Gum Sisymbrium irio effect on the quality attributes of baguettes

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Abstract

In this study, gum Sisymbrium irio at different levels of Control, 1/0, 1/5 and 2/0 percent (w, w) and wheat flour, in loaf bread and its impact on the quality attributes including technological features, colours and staling throughout the day, and various storage mechanisms were evaluated. The results of the evaluation of technical features, showed that gum Sisymbrium irio increased humidity, reduced stiffness and reduced volume compared with the control bread. By increasing the hold time, stale bread and buns control treated with different levels of gum Sisymbrium irio significantly increased, shelf life.

Key words: Gum Sisymbrium irio, loaf bread staling, colorimetric

Introduction

In multi-phase systems such as bread dough, stable, hydroxypropyl methyl cellulose emulsion is maintained during baking. The hydrocolloid films, the phase boundary between gas bubbles, are created and provide stability of cells in the gas expansion and other changes in the process. When the temperature rises during baking, hydroxyl propyl methyl cellulose, hydrocolloid gels formed through the interaction of the chain and create a temporary network. This will boost the dough during the expansion and reduction in volume is prevented. The gel also acts as a barrier against loss of moisture and flavor without any adverse effect on soft tissue of bread (Appelqvist et al. 1997, Armero et al .1997). The type and amount of hydrocolloids in bread depends on the type of bread and also properties of the flour used. Usually hydrocolloids are used in loaf bread for tissue recovery, and to strengthen the gluten network, creating a smooth, uniform consistency and to delay staling. Carboxy methyl cellulose (CMC) with an average size is more consistent with the gum flour and has been added to the dough in along with other components such as sugar, so more water is absorbed. Some types of carboxy methyl cellulose have very good water holding capacity but relatively poor solubility, Water holding capacity in bakery products is very important. Carboxymethyl cellulose in food, increase efficiency, to delay staling and also increase product acceptance by consumers and increase shelf life, Carboxy methyl cellulose is compatible with other ingredients and bread improvers (Bell, DA. 1990). Effect of a combination of carboxymethyl cellulose and hydroxyl propyl cellulose with other additives such as enzymes and emulsifiers to check and confirm that the addition of carboxymethyl cellulose and hydroxyl propyl

cellulose improves the rheological properties of dough and bread shelf life (Sarkar et al.. 1995). Xanthan gum and Locust, studies about the impact on the quality of bread and colleagues show that this hydrocolloids, stale bread delay and increased moisture in the bread crumb has a positive impact on the stability of the dough and the final product. Meat product is used to increase the storage period (Collar.1996). In relation to the effect of adding gum on the rheological properties and breadmaking quality of the research was done and it was found that gum production to the dough, improves dough stability during fermentation and specific volume, water activity increased bread moisture is better preserved (Brady et al .1985, Selomulyo et al. 2007). In the study several hydrocolloids with different chemical structures in loaf bread were observed and that some of these hydrocolloids are able to a degree prevent loss of moisture during storage and speed dehydration of bread crumb reducing and preventing staling of bread. According to various researchers, hydrocolloids to conserve water and to prevent redistribution of bread, as well as preserving more [brain] volume and softness gas improves speed and reduces fresh bread staling. Hydrocolloids in bakery products can be used as fat replacers. Hydrocolloids, xanthan and tragacanth effect on the levels of 0/5 and 1/5 on the rheological and sensory properties of frozen dough from flour as a way to improve the quality of structural damage caused by freezing and frozen dough bread waste reduction and tails, were studied. Effect of guar gum, pectin, alginate, and xanthan Kapakaragynan looked on wheat flour paste features and was also studied. They use Mylugraf which showed that the addition of the hydrocolloids in quantities of 5/0% and 1% (w w) improves the properties of dough produced (Kim et al . 1977). The use of frozen dough bread is one way of effectively reducing the rate of bread staling. In this study, the effect of hydrocolloids, xanthan and tragacanth at two levels: 5/0 and 5/1 percent (w weight based on flour) on the rheological properties of dough and hamburger buns made from frozen dough stored (at oC18- for 2 weeks) and sensory quality were studied. The results of the study of several hydrocolloid with chemical structures from different loaf bread showed that some of these hydrocolloids are capable of loss of moisture during storage of bread and speed dehydration bread crumb, reduce the staling prevent (Guarda et al , 2004 , MacRitchie et al- . 1973). The results of Rojas and colleagues showed that the forming properties of wheat starch paste greatly improved by adding hydrocolloids. In addition, in several studies of gum as a fat replacer, is used to replace gluten and source of dietary fiber (Appelqvist et al. 1997). Effect of hydrocolloids alginate, xanthan and hydroxy propyl methyl cellulose the rheological properties of dough and bread quality, were examined. The results showed that the addition of these substances increases during fermentation dough stability and increased specific volume and holding., Also, adding the hydrocolloids reduces the hardness of the bread crumbing (Selomulyo et al . 2007). They found that all hydrocolloids are able to hold moisture loss during crumbing of bread and reduce the rate of water loss and moisture to increase the bread crumb (Guarda et al , 2004).

