DEVELOPMENT ENGINEERING OF LONG-LASTING PASTRIES MADE WITH DIFFERENT TYPES OF HONEY

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ABSTRACT

A condition of staying on the global market is the presence of various products, as well as the continuous development of the already existing ones. Honey is the longest known sweetener fit for human nutrition, the consumption of which – given its high carbohydrate content – provides a significant amount of energy, too. In our experiments we studied the modification of honey-sugar ratio in blossom, silk-grass and acacia-honey.

On the basis of the sensory assessment/evaluation the following products proved to be of top quality: those with acacia-honey + silk-grass honey: 75% honey and 25% sugar; and those with acacia-honey: 50% honey and 50% sugar.

1. INTRODUCTION

Honey was the only known sweetener in Europe until the late Middle Ages. Only the rich citizens, the nobility could afford to make sugar from sugar-cane on their plantations, which was an expensive process. The development allowed the industrial production of cheap sugar from sugar beet thus the luxurious sugar became one of the popular and available consumer goods.

Hungarian honey is world-famous not only for its taste but also for the completely natural beekeeping.

During our work we study the development engineering of honey meringue. Our aim is to prepare the better quality products from the better raw materials. Each technological step is important to make a top-quality product: dough making, forming process, baking, cooling, decorating, packing and storage of the finished product. It is important to provide the consumers with a given product in appropriate packaging, retaining its quality.

In our experiments we studied the alteration of the honey-sugar ratio in flower, silk-grass and acacia-honey. We examined the effect of the honey-sugar ratio on dough making, assembly and baking parameters. We did the sensory evaluation of the finished samples using a 20-point sensory evaluation method.

2. MATERIALS AND METHODS

2.1. Materials

In our study we dealt with three different types of honey which were the following: acacia-honey, silk-grass and mixed blossom honey.

Acacia-honey: This type of honey ranges in colour from the almost clear to yellowish shades and smells like acacia flowers. The aroma is very delicate, that is why it is recommended for those who are just about to familiarize themselves with honey. It remains in a liquid state for a long period of time due to its high concentration of fructose. It is a good disinfectant and is recommended for coughs.

Silk-grass honey (silkweed honey, wild tobacco honey): It is a light-coloured, a little bit

dull type. It has a pleasant, strong smell and a vanilla flavour. The pollen content is insignificant as the plant does not produce pollen. It is ideal for those who are sensitive to pollen. It also remains liquefied for long periods just like acacia-honey.

Mixed flower honey: It is a mixed not a single type, that is it is made of the nectar of different flowers. For this reason its colour is really varied, generally with a dark shade, brown in colour. It usually goes sugary as it contains a significant amount of glucose (www.vandormehesz.hu, 2009).

Table 1. The average honey composition (Frank Renate, 2006).

Fruit-sugar (fructose) 38,2%	Enzymes 2,2,%
Grape sugar (glucose) 31,3%	Vitamins 2,2%
Maltose 7,3%	Volatile aromatic and colouring substances 2,2%
Cane sugar (sucrose) 1,3%	Amino acids 0,6%
Complex Carbohydrates (Oligo- and polysaccharides) 1,5%	Proteins 0,3%
Water 17,2%	Minerals 0,2%

2.2. Method

The honey dough is a little sticky, soft, easy to roll and form. We loosen the dough by a chemical process. During baking a gas is generated from the loosening agents added to the dough. As a consequence, the dough will have a structure full of small holes.

Preparation of the honey dough base: honey dough can be prepared both warm and cold. We filter the honey previously heated to 107 °C then it has to be cooled to 60 °C, finally we mix it with the flour. It is practical to use a 1:1 ratio of wheat and rye flour. If we use only one type of flour, then we take 4–5% more wheat flour or 4–5% less rye flour. The boiled dough must be ripened. The ripening time is 2–3 months.

Cold (raw honey dough): Warm up the honey so that it can be mixed easily with the flour but do not overheat it. You do not have to let the raw honey dough rest; you can knead the honey and the sugar dough together immediately.

Dough softening (breaking): The reason for dough softening is that the boiled honey dough is rather hard even after ripening. Dough break is done in a z-arm kneader dough-mixer.

Preparation of the sugar dough base: We produce it mixing 1:1 ratio of sugar and water. The sugar is dissolved in the water, and then heated to 107 °C. The chilled golden syrup is mixed with the wheat flour. The sugar dough can be prepared with corn syrup and starch sugar, too.

