SALT CONTENT OF BAKERY PRODUCTS IN THE HAJDÚSÁG REGION OF HUNGARY IN 2013

Péter Sipos[1], **Mariann Móré** [1], **Gerda Diósi** [1], **Mária Borbély**[2]

[1]University of Debrecen, Faculty of Agricultural and Food Sciences and Environmental Management, Institute of Food Science, Quality Assurance and Microbiology
[2]University of Debrecen, Faculty of Agricultural and Food Sciences and Environmental Management, Agricultural Laboratory Centre
138 Böszörményi street, Debrecen, Hungary, siposp@agr.unideb.hu

Abstract

Although salt (sodium chloride) is one of the most ancient and common food components, nowadays it is attacked due to its unfavourable health effects. In the case of the Hungarian population it is especially current topic as the Hungarian peoples' consumption is the multiple of the recommended. As bakery products are one of the ones with the highest sodium contents, salt contents of different commercially available bakery product groups (white bread, semibrown bread, rolls, crescent rolls, other breads, baguettes, scones and milky loads) were evaluated. It was found that the evaluated more than 90 samples met the requirements, but the measured values are close to the allowed maximum levels for most products and relatively low amounts of their consumption cover the daily recommended salt intake. A challenge of this industry in the near future is solving the questions emerging in relation with the stricter salt reduction legislation.

Key words: bakery products, commercial products, sodium chloride, salt content

INTRODUCTION

Salt (NaCl) is a basic component of our foodstuffs, one of the most ancient food additives. Its taste is required by customers, have an effect on the technological properties of food raw materials and it is maybe the first chemical preservative (Hutton, 2002). Moreover, the modern human nutrition science defines it as one of the most hazardous food additive because of the negative health aspects of sodium. It is especially current topic in Hungary; while the OETI reports 2 g/day sodium (5 g/day sodium chloride) as recommended daily intake, the national intake is about threefold-fourfold of the recommended value for men and twofold-threefold for women and, unfortunately it is about 6.9 g/day for kindergarteners (Martos, 2010).

Third of all global deaths is related to cardiovascular disease and high blood pressure is the most important, but modifiable casual factor of hearth related diseases. Sodium intake was found as the primary reason for raised blood pressure (He and MacGregor, 2007; Jones, 2008; Satin, 2008) and this connection is valid both for normal and hypertonic people. It is

also proves that decrease in sodium intake results immediately and linear decrease in blood pressure (Kurtzman, 2001). Six grams decrease in salt intake should decrease the risk of stroke by 24% and the risk of coronary disease by 18% (Strazzullo et al., 2004).

The main source of salt in human diet is food; about 70-75% of the total intake comes from our foodstuffs. The salt is basic components of meat and meat products, cheese, vegetable products, egg-containing foods and cereal based foods. Institute of Medicine found that 30% of overall intake comes from cereals and cereal products (Lynch et al., 2009). The risk of this foodstuff is especially significant in Hungary as the cereal - mostly bread - consumption is relatively high in our country.

The main roles of salt in bread making are flavouring, modifying the gluten structure (and therefore the rheologic properties of dough) and microbiological processes. Reduction of salt content if flour results tasteless flavour; consumers much more register the low than the high salt content of breads. Experiments presents that the average consumers did not noticed the lack of sodium-chloride while it reduces to the 50-75% of the original value, but further decrease has appreciable changes in taste (Wyatt, 1983; Rogers and Neal, 1999; Unbehend and Namiljav, 2009) and it was observed by similar tests with other foodstuffs (Hutton, 2002; Mitchell et al., 2009).

Several projects started to decrease the salt content of foodstuffs worldwide, for example the population of New Zealand was recommended to decrease the sodium intake by 25%, as about only 75% of total sodium content is required for food processing in average (Mhurchu et al., 2003). Both the Food Standards Agency (FSA) and the UK Committee on Medical Aspects of Food and Nutrition Policy (COMA) started an intensive anti-salt campaign in the food industry and encouraged the consumers to eat no more than 6 g salt (2,3 g sodium) a day. Only a small decrease was observed in 2007 as result for this initiative; the per capita consumption reduced only from 3,8 to 3,6 g (FSA, 2007). Similarly, Hungary announced the National Salt-Decreasing Program (Nemzeti sócsökkentő program), undertaking 16% decrease in four years (Martos, 2010). As introductory step, National Institute for Food and Nutrition Science (OÉTI) made a survey on the salt content of commercially available food products to present the current situation (www.oeti.hu).

The aim of this study is to evaluate the salt (sodium chloride) content of different commercially available bakery products from the markets of Hajdúság region of Hungary and get an overview from the most common products.

MATERIAL AND METHOD

The bakery products evaluated in this study are commercial samples produced in the Hajdúság region of Hungary in 2013. 91 samples were analysed from eight product groups. The first four groups are defined by Codex Alimentarius Hungaricus: white bread (made from 100% BL80 - winter wheat white flour) and semibrown bread (made from 85% BL112 semiwhite bread flour and 15% RL90 rye flour), as the most frequently bought bread types. The third group was the rolls (made from BL55 fine wheat flour using water) and crescent rolls (made from BL55 fine wheat flour using at least 3% milk powder or equivalent substituent). Other product groups were the other bread types, baugettes, scones and milky loads.

