80.03 de	78.90 kl	79.01 jk	79.33 hi	80.26 c	81.03 a	**79.57 a**
Giza 164	78.07 stu	78.86 fg	78.58 no	78.64 mno	78.89 kl	80.10 cd	80.69 b	**79.23 b**
Sakha 61	77.93 uvw	78.86 klm	78.30 pqr	78.40 pqr	78.56 no	79.00 jk	79.53 gh	**78.65 e**
Sakha 95	78.06 stu	79.04 jk	78.42 pqr	78.51 nop	78.65 mno	79.48 gh	79.87 ef	**78.86 d**
Misr 3	78.22 qrs	79.39 hi	78.46 nop	78.56 nop	78.69 lmn	79.97 de	80.51 b	**79.11 c**
Averages of combination	**77.83 g**	**78.82 c**	**78.12 f**	**78.25 e**	**78.43 d**	**79.12 b**	**79.66a**	

*Different letters mean there is a significant difference

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.3.3Percentage of protein :(%)

The presence of significant effects of the study factors in the percentage of protein as shown in Table (5), as the genetic structure gave Misr 3 the highest arithmetic mean (13.20)% and a significant difference from the rest of the genetic structures, while the genetic structure gave affection the lowest average trait (11.17)%, This variation is due to the ability of the genetic structure to take full advantage of glutamic acid and arginine and their combinations, which are sprayed on the leaves of the plant and in two stages of plant life, as they are the main component of protein and work to increase the synthesis of gluten [25]. These results were in agreement with [22,24], for the concentration of glutamic and arginine acids and their combinations, the results showed significant differences, as the plants of the genotype which sprayed its leaves with the combination (200 mg L-1 glutamic + 200 mg L-1 arginine) performed better, as it gave the highest arithmetic average of 13.31% compared to the rest of the coefficients, while the unsprayed control plants gave the lowest average of 11.27%. The difference in vegetative totals between genetic structures and their ability to deal with the process of spraying plants with glutamic acids and arginine and using them to increase the percentage of protein synthesised within the grain plus the amount of nitrogen absorbed and converted through the root system downstream [26], is consistent with [21,27]. The interaction between the genotypes and the combinations of glutamic acid and arginine was statistically significant according to the Dunkin' multiple range test, as the genetic type exceeded Misr 3 under the influence of the combination (200 mg L-1 glutamic acid + 200 mg L-1 arginine acid) with an arithmetic mean of (14.40) % compared to the genetic type of Al AL Mawaddah while the control treatment, which gave the lowest arithmetic mean of 10.50%, The results of the experiment showed a significant increase in protein percentage with increasing concentration of both glutamic acid and arginine acid. This is in agreement with [22,28

Table (5) Effect of the combination (glutamic acid and L-arginine) on the different genetic structures of the spelt for the characteristic of the protein percentage.

The combination / Genotype	**(Glu.0 +Arg. 0) mg L^{-1}**	**(Glu.200 +Arg.0) mg L^{-1}**	**(Glu.0 +Arg.200) mg L^{-1}**	**(Glu.100 +Arg.100) mg L^{-1}**	**(Glu.100 +Arg.200) mg L^{-1}**	**(Glu.200 +Arg.100) mg L^{-1}**	**(Glu.200 +Arg.200) mg L^{-1}**	**Genotypes Average**
Al-Fayyad	11.53 ijk	12.00 fgh	11.90 fgh	12.10 fgh	12.53 cde	13.03 abc	13.50 abc	**12.37 bcd**
AL Mawaddah	10.50 q	11.00 nop	10.80 pq	11.00 nop	11.13 lmn	11.80 ghi	12.00 fgh	**11.17 e**
Buhouth 22	11.00	11.70	11.50 hij	11.80 ghi	12.20 def	12.76	12.93	**11.98 cd**