Kneading of the honey- and sugar dough: we also add other ingredients (cinnamon, clove, and anise). The loosening agents mingled with some flour are added slowly to the dough.

Dough shaping: We roll out the dough made homogeneous with the other ingredients on a wooden- or marble table covered with flour. We shape the cakes from the dough previously rolled out by stamping, cutting or moulding. The formed cakes are decorated before baking and then put on a baking plate.

Baking: The thinner, smaller cakes must be baked at 200 °C for 4–6 minutes, while the thicker, bigger pieces need 10–20 minutes at 170 °C.

Decoration: Most cakes are dressed with different materials and thus they have longer shelf-life and their appearance is better. These coatings protect the cakes from moisture as well as drying, and they become more pleasing to the eye.

To prepare the coating of honey cakes we can use coating materials made of sugar, whip and chocolate.

Packaging and storing: we market the storable pastries with honey in bulk in a packaging permeable to water vapour, or maybe in card boxes.

A storing area with a temperature of 18–20 °C and with medium humidity is suitable for their storage (Dunszt-Schulhof, 2001).

20-point sensory evaluation method: During the sensory evaluation the following characteristics are judged by points: shape, colour, appearance, consistency, smell and flavour. The evaluation of 13 samples was done by a jury of five members.

3. RESULTS

We applied different mixtures during the test series: We prepared the product using 100% sugar, as well as with 75% sugar – 25% honey, 50% sugar – 50% honey and 25% sugar – 70% honey.

The dough of the products containing 100% honey (Figure 1.) was the most difficult to mix together as it had only honey in it. The assessors were not satisfied; the consistency of the products was too hard; nevertheless, all the three types had a characteristic, honey flavour.

Figure 1. Picture of the honey biscuits made with 100% acacia-honey

As for the products made with 50% sugar and 50% honey, the ones with 50% acacia-honey content got an excellent ranking (Figure 2.), the assessors were dissatisfied with the imperfect shape only, the flavour and the aroma were sufficiently characteristic.

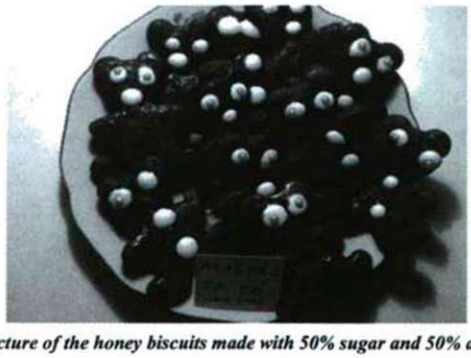

Figure 2. Picture of the honey biscuits made with 50% sugar and 50% acacia-honey

As for the mixtures of 25% sugar and 75% honey, both product made with acacia-honey and the product made with silk-weed honey got an excellent ranking. During our study we found that it required noticeably more mechanical force to knead together the honey and sugar dough. The dough was sticky during rolling. The finished products were hard; however, their flavour and aroma were sufficiently characteristic.

Figure 3. Picture of the honey biscuits made with 25% sugar and 75% silk-grass honey.

4. CONCLUSION

We judged the results and found that the more honey the products contain, the more difficult it is to work with the dough (the products are stickier); the finished products are harder, still, they are much tastier.

On the basis of the sensory evaluation the following products got the excellent ranking: 75% acacia-honey and silk-grass honey and 25% sugar, 50% acacia-honey and 50% sugar. The products made with 75% acacia-honey and 25% sugar got 18.47 total points after the sensory evaluation. The total score for the 75% silk-grass honey and 25% sugar content was 17.64 and it was 18.32 for 50% acacia-honey and 50% sugar content.

The following products got the least points: 100% acacia-honey (14.7), 100% silk-grass honey (14.5), and 75% silk-grass honey + 25% sugar (14.47). They can be ranked as medium-quality products.

As our finished products were rather hard, we intended to find out how we can make the given products softer. We stored the products in a well-closed plastic box for months. The products became softer slowly and only to a little extent. We placed apple slices in the box next to the biscuits in order to support the softening process. After some days of storage softening cold be observed, the extent of which was much higher than that found during the normal storage in the box, as the honey biscuits absorbed the moisture of the apple slices.

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