Methods

In this study, Sisymbrium irio Golestan Mohammadi was purchased from flour factories. The use of dry yeast factory production FARIMAN Mashhad. In Tables 1 and 2, respectively Sisymbrium irio characteristics of flour and gum used is listed.

Gum prepared Sisymbrium irio

Sisymbrium irio was 40 ° C for 4 hours in the water, after passing through the filter, the material after drying (gum) was added to breads and cakes.

Baking bread

Bread baguette in the bread industry unit according to Lee, who, has been mentioned in Table 3, were produced. After sieve weighing the dry ingredients for making bread they can be mixed together. The yeast suspension in water with a temperature of 35 ° C containing 5.0% sucrose for 10 minutes to activate the yeast cells was prepared, and was added to the above materials. Finally, the remaining water was also added to the formulation. All compounds were mixed at 1 mixer for 10 minutes. Pulp obtained from the following 4 treatment groups were prepared so that all of their components except Sisymbrium irio gum, were considered constant.

Treatment 1: No gum Sisymbrium irio
Treatment 2: containing 1.0% gum Sisymbrium irio
Treatment 3: 15/0 percent gum containing Sisymbrium irio
Treatment 4: 2.0% gum containing Sisymbrium irio

90 gram pulp were split into pieces and shaped in the form, respectively. Templates in the fermentation chamber temperature and relative humidity of 85% C ° 38 were placed for 60 minutes. Action Bake for 25 to 30 minutes at a temperature C ° 240 industries in the oven with steam injection was performed. After baking, breads were extracted from the mold, and cooled at room temperature for half an hour and then were packed in polypropylene bags until tests were kept at the right temperature.

Statistical analysis

Statistical tests based on completely randomized design with three treatments and three replications. First, by analyzing the variance in the comparison test Duncan means of a significance level of 5% was conducted to evaluate the significance of the results. Statistical analysis using Excel software and SPSS version 21 was conducted.

Table 1: Wheat and Flour Quality Characteristics in terms of dry matter

Test Method	Test result	Description of test
Iranian National Standard No. 2705	15/2	Humidity
Iranian National Standard No. 2863	12/14	Protein
	28/8	Gluten
Iranian National Standard No. 103	6/67	pH

Results and Discussion

Table 2, shows that the control samples had the sample had the highest humidity and low moisture content in the sample was found to contain 1.0 per cent Gum Sisymbrium irio. Eskandari and his colleagues, as well as Yarmand and Ardebil's similar results were reported (Yarmand et al . 2005, Pouresmaeil. 2010). Russell et al., Guarda and colleagues and Pooresmaeel also had similar results from adding hydrocolloids, xanthan gum, sodium alginate, Kapakaragynan, hydroxypropyl methyl cellulose and guar and increase their concentration acquired (Bouaziz et al . 2010, Guarda et al . 2004).

Table 2: Increase in moisture content compared to control samples

Treatment	Humidity
instance	18.58 ± 3.86
0.1	17.64 ± 4.59
0.15	18.72 ± 3.41
0.2	18.52 ± 3.36

Volume

Gum Sisymbrium irio at 1/0, 15/0 2/0% on bread, reduced size compared with the control bread. Sisymbrium irio gum may reduce the production of cavities in bread. This reduction could be due to reduced capacity as a result of reducing the amount of gas in the dough gluten.

The results obtained in the investigation (-Bazayz and colleagues in 2010),(Garmyla and colleagues in 2011), as well as liquids .

Table 3: Gum Sisymbrium irio at 1/0, 15/0 2/0% on bread, reduced size compared with the control bread

Treatment	Size (cm)
instance	0.00048
0.1	0.00046
0.15	0.00043
0.2	0.00046

Firmness

Hardness, resistance to deformation crumb texture is a characteristic that in most cases is used to assess staling (212) . On the seventh day the most difficult to control bread and the least amount of hard bread with 2.0 percent in the first batch was awarded Sisymbrium irio gum. Retrogradation is a function of the difficulty and thus increases with increasing difficulty retrograde.

Table 4: Compare the average impact factor gum Sisymbrium irio difficult and time consuming bread

Seventh	Fifth	Third	First	Repeat Treatment
Aa 1206/6667±78	Bb 248/7500±30	Bb 227/0000±17	Ab 190/3333±70	Witness
Bb 737/3333±206	ABb 331/1667±38	ABc 243/8333±22	Ac 199/0000 ±54	0/1
ABa 984/8333±135	ABb 332/0000±16	Bbc 222/3333±26	Ac 170/8333±69	0/15
Ba 859/3333±118	Ab 490/8333±208	Abc 282/0000±19	Ac 168/0000±61	0/2

Continuity

Back to the flexibility of the tissue and its continuity depends on the initial state. Gum Sisymbrium irio may cause damage to the gluten network structure and causes reversal to the original state. Therefore, the addition of gum Sisymbrium irio reduced coherence factor in bread samples containing gum Sisymbrium irio, against controls. Therefore, by increasing the gum and over time, decreases the staling.