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	nop	ghi				bcd	bcd	
Babylon 113	11.10 mno	11.80 ghi	11.60 hij	11.80 ghi	12.00 fgh	12.50 cde	12.76 bcd	**11.93 d**
Gemmayzeh 9	10.90 opq	11.90 fgh	11.60 hij	12.00 fgh	12.40 def	12.90 bcd	13.16 abc	**12.12 cd**
Giza 164	11.30 klm	12.00 fgh	12.23 def	12.20 def	12.80 bcd	13.00 abc	13.50 abc	**12.40 bcd**
Sakha 61	11.50 jkl	12.30 def	12.10 fgh	12.40 def	12.60 bcd	13.33 abc	13.90 abc	**12.61 b**
Sakha 95	11.60 hij	12.20 def	12.00 fgh	12.30 def	12.50 cde	13.00 abc	13.66 abc	**12.46 bc**
Misr 3	12.00 fgh	13.00 abc	12.53 cde	13.00 abc	13.50 abc	14.00 ab	14.40 a	**13.20 a**
Averages of combination	**11.27f**	**11.98de**	**11.80e**	**12.06d**	**12.40c**	**12.92b**	**13.31a**	

*Different letters mean there is a significant difference.

.3.4Percentage of wet gluten: (%)

The results of table (6) showed that the two factors of the study and their combinations have a significant variation for the percent characteristic of wetting cotin, as the two genetic compositions surpassed Sakha 95 and Misr 3, recording the highest average characteristic of 36.15 and 36.02 %, respectively, with an insignificant difference from the genetic composition of Giza 164 with an average of 35.42 %. While the plants of the genotype obtained the lowest average of 29.92%, the difference between the genetic structures of the plants among themselves in this trait may reflect the difference in their genetic nature and high content of good quality protein. This result is consistent with the findings of [24,28], who found significant differences between wheat varieties in the percentage of chlorotene in cereals. The combined treatment plants (glutamic acid 200 mg l-1 + arginine acid 200 mg l-1) achieved a significant superiority, giving them the highest arithmetic averages of 35.42 and 35.10% respectively, compared to the unsprayed control plants, which gave the lowest average of 11.27%. This was due to the direct relationship between protein ratio and wet gluten ratio, in addition to the ability of the genetic structure to convert the product of carbon metabolism from source to downstream [29], and these results were consistent with the findings of [22,30]. Statistical evidence of the results of the interaction between the genotypes and the combinations of glutamic acid and arginine indicates the superiority of the genetic structure of Giza 164 in the percentage of wet chloroten when spraying its plant leaves with

the combination (glutamic acid 200 mg l-1 + arginine acid 100 mg l-1) with an arithmetic mean of (41. 81)% and a significant difference from all the interactions except (glutamic acid 200 mg l-1 + arginic acid 200 mg l-1) with the composition Misr 3, while the ALMawaddah genetic composition with the comparison treatment of the lowest arithmetic mean (27.89.%(

Table (6) Effect of the combination (glutamic acid and arginine) in several genotypes of wheat on the characteristic of wet gluten (%).

The combination / Genotype	**(Glu.0 +Arg. 0) mg L^{-1}**	**(Glu.200 +Arg.0) mg L^{-1}**	**(Glu.0 +Arg.200) mg L^{-1}**	**(Glu.100 +Arg.100) mg L^{-1}**	**(Glu.100 +Arg.200) mg L^{-1}**	**(Glu.200 +Arg.100) mg L^{-1}**	**(Glu.200 +Arg.200) mg L^{-1}**	**Genotypes Average**
Al-Fayyad	31.70 opq	33.68 ghi	32.59 ijk	32.17 ijk	34.75 fgh	34.83 efg	36.44 cde	**33.83 c**
ALMawaddah	27.89 w	30.20 stu	29.01 uvw	29.73 tuv	30.86 qrs	30.63 rst	31.11 pqr	**29.92 f**
Buhouth 22	31.34 opq	32.94 ijk	32.10 lmn	23.23 klm	32.71 ijk	31.78 nop	32.30 jkl	**32.20 d**
Babylon 113	28.94 vw	31.11 pqr	30.20 tuv	30.72 rst	31.75 nop	32.92 ijk	33.18 ghi	**31.26 e**
Gemmayzeh 9	32.87 ijk	34.88 efg	34.02 ghi	34.22 fgh	34.63 efg	32.23 klm	32.08 mno	**33.56 c**
Giza 164	32.94 ijk	34.12 fgh	33.69 ghi	33.86 ghi	34.58 fgh	41.81 a	36.97 cde	**35.42 ab**
Sakha 61	32.68 ijk	34.34 fgh	34.22 fgh	33.79 ghi	35.22 efg	36.32 def	37.33 cde	**34.84 b**
Sakha 95	34.19 fgh	36.09 def	35.08 efg	35.30 efg	36.01 def	37.32 cde	39.08 bc	**36.15 a**
Misr 3	32.75 ijk	35.12 efg	34.38 fgh	35.04 efg	36.44 def	38.10 bcd	40.31 ab	**36.02 a**
Averages of combination	**31.70e**	**33.60bc**	**32.81d**	**33.08cd**	**34.10b**	**35.10a**	**35.42a**	

