EFFECT OF LAVENDER ADDITION ON THE QUALITY PROPERTIES OF THE LABORATORY MANUFACTURED BISCUIT

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Abstract

The aim of this study is to indicate the effect of lavender addition on the microbial, physical, chemical, sensory properties compared with laboratory produced sodium sorbate biscuit. The microbial test in the total count of the aerobic bacterial colonies showed that the treatment (8) was free of the aerobic bacteria during the microbial test after storing at a freezer (-18 ^{o}C) and melting for 3 hours at 20° C and when the storing was at room temperature (19-22 ^{o}C) for 7 days and after petri dishes incubation at 37° C for 24 and 48 hours .There was no fungi (yeasts and molds) growth in the treatment (8) after production and storing in a freezer and melting for 3 hours at 25 C^o and after 7 days storing at room temperature (22-26°C$^)$ and after petri dishes incubation at 30°C for 3 and 5 days. There was no bacteria and fungi growth when the treatment (8) biscuit was stored in a freezer for eight months and melting for 3 hours at 25°C , but when the product was pulled out the freezer and storing for 7 days at 25 to 29°C, there was bacterial growth at rate of 0.66 and 315 cfu ml^{-1} after petri dishes incubation at 37°C for 24 and 48 hours respectively and there was fungal growth at rate of 0.33 and 1.0 cfu ml^{-1} after petri dishes incubation at 30° C for 3 and 5 days respectively.

Keyword **:** Biscuits, Flour, lavender, Preservatives Materials.

Introduction

Food manufacturing is considered as one of the human requirements for his life continuously (Al- Kobane, 2009), and the food safety concern is very important due to its correlation with human health. With technology development the foods and their production procedures varied. Biscuit is one of these foods and, it is considered as baked products due to the country cultural development and to non-fluffy products (Sajde, 2000). To improve the food quality, its acceptance by the consumer, improving food nutrition value and lengthiness the biscuit store age must be achieved (Ahmed and Mirwan, 2006). The natural materials (spices) is such as lavender herb (*Lavandula dentata* L.) (Khalifa, 2011) and it is from lamiaceae family (Wikipedia, 2018) and, in Latin is Hyacinthus (Luinus, 2018). The lavender has many names such as, Kozame, Zarm, Al-lawinda, Fix, Thenban and Fatima Hawth (Al-wahish, 2008), and its original place is the Mediterranean basin (Ketane, 2018). The plant contains volatile oil (Al-Kahtane, 2008) and the active compounds such as perilyl alcohol, linalool, geranial, flavonoids and coumarin (Neda, 2008). It may be used to treat many diseases such as skin diseases, eczema and skin inflammation (Samer, 2012) and stomach upset, intestine gases expeller and nervous turbulence (Heart pulse, nervous and headache), and the old doctors recommended to use its flower to re-pronunciation to the tongue when someone has brain paralysis (Al-Aamle, 2007). It can be used to treat the persons who are suffering from ulcer, colon sores (Abo Al-Hajaj, 2010) and in treating women diseases in the climacteric such as diarrhea and bleeding stoppage and etc. (Aobeed, 2005). It helps to treat anxiety and insomnia (Naeem and Naeem, 2010). It is used in food industry to give flavor to the baked food (Nordgvist, 2018), and it is used in cooking (Ernst, 2017) to give color and accepted taste for the consumer (Al-Kobane, 2009) and it has hot and sweet taste (Al-wahish, 2008).

Materials and Methods

The following components were used in biscuit production laboratory:

140 g. flour (Al-Faher, Kuwait); 1.45g. Salt (Al-Mansour, Iraq); 1.55 g. vanilla (Non, Jordan); 24.05g. fat (Jana , Egypt); 7.17 g baking powder (Non, Jordan) ; milk as need of paste (80-98 ml) (Al-Modheish , Iraq); lavender which was added at different percentages to the flour weight (0.50, 1.00, 1.25, 1.75 and 2 g. /%) (Al- Kodis herbarium, Al-Sedia, Iraq) and it was confirmed by Dr. Khlel who works in college of science herbarium, University of Baghdad, and sodium sorbate was added at 0.10 g /% ratio to the flour weight (Chinese origin).

1- Flour and baking powder were sieved twice together

2- Fat was added to flour mixture and it was rubbed by hand to be thoroughly mixed.

3- Milk was gradually added to ensure soft paste and it can be pasted by hand.

4- The paste was put on wooden surface having sprinkled flour and it was pasted lightly for half an hour and then, it was opened by Shibek at 1 cm thickness and chipped as circles.

5- The chopped pieces were put on oiled dish with leaving one inch distance between the pieces

6- The pieces were grilled using hot oven (180° C)

The physical tests:

The diffusion ratio in the biscuit was measured according to the method that is mentioned by Al-Zobide.

