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Effect Of Adding Different Levels Of Ginger Powder On The Sensory Parameters Of Berker Frozen Buffalo Meat Discs

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Abstract

This study was conducted in the laboratories of the Department of Animal Production,College of Agriculture / University of Thi Qar for the period from 6/1/2022 to 3/4/2022 to know the effect of adding different levels of ginger powder on the sensory parameters of Berker frozen buffalo meat tablets used for thigh meat, which was purchased From the local markets of the city of Nasiriyah and the experiment was conducted using concentrations of 1, 2 and 3% of ginger powder, which was added to the meat tablets kept by cooling at a temperature of 4 ° C. The sensory tests were conducted, and the results when assessing the sensory criteria led to a moral superiority in the color of buffalo meat in favor of the treatment T2 for the fourth, seventh and ninth days, with averages (9.00, 8.00, and 8.33), respectively, and on the twelfth day, T3 outperformed with an average of (8.67). The moral superiority for the first, fourth, seventh and ninth days was in favor of the T2 treatment, and their averages were (8.67,8.33, 8.67,8.67, respectively), and with regard to freshness, the moral superiority was in favor of the T2 treatment for the fourth, seventh and ninth days, with averages (8.33, 7.67, 8.00 (respectively and on the day). The twelfth treatment T4 outperformed the rest of the treatments with an average of (8.00) The results showed a significant increase in meat juice in favor of the T2 treatment for the fourth, seventh and ninth days with averages of (8.33, 8.00, 8.00) respectively, and on the twelfth and fifth days, treatment T4 outperformed the rest of the treatments with an average It reached (7.33, 7.00), respectively, and the significant increase continued in favor of T2 treatment in general acceptance and for the first, fourth, seventh and ninth days, with an average of (9.00, 9.00, 8.67, 7.67).T3 treatment time was significant and averaged (7.67) for the twelfth day

Keywords: buffalo meat, ginger, sensory qualities

I. INTRODUCTION

The consumption of meat and its products has increased recently due to the high level of per capita income, and the desire of consumers to obtain a main meal of this meat, as it constitutes a main source of human (Al Fayadh,2011)supply with proteins, fats, vitamins and minerals,

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The oxidation of fats and proteins in meat products is the second Themost important cause of meat spoilage after microbial contamination. (Falowo, 2014) which is associated with deterioration in nutritional value and general deterioration in meat palatability and other organoleptic qualities(Mercier et al; 2004, and Zhang et al; 2013, and Domínguez et al; 2019).

And after the development in meat preservation techniques through the global use of cold chain logistics and new heat treatments and developments in packaging and the addition of preservatives, which have been used to enhance the safety and quality of meat and meat products (Zhou; 2010 and Pereira et al; 2010 and Rahman et al; 2018) . Meat has been controlled and preserved from microbial contamination and oxidation processes. Due to the development of the meat industry all over the world, the demand for extending the preservation period of meat has increased, and many techniques for preserving meat such as salting, drying, smoking, fermentation and canning have traditionally been used to extend the shelf life of meat(Dave;2011), Reactions to these artificial additives have increased due to their impact on consumer health, disorders in pregnant women and children, potential for cancer, etc. (Kumari et al; 2019), Consequently, attention was drawn to the use of natural antioxidants (Pokorný et al; 2007), and since they are safer, healthier and beneficial in themselves, the use of plant-derived additives in the meat industry has increased, with the aim of replacing synthetic antioxidants (Shah ;2014). One of these plants is Zingiber officinale Zingiber officinale var. Roscoe, which is called home pharmacy for its great medical importance, and is considered one of the richest plants for its nutritional and therapeutic value . (Al-Bahadli ,2020) .

II. MATERIALS AND WORKING METHODS

Materials used in the study: Ginger powder / meat / buffalo meat (thigh area) was obtained from the local markets of Thi Qar Governorate in the early morning and the physical inventory was conducted for it, it was minced and placed in sterile containers and then transferred to the laboratory until manufacturing.

Fat / The fat was obtained from the same carcass from which the meat was taken and was minced and transported in sterilized containers until processing ,**Spices/** The spices for the manufacture of meat birker were obtained from the local markets of Thi Qar Governorate (production of Karbala Factory for the manufacture of food powders and spices) made in Iraq ,**Salt /** Salt was added by weight of 1.5% of the weight of processed meat, **Starch /** starch was added at a weight of 5% of the weight of processed meat.