*Different letters mean there is a significant difference

.3.5Percentage of Dry gluten: (%)

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The results of table (7) show that the arithmetic averages indicate the superiority of the two genetic structures Misr3 and Sakha 95 significantly over all the structures by giving them the highest average of the dry gluten ratio trait of 12.14% and 11.98% respectively, while the affection structure recorded the lowest average trait of 10.00%. The advantage of the two compositions Misr3 and Sakha95 was the result of a direct relationship: the higher the percentage of protein and wet nodule, the higher the percentage of dry gluten, and the role of amino acids in promoting the biosynthesis of free amino acids, which are one of the constituents of protein [31], and these results are consistent with the results of [22,32].The combination (glutamic acid 200 mg L-1 + arginine 200 mg L-1) recorded the highest average feature of 11.90% with significant variation from the rest of the genotypes The comparison treatment recorded the lowest mean score an arithmetic average of 10.63%. The bilateral interaction between the genotypes and glutamate and arginine has a considerable variation, as the genotype of Misr 3 was recorded at the concentration (glutamate 200 mg L-1 + arginine 200 mg L-1) with the highest mean characteristic of 13.50, with a non-significant difference at the same concentration of the genotype Sakha95, while the lowest average trait (9.60) % for the AL Mawaddah genetic type was recorded with the comparison treatment, The reason for the difference between the genetic structures of this characteristic is, on the one hand, due to the genetic character and, on the other hand, due to the genetic character. These results are consistent with those of [33,34] in that these percentages parallel the percentages of wet gluten as shown in Table (5

Table (7) Effect of combination (glutamic acid and arginine) on several genetic structures of wheat for dry gluten content (%)

The combination / Genotype	**(Glu.0 +Arg. 0) mg L^{-1}**	**(Glu.200 +Arg.0) mg L^{-1}**	**(Glu.0 +Arg.200) mg L^{-1}**	**(Glu.100 +Arg.100) mg L^{-1}**	**(Glu.100 +Arg.200) mg L^{-1}**	**(Glu.200 +Arg.100) mg L^{-1}**	**(Glu.200 +Arg.200) mg L^{-1}**	**Genotypes Average**
Al-Fayyad	10.56 nop	12.14 cde	11.24 ghi	10.90 klm	11.08 def	11.72 def	12.13 cde	**11.46 b**
ALMawaddah	9.60 uv	10.02 stu	9.49 v	9.93 tuv	10.29 rst	10.34 qrs	10.36 qrs	**10.00 e**
Buhouth 22	10.44 pqr	10.17stu	10.99 hij	10.74 mno	10.60 nop	10.56 opq	10.76 mno	**10.61 d**
Babylon 113	9.65 uv	10.61 nop	10.36 qrs	10.27 qrs	10.96 ijk	10.99 hij	11.71 def	**10.65 d**
Gemmayzeh 9	11.42 efg	11.38 fgh	11.60 def	11.41 fgh	10.73 mno	10.70 mno	10.77 mno	**11.14 c**
Giza 164	10.77	11.33	11.93	11.29	11.81 def	10.76	12.32	**11.46 b**

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	mno	fgh	cde	fgh		mno	cde	
Sakha 61	10.88 lmn	11.85 def	11.49 efg	11.24 ghi	11.75 def	12.10 cde	12.42 bcd	**11.67 b**
Sakha 95	11.40 fgh	11.72 def	11.25 ghi	11.89 cde	12.04 cde	12.43 bcd	13.16 ab	**11.98 a**
Misr 3	10.92 jkl	11.69 def	12.20 cde	11.83 def	12.15 cde	12.72 bc	13.50 a	**12.14 a**
Averages of combination	**10.63d**	**11,21cb**	**11.17cb**	**11.05c**	**11.32b**	**11.37b**	**11.90a**	

*Different letters mean there is a significant difference.

