Comparison in physicochemical attributes changes between soy pretzels made with various saturated lipids at 10% or 40% oil concentration

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INTRODUCTION

Pretzels, traditionally made with 3-6% shortening, is a popular snack in America resulting in over 500 million sales in 2010. Incorporating ingredients shown to decrease biomarkers of obesity in this popular snack food may provide an excellent means of enhancing nutrition. In previous studies, diets rich in safflower oil induced fat mass reduction by influencing lipogenesis and lipid metabolism; while thermogenesis was mediated by satiation of fatty-acids. Various studies indicated soy protein have anti-obesity implications. Changes in amount, composition (chain-length, degree of saturation) and crystalline polymorph of added lipid affect the pretzels physicochemically and may lead to undesirable food products.

AIM

The objective was to select a type and amount of lipid that will least affect the texture and water distribution of an optimized soy pretzel.

Variables selection

The lipids investigated are coconut oil, ghee, shortening and high oleic safflower oil. Based on the structures of the hydrocarbon chain, there are divisions in fatty acids (see Table 1). Lipids can also be classified by their crystalline behavior, including alpha-, beta-, and beta-prime forms. Ghee and shortening are classified to beta-prime type, while safflower and coconut are beta type. Beta-prime polymorph is usually the most stable and functional in fat products.

Method

Soy pretzels were made by mixing, proofing, alkaline spraying, baking, and then were frozen until instrumental analysis. Samples varied in types (coconut oil, ghee, shortening and safflower oil) and amount (10% and 40%) of lipids were analyzed to give total water content, amount of bounded water and textual attributes (hardness, springiness and chewiness) results.

Conclusions

Safflower oil, rich in mono-unsaturated triglycerides, changed the least in texture properties compared to saturated fats, and showed a reduction of percent “freezable” water in soy pretzel. Thus a safflower oil/soy pretzel will be utilized in future human clinical trials.

Future direction

• Sensory testing to affirm the acceptability for soy pretzels with safflower oleic oil at high percentage

Acknowledgement

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Table 1. Type and composition of Coconut Oil, Ghee, Shortening and Safflower Oleic

<table>
<thead>
<tr>
<th>Oil Type</th>
<th>Saturated fat (%)</th>
<th>Monounsaturated C12 (%)</th>
<th>Polyunsaturated C16 (%)</th>
<th>Monounsaturated C18 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut Oil</td>
<td>10%</td>
<td>5%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Ghee</td>
<td>90%</td>
<td>4%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Shortening</td>
<td>10%</td>
<td>4%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Safflower Oleic</td>
<td>10%</td>
<td>4%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Figure 1. Percentage of Free Water to all water in the soy pretzels made with coconut, shortening, ghee and safflower oleic oils at 10% and 40% in the dry basis.

Figure 2. Springiness(nm) and Hardness(N) the soy pretzels made with coconut, shortening, ghee and safflower oleic oils at 10% and 40% in the dry basis.

Figure 3. Chewiness(kg) the soy pretzels made with coconut, shortening, ghee and safflower oleic oils at 10% and 40% in the dry basis.

REFERENCES


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