Cryopreservation experiment at 4°C

The meat was minced using the electric mincing machine, and fat (minced fat) and starch were added to the transactions and mixed well. Ginger powder was added with different concentrations, and the transactions were distributed as follows:

1-Control treatment (T1): 15% fat and 5% starch were added to the meat without adding ginger powder the meat without adding ginger powder .

.**2-**The second treatment (T2), adding ginger powder by 1% with the addition of 15% fat and 5% starch.

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3-The third treatment (T3), adding ginger powder by 2%, with the addition of 15% fat and 5% starch.

4-Fourth treatment (T4), adding ginger powder by 3%, adding 15% fat and 5% starch.

Then I made Berker meat with a weight of 100 g per sample and kept refrigerated until tests were done

Panel test

Levie (1970) method was used after the completion of cooking, the discs were cut into small pieces for the purpose of conducting sensory evaluation by a number of experienced arbitrators in the animal production department to evaluate the samples in terms of color, tenderness, flavor and juiciness. And general acceptance (Over all acceptability) and according to the scale of grades consisting of 9 degrees (Form 1).

Table (1) Sensory evaluation score form

Sensory Evaluation Form			
	Rating		Rating
Average	٦-٥	Excellent	٩
Acceptable	٤-٣	Very Good	٨
Unacceptable	٢-١	Good	٧

Table (2) Sensory evaluation form

Sample Number	Color	Tenderness	Flavor	Juiciness	General Acceptance

III.RESULTS AND DISCUSSION/ Refrigerate the Berker tablets at 4 pm

Evaluation Properties

Color

Table (1) shows the average evaluation scores given to Berker meat tablets treated with different levels of chilled ginger powder, which led to a significant improvement in the color of the tablets at the level ($P<0.05$), as ginger had an improved effect on the color character compared to the control treatment. The results of the current study showed on the first day of the experiment that there were no significant differences in the meat tablets for the different experimental treatments. As

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for the fourth day of the study, there was a clear increase in the mean meat color in favor of treatment T2 with an average of (9.00) compared to the two treatments (T3 and T4) which did not differ significantly between them and their mean was (8.00 and 7.76), respectively, and these two treatments outperformed the treatment of T1, which recorded An average of 6.00. On the seventh day of the study, each of the three treatments (T2, T3, and T4) showed a significant and clear increase compared to treatment (T1), and the averages recorded for meat color were for the treatments (T2, T3, T4 and T1) (8.00, 7.76, 7.00, 6.00), respectively. As for the results of the ninth day, the significant increase was in favor of treatments (T2, T3, and T4) compared to treatment (T1), and the averages recorded for meat color for the treatments (T2, T3, T4 and T1) were (8.33, 7.67, 7.33, 5.00), respectively, and treatment T1 was excluded due to microbial contamination. it and oxidize it. On the twelfth day, treatment (T3) excelled with an average of (8.67) compared to treatments T4 and (T2, for which the average color of meat was (7.67, 7.33), respectively, and treatment T2 was excluded due to its microbial contamination and oxidation. The experiment did not show any significant differences between the two treatments (T3 and T4), and the averages of the two treatments were (6.00 and 6.00), respectively.The continuity of the Burker tablets treated with ginger powder is due to maintaining the color of the meat for longer periods of time when kept in cold storage, to the effectiveness of ginger in preventing the oxidation of myoglobin pigment to dead maglobin. The phenolic compounds in ginger preserve the pigment by inhibiting the formation of free radicals through the oxidation of fats that turn the meat brown as a result of the iron-containing dead

Al eadhari,2017) (myglobin Fe^{+3}

The results agreed with ginger powder, and when conducting (2019، Ahmed),when fed arab lambs

tests and sensory evaluation, a significant superiority of meat tablets treated with ginger was observed, which led to an improvement in color quality, It agreed with (Al-Birawi,2020)

that the color of Burker meat discs treated with adult gel improved compared to the control treatment, and the results differed with **(2017, Reshi)** when chicken sausages were treated with ginger

extract.

Table (1) Effect of adding different levels of ginger powder on the color character of birker pellets for refrigerated buffalo meat with different durations (mean ± standard error).