.3.6Sedimentation value (xylene test mL-1:(

From Table (8) we can see that the genetic structure of Misr 3 was significantly better than the remaining genetic structures included in the study, recording the highest mean (13.20%), while the structure AL Mawaddah that was least affected in this trait had a mean (11.17%). The difference between the genotypes in this trait is due to the percentage of gluten and its quality, related to the ratio of strong gluten (collected at the top of the centrifuge sieve) to weak gluten, since high values of sedimentation volume indicate good gluten quality, increased dough elasticity and improved baking quality and vice versa [21], in agreement with the results obtained by [22,28],In addition, the results showed that the concentration of glutamate and arginine by the combination (glutamate 200 mg L-1+arginine 200 mg L-1) was higher than all the treatments, with the highest mean value (27.55%) compared to the control treatment (23.32%), due to the difference in the proportion of non-chlorogenic [35], which is in agreement with the results of [22,24]. The intersection between the study factors had a significant effect, as the genotype of Misr 3 achieved the highest average (29.06)% with a non-significant difference for the genetic makeup of Sakha 95 with an average of (28.49)% when sprayed with the combination (glutamic acid 200 mg l-1 + arginine acid 200 mg l-1), and the AL Mawaddah genetic type recorded affection with the lowest arithmetic average of 22.00%.

Table (8) Effect of the combination of glutamic acid and arginine on different genetic structures of spelt for the sedimentation value (xylene test ml^{-1})

The combination / Genotype	**(Glu.0 +Arg. 0) mg L^{-1}**	**(Glu.200 +Arg.0) mg L^{-1}**	**(Glu.0 +Arg.200) mg L^{-1}**	**(Glu.100 +Arg.100) mg L^{-1}**	**(Glu.100 +Arg.200) mg L^{-1}**	**(Glu.200 +Arg.100) mg L^{-1}**	**(Glu.200 +Arg.200) mg L^{-1}**	**Genotypes Average**

Al-Fayyad	23.87 wxy	24.44 qrs	24.21 stu	24.52 qrs	26.16 lm	26.95 gh	28.23 bc	**12.37 bcd**
ALMawaddah	22.00 f	23.08 bcd	22.52 e	23.13 bcd	24.09 tuv	25.06 op	26.05 lm	**11.17 e**
Buhouth 22	23.75 xyz	24.21 stu	23.85 wxy	24.21 stu	25.46 no	26.24 jkl	26.86 gh	**11.98 cd**
Babylon 113	22.50 e	23.24 abc	22.87 cde	23.15 bcd	24.34 rst	25.85 lmn	26.65 hij	**11.93 d**
Gemmayzeh 9	23.03 bcd	23.94 vwx	23.24 abz	23.86 wxy	25.78 mn	26.88 gh	27.34 efg	**12.12 cd**
Giza 164	22.72d e	23.71 xyz	22.95 bcd	23.63 ayz	24.79 pqr	26.32 ijk	26.96 fgh	**12.40 bcd**
Sakha 61	23.91 wxy	24.76 pqr	24.31 rst	24.02 tuv	26.62 hij	27.09 fgh	28.31 bc	**12.61 b**
Sakha 95	24.00 uvw	24.86 pq	24.75 pqp	24.67 pqr	26.78 hi	27.75 de	28.49 b	**12.46 bc**
Misr 3	24.12 tuv	25.04 op	25.11 op	24.47 qrs	27.41 ef	27.93 cd	29.06 a	**13.20 a**
Averages of combination	**23.32g**	**24.14d**	**23.77f**	**23.96e**	**25.71c**	**26.67b**	**27.55a**	

*Different letters mean there is a significant difference.

Conclusion

The positive effect of spraying with glutamic and arginine acids on yield, quality and characteristics, as well as the genetic disparity between genetic structures in their ability to benefit from the amino acid spraying process towards activating enzymes for protein synthesis and converting most of the products of carbon metabolism downstream, The introduced genetic structures (Misr 3, Sakha 95 and Giza 164) were significantly superior to the other structures for most of the traits studied. It was possible to grow them for more than one season and site to see the extent of their stability under the conditions of the region.

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