The sensory evaluation:

The sensory evaluation of the eight treatments of the laboratory produced biscuit was by done using the

questionnaire which is certified by food and nutrition department of the University of Texas state (USA). The evaluators are working at home economic and the measured properties were appearance, texture, softness, flavor, laminar, color and the general acceptance in order to recognize the best product.

The chemical tests:

Moisture, dry materials and protein were determined using the method mentioned by AOAC (1992). Fat were determined using the method mentioned by Wette (2003). Fibers, ash and carbohydrates were determined using the method mentioned by Al-Dilale and Al-Hakem (1987) and the heat calories were estimated by the method mentioned by Al-Eebade *et al.* (2001), with an average of two readings. pH value was determined using the method mentioned by CTM (2014), and total acidity by the method mentioned by Al-Dilale and Al-Hakem (1987) for five days and using three replicates. The mineral calcium, Iron and phosphorus were determined according to AOAC (1992).

Arithmetic mean ± Standard error./ cfu /ml x 10^1 (units cell bacterial)		Treatments add gm / %
48 hour	**24 hour**	
3.33 ±0.06 b	0.00 ± 0.00 c	1 (100 flour+0.00 lavender seed) control
3.3 3 ±0.01 c	0.00 ± 0.00 c	2 (100 flour + 0.10 sodium sorbet)
0.33 ± 0.01 c	0.00 ± 0.00 c	3 (100 flour + 0.50 lavender seed)
3.00 ±0.08 b	0.00 ± 0.00 c	4 (100 flour + 1.00 lavender seed)
3.33 ±0.11 b	3.33 ±0.06 c	5 (100 flour + 1.25 lavender seed)
8.33 ±0.52 a	8.33 ±0.25 a	6 (100 flour + 1.50 lavender seed)
1.00 ±0.04b	0.33 ± 0.01 c	7 (100 flour + 1.75 lavender seed)
0.00 ± 0.00 b	0.00 ± 0.00 c	8 (100 flour + 2 .00 lavender seed
2.166 *	2.073 *	LSD
(*P<0.05)		

*The above table represent the arithmetic mean ± Standard error.

Table (2) shows the aerobic bacteria numbers after test of the stored sample in freezer and then storing them at room temperature (19-20° C) for 7 days. There was no bacterial growth in the 1, 2, 3, 4, 5, 6 and 8 treatments.

Table 2 : The total number of bacteria growth after 24 and 48 hours of incubation and freezing at (-18° C) and store at room temperature (19-22° C) for 7 days.

Arithmetic mean ± Standard error./ cfu /ml x 10^1 (units cell bacterial)		Treatments add gm / %
48 hour	**24 hour**	
0.00 ± 0.00 a	0.00 ± 0.00 a	1 (100 flour+0.00 lavender seed) control
0.00 ± 0.00 a	0.00 ± 0.00 a	2 (100 flour + 0.10 sodium sorbet)
0.00 ± 0.00 a	0.00 ± 0.00 a	3 (100 flour + 0.50 lavender seed)
1.00 ± 0.04	0.00 ± 0.00 a	4 (100 flour + 1.00 lavender seed)
0.00 ± 0.00 a	0.00 ± 0.00 a	5 (100 flour + 1.25 lavender seed)
0.3 3 ± 0.01 a	0.00 ± 0.00 a	6 (100 flour + 1.50 lavender seed)
0.66 ± 0.01 a	3.33 ± 0.06 a	7 (100 flour + 1.75 lavender seed)
0.00 ± 0.00 a	0.00 ± 0.00 a	8 (100 flour + 2 .00 lavender seed
1.822 NS	1.459B NS	LSD
NS : non - Significant.		

*The figures above represent the arithmetic mean ± Standard error.

Table 3: Fungi numbers count after 3 and 5 days incubation , freezing at (-18°C) and store for 7 days at room temperature (22-26° C).

Arithmetic mean ± Standard error./ cfu /ml x 10^1 (units cell bacterial)		Treatments add gm / %
48 hour	**24 hour**	
0.00 ± 0.00 a	0.00 ± 0.00 a	1 (100 flour+0.00 lavender seed) control
0.33 ± 0.01 a	0.33 ± 0.01 a	2 (100 flour + 0.10 sodium sorbet)
0.00 ± 0.00 a	0.00 ± 0.00 a	3 (100 flour + 0.50 lavender seed)
0.33 ± 0.01 a	0.33 ± 0.01 a	4 (100 flour + 1.00 lavender seed)
0.00 ± 0.00 a	0.00 ± 0.00 a	5 (100 flour + 1.25 lavender seed)
0.00 ± 0.00 a	0.00 ± 0.00 a	6 (100 flour + 1.50 lavender seed)
0.00 ± 0.00 a	0.00 ± 0.00 a	7 (100 flour + 1.75 lavender seed)
0.00 ± 0.00 a	0.00 ± 0.00 a	8 (100 flour + 2 .00 lavender seed
0.333NS	0.333NS	LSD
NS : non - Significant.		