Table 5: Compare the average impact factor gum Sisymbrium irio and time-consuming integration of cake

Seventh	Fifth	Third	First	Repeat Treatment
Aa 0/5433	Aa 0/7100	Aa 0/7367	Aa 0/7033	Witness
Ac 0/4567	Aab 0/7500	Aa 0/8133	Ab 0/7000	0/1
Ab 0/4900	Aa 0/7133	Aa 0/7767	Aa 0/6667	0/15
Ac 0/4833	Ab 0/6600	Aa 0/8033	Aab 0/7267	0/2

A, B and C show a significant difference between the rates on different days and a, b and c indicate the presence of significant differences in different treatments (0/05> p).

The resinous gum

Appendix 3 can be downloaded by examining the sample containing the resinous gum Sisymbrium irio at intervals less than the control sample immediately after cooking. Resinous and other parameters of texture analysis. This parameter assists to digest food and prepare it for swallowing.

Table 6: Compare the average impact factor of gum Sisymbrium irio and time Smghyt bread

Seventh	Fifth	Third	First	Repeat Treatment
Aa 545/3000	Ab 171/3333	Aba 167/3000	Ab 135/9500	Witness
Ba 249/7667	Ab 249/8667	ABbc 198/5333	Ac 137/3000	0/1
Aba 487/0667	Ab 236/3333	Cb 113/8667	Ab 114/4333	0/15
ABa 484/5333	Aab 330/8667	Abc 227/9667	Ac 122/4000	0/2

A, B and C show a significant difference between the rates on different days and a, b and c indicate the presence of significant differences in different treatments (05/0> p).

Image Processing

Compared with the control of bread crumb with gum and increased levels of color which was darker. Since the Maillard reaction is not involved in making the bread crumb color, dark bread crumb is likely caused by gum Sisymbrium irio, according to the results obtained by Pooresmaeel due to compression of the grain tissue due to decreased volume, and gum gel formation Sisymbrium irio is (Bouaziz et al , 2010).

Table 7: Compare the average impact factor of gum Sisymbrium irio and time-consuming brown bread

Seventh	Fifth	Third	First	Day Treatment
a 71/5882±9	a 67/6247±0/992	b 33/9999±0/411	a 83/1372±0/556	Witness
b 74/2353±1	a 76/7451±0/323	d 34/0000±0/327	c 64/1176±0/905	0/1
a 77/3333±2	b 70/3137±0/849	c 40/6656±0/650	b 70/3137±0/849	0/15
a 71/4705±7	a 71/6862±1	b 42/8235±1/979	a 71/6862±1/6861	0/2

a, b and c indicate the presence of significant differences in different treatments (05/0> p).

Results Table (8) , shows that in the control sample had reduced color change over time, while gum samples containing 2.0 Sisymbrium irio 15/0 and color changes were observed with the passage of time.

Table 8: Compare the average impact factor of gum Sisymbrium irio and time-consuming color variations in bread

Seventh	Fifth	Third	First	Day Treatment
b 2/3068±0/341	b 3/1477±0/357	a 4/7878±0/943	c 0	Witness
a 3/6752±0/321	a 2/9324±0/828	a 3/3964±0/793	a 3/4609±0/749	0/1
ab 5/4265±0/530	a 6/6916±0/754	ab 5/2605±0/974	b 3/8976±0/544	0/15
a 6/8679±1/740	ab 5/8686±1/206	ab 6/2373±1/304	b 4/8385±0/529	0/2

a, b and c indicate the presence of significant differences in different treatments (05/0> p).

Evaluation of Porosity

Results Tables (7) to (8) obtained from analysis of texture images show that by increasing the pore size it reduced Sisymbrium irio gum that can be difficult due to reduced volume and increased bread. The mean pore diameter of the holes indicate the area is reduced, decreasing in height and diameter of these changes. These results are consistent with the results of research of S.Han and colleagues (Ozkoc et al . 2009). In addition, during the leavening, the bubbles that are produced during the mixing within the dough expand their gas production by yeast. Thus, the stability of bubbles is most important in that the main cause of instability is connected to individual gas cells. Thick layer of bubbles on the inter connectedness of the dough is reduced (Volpini-Rapina et al . 2012).

Sensory evaluation

Bread properties, such as colour, aroma, taste, are enhanced by increasing the gum Sisymbrium irio points respectively. Related to the appearance of bread it is similar to the results obtained in their research confirms that Shalin and colleagues (Mettler et al . 1993, Sidhu et al . 1988). With the increase in chewing ability bread with Sisymbrium irio, shows improvement and that corresponds with the results of Guarda and colleagues (Guarda et al . 2004). According to the results of tests to assess the properties of bread, it was found that bread with 1/0 Drsdsmgh Sisymbrium irio gives the best sensory quality.

Conclusion

Gum Sisymbrium irio in increased levels in bread increased hardness, cohesiveness, its resinous, elasticity,and chewiness . along with cutting ability, brightness, and reduced porosity. Sensory evaluation factors decrease with increasing gum. Reduced volume and crumb and crust color darkening,are the unfavorable characteristics of the gum. It should be noted that treatment with 1.0 per cent Gum Sisymbrium irio enhances the sensory properties of bread better than the control sample.

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