Investigation of the Affection of Some Gums on the Low Fat Sausage Properties

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ABSTRACT: Today reduction of fat in high fat meat products and producing more healthy food stuff is one of the important policies in inhibiting of dangerous diseases. Among food additives, fat replacers are of more interested by food scientist in reduction of fat. Gums with the properties of having adsorption properties may consider as good replacer for food products. In this study we are focusing on investigation of gums affections on the physiochemical properties of low fat sausages formulated with gum as fat replacers.

Materials and methods:
The present study measures the effects of replacing sugar with diet sweetening (at a 1 to 200 ratio) and tragacanth in three stages (levels) (5%, 1%, 0.5%) on characteristics including hardness, micro-structures, color and sensory features in an entirely random plan by applying the comparison of LSD average.

result:
The results revealed that substituting sugar with stevioside results in hardening the texture and that increasing the amount of tragacanth causes the significant reduction of toughness of Ghotab (p<0.05). The experimental subject containing 1% of tragacanth did not show a marked difference with the controlling subject (p<0.05). The analysis of micro-structure of the texture revealed that the increase in the amount of tragacanth resulted in the increase of the diameter and the number of the air bubbles in Ghotab structure. The color analysis showed that with the increase in the amount of tragacanth, the changes in color and turning browning index also rise. In the samples of ghotab in which sugar was replaced with stevioside no tinge of unusual taste was recognized by the observers while in samples containing 5% of tragacanth a more delicate texture was formed.

Conclusion:
Considering the characteristics of texture and sweet taste of traditional Ghotab, it is concluded that replacing sugar with natural sweetening of stevioside and tragacanth gum is a suitable exchange to produce low-calorie Ghotab.

Keywords: stevia, Ghotab- Traditional Confectionary, diet, tragacanth gum
INTRODUCTION

Today, consuming Stevia leaves and its sugar, Stoiiozide, has been an appropriate replacement of saccharose in Iran (11). Glycosides play an important role in the sweet taste of stevia. Stevia has been used in the treating of diabetes, exhaustion, cancer and high blood pressure. (12, 14, 18).

For recent decades, stevia formulated in confections, beverages and marine foods in Japan, China and South America(16). To produce sugar free foods, a filling agent needs to be formulated with functional properties, therefore in this study Tragacanth Gum applied (4). This Gum is heat and acid resistance with no affection on flavor and high consistency power (4, 17) and composed of both soluble and insoluble constituents in which swells in water and forms a gel(13). This article aims at investigation of replacement affection of saccharose with Stoiioside on the rheological properties of Ghotab.

MATERIALS AND METHODS

Ghotab, an Iranian confectionary, is preparing base on national Iran standard N.O. 3269. Baking powder, egg yolk, oil and yogurt mixed together and flour added gradually and leavened 1 hr at 24 °C (8). Cardamom and almond put in the batter and finally fried. To produce dietary Ghotab, saccharose replaced by stoiioside with ratio of 200 : 1. tragacanth gum used as texture agent in 3 levels, 5, 1 and 0.5 %.

Table 1. Ghotab recipe

<table>
<thead>
<tr>
<th>Raw material</th>
<th>Compounds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>saccharose</td>
<td>16.21</td>
</tr>
<tr>
<td>Oil</td>
<td>4.25</td>
</tr>
<tr>
<td>Egg</td>
<td>13</td>
</tr>
<tr>
<td>Flour</td>
<td>19.4</td>
</tr>
<tr>
<td>Yogurt</td>
<td>13</td>
</tr>
<tr>
<td>Almond</td>
<td>32.44</td>
</tr>
<tr>
<td>Cardamom</td>
<td>1</td>
</tr>
<tr>
<td>Baking powder</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Texture analysis

Texture analyzer Brookfield Engineering middle base, CT3-4500, USA equipped with probe Ta44 used to conduct penetration test.

Color Measurement:

To investigate color, samples placed in a Petri dish with white walls. Two lamps (18 w, with a 30° as angle of radiation) used to take photos of samples. Pictures analyzed by Image Pro software through selecting 10 random points, then RGB determined and converted to *L*, *a and *B*. *L*. Positive values of *a and *b index are related to red and yellow, negative values to green and blue respectively (Mohebi, 2008). Browning index calculated by equation 1 and 2 in which determined factors including *L*, *a and *b. In fact ∆E, ratio of color changes of control to browning index, displays browning level (Saricoban and Yilmaz 2010).

Evaluation of Jam’s Sap Color:

Hunter lab (Colorflex EZ, Virginia, USA) used to conduct *L*, *a and *b factors. Browning level and color changes determined by Equation 1 and 2.

\[
\Delta E = \sqrt{(L^o - L)^2 + (a^o - a)^2 + (b^o - b)^2} \tag{1-2}
\]

\[
B = \frac{100 \times (X - 0.31)}{0.17} \tag{2-2}
\]

\[
X = \frac{(a + 1.75 \times L)}{(5.645 \times L + a - 3.012 \times b)} \tag{3-2}
\]
Statistical methods:
All experiments investigated in completely random plan and 3 replicates. Results were analyzed by SAS9 software AND Excel 2007. (α <0.050)

Results
Findings revealed that by increasing tragacanth gum hardness decreased and the most rewuired force to penetrate the axle into the food sample was related to Ghtab contains 0.5 % tragacanth gum and sugar replaced with stevioside, treatment contain 1 % tragacanth showed no significant differences in comparison with control while sample contain 5 % tragacanth differed significantly from control in hardness due to its gel formation and keeping moisture of Ghtab as an appropriate consumer accepatcen quality of this confectionary.

Color measurement
There observed no significant differences between colors, however by increasing tragacanth color would become darker and this changes would be more remarkable in sample contain 5 % tragacanth, besides by increasing this gum browning index increases due to galactronic acids and fructose, pyranose, xylose in its chemical structure (5), cause all these sugars contribute in Millard and Browning reactions. On the other side, tragacanth increases water uptake thus more water lost occurs during frying time and it results in caramelization. By increasing tragacanth viscosity of batter increased and caused to reduction of heat transfer, keeping the heat on the surface of samples, therefore more rosasingt, AS it has shown in table 1 L* index has been reduced and * a increased, but *b increase to 0.5 % of adding tragacanth and reduced by adding more gum. Results revealed a significant differences between the amount of traganth and color indexes(1).

<table>
<thead>
<tr>
<th>BI</th>
<th>ΔE</th>
<th>b*</th>
<th>a*</th>
<th>L*</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>76/5+7/8</td>
<td>-</td>
<td>4/5±40/8</td>
<td>2/2±9/8</td>
<td>1/5±69/8</td>
</tr>
<tr>
<td>b</td>
<td>8/0±115</td>
<td>a</td>
<td>2/1±12/5</td>
<td>1/4±50/7</td>
<td>1/2±2/4</td>
</tr>
<tr>
<td>c</td>
<td>4/0±116</td>
<td>a</td>
<td>1/8±15/4</td>
<td>5/4±50/7</td>
<td>4/5±0/05</td>
</tr>
<tr>
<td></td>
<td>4/4±149</td>
<td>a</td>
<td>3/9±16/3</td>
<td>5/1±50/1</td>
<td>3/4±1/17</td>
</tr>
</tbody>
</table>

Conclusion
Regarding results in this study showed that produced Ghtab with natural sweetener is possible and in sample contain stevioside and 1 % tragacanth gave the most possible ghotab like texture contains sugar

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