Storage period (day)						Transactions
15	**12**	**9**	**7**	**4**	**1**	
		5.00 0.00± B	6.00 0.57± B	6.00 0.57± C	0.33± 7.53	T1
	7.33 0.33± B	8.33 0.67± A	8.00 0.57± A	9.00 0.00± A	0.33± 7.46	T2
6.00 0.33±	8.67 0.33± A	7.67 0.33± A	7.76 0.67± A	8.00 0.57± B	0.33± 7.67	T3
6.00 0.67±	7.67 0.67± B	7.3 0.33± A	7.00 0.57± A	7.76 0.33± B	7.67 0.66±	T4
N.S	*	*	*	*	N.S	morale level

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* The different letters vertically indicate the presence of significant differences between the mean of the transactions under the level of significance of 0.05.

* N.S means that there is no significant difference between the means. T1 = control treatment, T2 = ginger 1% T3 = ginger 2% T4 = ginger 3%

Flavor

The results of the current study showed the effect of adding different levels of ginger powder in the flavor of Berker's tablets(2) stored in refrigeration for different periods of time. The fourth of the experiment was superior to treatment (T2) with an average of (8.67) compared to treatment (T3) and its average (7.67) which outperformed (T4), which had an average of (7.00), while treatment (T1) recorded the lowest averages among the different experimental treatments. On the seventh day of the experiment, the significant increase was recorded in favor of treatment (T2) with an average of (8.67) compared to treatment (T4) with an average of (7.33), while (T3) did not differ from (T2 , T4) with an average of (7.67) and the treatments were significantly superior (T2, T3, , T4) with the treatment (T1), which had a mean of (5.00). On the ninth day of the experiment, the significant increase was recorded in favor of treatment (T2) with an average of (8.67) compared to treatment (T3) with an average of (8.00), and it was significantly superior to treatment (T4) with an average of (7.33) and treatment (T4) was significantly superior to treatment (T4) with an average of (7.33). Treatment (T1), whose mean was (4.00), was excluded due to bacterial contamination and oxidation, There was no significant difference between the different experimental treatments for the twelfth and fifteenth days. The reason for keeping ginger powder tablets within the limits of good and very good grades is due to the fact that ginger contains volatile oils and they are used as flavorings and thus increase the evaluation of the flavor characteristic. What happens in the percentage of free fatty acids may be caused by lipolytic enzymes such as Lipase and Phosphlipase, which leads to the release of free fatty acids, which contribute significantly to the formation of an undesirable smell and thus is reflected in the deterioration of flavor, causing a decrease by increasing the length (Al-Rubeii,2009,2005;Al Raawy) ,The results of storage period.

agreed with**(Mancini et al; 2017)** when using ginger powder to improve the quality characteristics of pork led to a significant improvement in the sensory evaluation characteristics of the treatments treated with ginger powder. The results also agreed with **(Draszanowska et al., 2020**) when adding chili fruits to canned cold stored meat was observed. Preservation of the flavor characteristic. **(Andres et al; 2017)** differed. No significant effect was observed on sensory characteristics when treating lamb with olive and red grapes.

Table (2) Effect of adding different levels of ginger powder on the flavor profile of burker pellets for refrigerated buffalo meat with different durations (mean ± standard)(error)

Storage period (day)						Transactions
15	12	9	7	4	1	
		4.00 0.57±	5.00 0.00±	6.33 0.33±	6.33 0.33±	T1

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		D	C	D	C	
	7.67 0.67±	8.67 0.33± A	8.67 0.33± A	8.67 0.33± A	8.33 0.33± A	**T2**
6.00 0.00±	8.00 0.00±	8.00 0.00± B	7.67 0.88± ab	7.67 0.33± B	7.33 0.33± B	**T3**
5.67 0.67±	7.67 0.67±	7.33 0.33± C	7.33 0.88± B	7.00 0.33± C	7.33 0.33± B	**T4**
N.S	N.S	*	*	*	*	morale level

Tenderness

The addition of different levels of ginger powder led to a significant improvement in the freshness of the tablets treated with ginger compared to the control treatment as shown in Table (3)