*The figures above represent the arithmetic mean ± Standard error.

The bacteria and fungi did not appear after biscuit store (treatment 8) in freezer for 8 months and melting for 3 hours at 25° C, but after pulling it out from the freezer and store it for 7 days at 25-29° C, the bacteria appeared at numbers reached 0.66 and 315 cfu ml^{-1} (average of triplicate) in the first dilution after petri dishes incubation at 37° C for 24 and 48 hours respectively and the fungi numbers were 0.33 and 1.0 cfu ml^{-1} (average of replicate) after petri dishes incubation for 3 and 5 days respectively.

Table 4 : Calculation of diffusion ratio in biscuit.

arithmetic mean ± Standard error. diffusion ratio	Treatments add gm / %
2.47 ± 0.08 a	1(100 flour + 0.00 lavender seed) control
0.84 ± 0.02 b	2 (100 flour + 0.10 sodium sorbet)
1.03 ± 0.02 b	3 (100 flour + 0.50 lavender seed)
0.96 ± 0.05 b	4 (100 flour + 1.00 lavender seed)
0.94 ± 0.07 b	5 (100 flour + 1.25 lavender seed)
0.87 ± 0.05 b	6 (100 flour + 1.50 lavender seed)
0.99 ± 0.10 b	7 (100 flour + 1.75 lavender seed)
1.04 ± 0.06 b	8 (100 flour + 2.00 lavender seed)
1.274*	LSD
* (P<0.05)	

*The figures above represent the arithmetic mean ± Standard error.

Table 5 : The chemical components according to dry weight / % of treatment (8) (100g. flour + 2 g. /% lavender.

%	Compound
26. 4	Moister
18.2	Ahs
14 . 16	Fat
25. 6	Fiber
05. 13	protein

*The figures above represent the arithmetic mean

Table 6 : The dry matter, carbohydrate and heat calories according to the dry weight / % in the treatment (8) (100 g. flour + 2 g/% lavender).

%	Compound
74. 95	Dry mater
66.18	carbohydrate
02.373	Cal calorie

*The figures above represent the arithmetic mean

Table 7 : The sensory evaluation of the laboratory produced biscuit .

General acceptance	color	laminar	flavor	softness	Texture	appearance	Treatments
arithmetic mean ± Standard error.	
5.70±0.08 a	5.60±0.11 a	5.20±0.08 a	4.90±0.09 ab	5.80±0.08 ab	5.30±0.06 ab	5.80±0.08 ab	1(100 flour + 0.00 lavender seed) control
5.90± 0.12 a	6.00±0.08 a	5.50 ±0.10 a	5.60±0.12 a	6.20±0.11 a	6.10±0.14 a	5.90±0.13 ab	2 (100 flour + 0.10 sodium sorbet)
5.80±0.11 a	6.40±0.12 a	5.70± 0.10 a	5.70±0.09 a	5.20±0.07 ab	5.50±0.08 ab	6.30±0.12 a	3 (100 flour + 0.50 lavender seed)
5.20± 0.09 ab	5.40±0.07 a	5.20±0.09 a	5.10±0.11 ab	4.90±0.07 ab	4.50±0.08 ab	5.00±0.06 ab	4 (100 flour + 1.00 lavender seed)
4.80 ± 0.08 ab	4.90±0.08 a	4.60±0.07 a	4.60±0.08 ab	4.80±0.10 ab	4.50±0.06 ab	4.50±0.11 b	5 (100 flour + 1.25 lavender seed)
4.50 ± 0.08 ab	5.60±0.10 a	4.80±0.10 a	4.70±0.08 ab	4.90±0.06 ab	4.80±0.11 ab	5.00±0.08 ab	6 (100 flour + 1.50 lavender seed)
4.40 ± 0.05 ab	5.40±0.08 a	4.50±0.08 a	4.70±0.06 ab	4.50±0.05 b	4.00±0.07 b	5.30±0.10 ab	7 (100 flour + 1.75 lavender seed)
3.80 ± 0.05 a	5.30±0.06 a	4.70±0.06 a	3.90±0.02 b	4.20±0.05 b	4.30±0.08 b	4.60±0.08 b	8 (100 flour + 2 .00 lavender seed)
1.45 *	1.53 NS	1.60 NS	1.55b *	1.62 *	1.75 *	1.69 *	LSD
* (P<0.05)	

*degree: 7 - Excellent -6 very good -5 good -4 average - 3acceptable - 2 pad – 1 very bad.

 * Each number in the table represents the sensory properties of the rate for the 10 Residers

*General acceptance = total sensory properties.

NS does not have a significant difference between the mean sensory properties.

There is a significant difference between the mean sensory properties.*

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