There were no significant differences between the different experimental treatments during the first day of the experiment. On the fourth day, treatment (T2) was significantly superior with an average of (8.33) compared to treatment (T1) (5.67), while the two treatments (T3 and T4) did not differ significantly from the rest of the treatments and their averages were (8.00, 7.67). On the seventh day of the experiment, both treatments (T2 and T3) were significantly superior to treatment (T1), and the averages recorded for the tenderness of meat for the treatments (T2, T3 and T1) were (7.67, 7.67, 5.67), while treatment (T4) did not differ significantly from the rest. Experiment coefficients for today and recorded an average of (7.33). The two treatments (T2 and T3) were significantly superior to treatments (T4 and T1) on the ninth day of the experiment, and treatment (T1) was excluded due to its microbial contamination and oxidation. The averages recorded for the treatments (T2, T3, T4 and T1) were (8.00, 7.67, 6.67, 6.33, respectively . On the twelfth day, the two treatments (T4 and T3) outperformed treatment (T2), which was excluded from the experiment due to its microbial contamination and oxidation, and the averages recorded for the treatments (T4, T3 and T2) were (8.00, 7.00, 5.33), respectively. Finally, on the fifteenth day, no significant differences appeared between the two treatments (T4 and T3), except for an arithmetic increase in favor of treatment (T4), whose value was (7.00), while the value of treatment (T3) was (6.00). Through the results, we find that the characteristic of tenderness constantly decreases the storage period, but the decrease in the degree of evaluation is higher than that of the control treatment as a result of treating the meat with ginger powder, which increased the water-carrying capacity and the decrease in the percentage of liberated liquid for the effectiveness of ginger in preserving the cell membranes from damage and thus led to an increase in the duration of preservation When treating Cooling at 4°C.(Al-Tufaili,2016) The results agreed with, the addition of sprouted barley, flax seeds and Almazah led to a significant superiority of the tenderness characteristic compared to the control treatment and it agreed with **(Yousif, 2020)**. However, it is less compared to the control treatment.

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Table (3) Effect of adding different levels of ginger powder on the tenderness of Berker buffalo meat discs stored in refrigeration for different periods of time (mean ± standard error).

Storage period (day)						Transactions
15	**12**	**9**	**7**	**4**	**1**	
	.	6.33 0.33± B	5.67 0.67± B	5.67 0.33± B	6.00 0.57±	**T1**
	5.33 0.33± B	8.00 0.57± A	7.67 0.33± A	8.33 0.33± A	6.87 0.34±	**T2**
6.00 0.57±	7.00 0.57 ± A	7.67 0.33± A	7.67 0.33± A	8.00 0.57± AB	7.34 0.82±	**T3**
7.00 0.57±	8.00 0.57± A	6.67 0.33± B	7.33 0.67± AB	7.67 0.82± AB	7.00 0.57±	**T4**
N.S	*	*	*	*	N.S	**morale level**

Juiciness

The results of the current study showed that there were no significant differences between the experimental treatments of Berker tablets on the first day of the study, as shown in Table (4). On the fourth day of the study, the two treatments (T3, T2) were significantly superior to treatment (T4) and at the same time outperformed Treatment (T4) over treatment (T1) and the values of the averages recorded for the different experimental treatments ,(5.67,7.33, 8.00, 8.33), (T1, T4, T3, T2) On the seventh day of the experiment, the significant increase was in favor of the treatments (T3, T4, T2) compared to treatment (T1), and the averages recorded for the different experimental treatments were (T1, T3, T4, T2), (8.00, 7.33, 7.67,6.00).

On the ninth day of the experiment, there was a significant increase in favor of treatments (T4, T3, T2) compared to treatment (T1) that were excluded for microbial contamination and oxidation. The averages of the experimental treatments were (T1, T4, T3, T2), (5.67, 7.33. 7.33, 8.00) While the results of the study for the twelfth day showed a significant increase in favor of treatment (T4) with an average of (7.33) compared to the two treatments (T2, T3) and their average was (6.00, 6.33), respectively, and treatment (T2) was excluded from the experiment due to its microbial contamination and oxidation. . On the fifteenth day of the experiment, treatment (T4) was significantly superior with an average of (7.00) over treatment (T3), which recorded an average of (6.00). Reihani et al., (2014) justified the high water carrying capacity and low fat loss during cooking, but the decrease in evaluation of this trait with the progression of the storage period is due to the decrease in pH values due to the release of lactic acid upon lipolysis by the enzyme lipase (Al-Murshidi,2017)

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When the whey was added to the results agreed with Berker's cold- preserved meat lozenges, it led to a singnificant im provement judges.(Abdullah,2016) in juiciness and other sensory evaluation traits when spraying the thigh muscle of awassi lambs with different concentrations of cinnamon leaf extract.

Table (4) Effect of adding different levels of ginger powder on the juiciness of birker pellets for refrigerated buffalo meat with different durations (mean ± standard error)

Storage period (day)						Transactions
15	**12**	**9**	**7**	**3**	**1**	
		0.33± 5.67 B	0.57± 6.00 B	5.67 0.33± C	7.56 0.33±	**T1**
	0.57± 6.00 B	0.57± 8.00 A	0.57± 8.00 A	0.33± 8.33 A	7.67 0.33±	**T2**
6.00 0.57± B	0.82± 6.33 B	0.33± 7.33 A	0.67± 7.33 A	0.57± 8.00 A	7.76 0.33±	**T3**
7.00 0.00± A	0.67± 7.33 A	0.33±7.33 A	0.33± 7.67 A	0.33± 7.33 B	7.00 0.57±	**T4**
*	*	*	*	*	N.S	**morale level**

Over all acceptability

The current study showed the effect of adding different levels of ginger powder on the general acceptance of frozen meat burger with different durations (Table 5), and there were no significant differences between the different experimental treatments on the first day of the experiment. On the fourth day of the experiment, treatment (T2) was significantly superior to treatment (T3), treatment (T3) outperformed treatment (T4), treatment (T4) outperformed treatment (T1), and the general acceptance averages of experimental treatments were (T1, T4, T3 , T2) (5.67, 6.33 ,8.00, 9.00), respectively. On the seventh day of the experiment, treatment (T2) with an average of (8.67) significantly outperformed the two treatments (T1, T4), and the average recorded for these two treatments was (6.33, 5.67), respectively, while treatment (T3) did not differ significantly from the rest of the treatments and recorded an average of (7.00). The moral superiority on the ninth day of the experiment was in favor of treatment (T2) with an average of (7.67) compared to the two treatments (T4, T3) and their average was (6.00, 6.33), which did not differ between them, but they were significantly superior to treatment (T1), which recorded an average of (4.00) This treatment was excluded due to its microbial contamination and corruption. On the twelfth day, the significant increase was clear in favor of the two treatments (T2, T3), which did not differ between them compared to the treatment (T4), and the values of the general acceptance averages for the three treatments were (T3, T2, T4) (7.67, 7.33, 5.67) for the treatments, respectively. Treatment (T2) was excluded from the experiment due to its

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microbial contamination and spoilage. On the fifteenth day, there were no significant differences between the two treatments (T4 , T3) whose mean values were (6.00 , 5.67) respectively.

The trait of general acceptance is the final outcome of these traits as the decrease in the degrees of sensory evaluation of the traits in the stored meat discs, which resulted from the processes of decomposition and oxidation of fats, was reflected in the decline in the trait of **(**Al eadhari ,2017).Due to the effectiveness of ginger being acceptance an antioxidant because it contains active compounds and volatile oils, it improves the qualitative characteristics of meat. However, the results of the statistical analysis showed a moral superiority in favor of T2 with a concentration of 1% ginger powder for most of the sensory characteristics, followed by T3 and T4. The results showed that there were no significant differences in favor of the treatment of higher were no significant differences in favor of the treatment of higher evaluation (Al-Daoudi,2019) concentration , while confirming of the general acceptance trait of ginger treatments decreased compared to the control treatment, However, the results of the study The overall acceptability agreed with the results o f rating was very good by the judges when adult jelly was added to Berker meatpatties.(Al-Birawi,AnwarRaad. 2020)

Table (5) Effect of adding different levels of ginger powder on the general acceptance of birker pellets for refrigerated buffalo meat with different durations (mean ± standard error)

Storage period (day)						Transactions
15	**12**	**9**	**7**	**4**	**1**	
		4.00 0.57± C	5.67 0.67± B	5.67 0.33± D	6.67 0.67± Bc	**T1**
	7.33 0.33± A	7.67 0.33± A	8.67 0.82± A	9.00 0.00± A	9.00 0.00± A	**T2**
6.00 0.57±	7.67 0.33± A	6.33 0.33± B	7.00 1.00± Ab	8.00 0.57± B	7.00 0.00± B	**T3**
5.67 0.33±	5.67 0.33± B	6.00 0.57± B	6.33 0.67± B	6.33 0.33± C	6.67 0.33± C	**T4**
N.S	*	*	*	*	*	**morale level**

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