The measurements were performed in the accredited analysing laboratory of University of Debrecen, Centre for Agricultural Sciences, Faculty of Agricultural and Food Sciences and Environmental Management. Dry matter contents and salt contents of products were determined by MSZ 20501-1:2007 Hungarian Standard and presented on dry matter base. Results were analysed by SPSS 18 statistical program package.

RESULTS AND DISSCUSIONS

The statistical summary of measurements cen be seen in Table 1. The salt contents of whire bread samples are raged from 2.34 to 2.70 with a mean of 2.43 %w/w. The Codex Alimentarius Hungaricus limits the sodium contents of white and semibrown bread products between 1.5 and 2.8 %w/w; this means that the producers target those consumers who prefer the saltier taste. The salt contents of semibrown breads have slightly less values; it is 2.36 %w/w on average with a 2.21 %w/w mimimum and a 2.56 maximum value showing the same situation as in the case of white breads. In the cae of rolls the measured values are ranged from 1.67 and 2.10 %w/w with 1.91 %w/w as average, while the Codex requires a salt content from 1.20 to 2.10 %w/w. In the case of crescent rolls the average was 1.67 %w/w and the results ranged from 1.45 to 1.96 %w/w; one sample exceeded the limit what is between 1.20 and 1.80 %w/w.

The three evaluated baugettes had similar values with an average of 1.74 %w/w; the low standard deviation value raises the the probability of the same producer. The scones had the product group with the highest salt contents; it was 3.00 %w/w on average and the values ranged from 2.48 to 3.55 %w/w. The readings of milky loads were the lowest ones (from 1.05 to 1.34 %w/w with an average of 1.13 and 1.5 %w/w maximum value), not surprisingly, considering the character of these products. The highest variability was showed by the other bread product group; the nineteen

evaluated products had their salt contents from 1.97 to 4.61 %w/w. The lowest value had a form bread made from Graham flour and the highest one had an extreme value (4.61%w/w) (Figure 1.).

Table 1

Salt (sodium chloride) contents of bakery products (Hajdúság region, 2013) (%w/w)

bakery products	mean	n	standard deviation	range
white bread	2.43	18	0.10	2.34 - 2.70
semibrown bread	2.36	9	0.13	2.21 - 2.56
rolls	1.91	21	0.12	1.67 - 2.10
crescent rolls	1.67	14	0.13	1.45 - 1.96
other breads	2.40	19	0.54	1.97 - 4.61
baugettes	1.74	3	0.03	1.71 - 1.77
scones	3.00	3	0.53	2.48 - 3.55
milky loads	1.13	4	0.13	1.05 - 1.34
Total	2.12	91	0.48	1.05 - 4.61

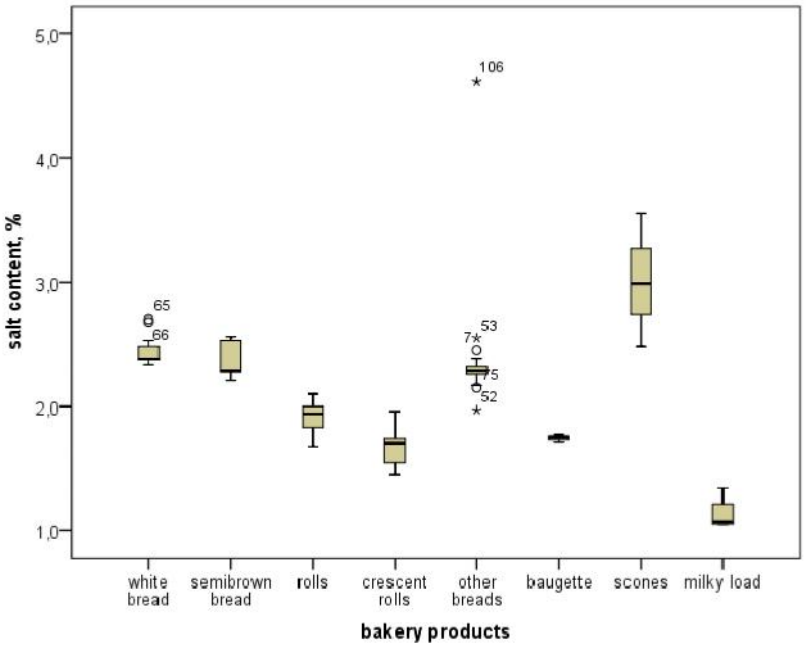

Fig. 1 Differences of bakery products in salt (sodium chloride) contents (Hajdúság region, 2013) (%w/w)

Based on these result we calculated that how much bakery products covers the recommended daily salt intake (5 g). In the case of white and semibrown breads 205 and 211 g (about 3 slices) consumed product is the portion which depletes the recommended values assuming that no other

sodium intake. About 261 g rolls (4.8 pieces) or 300 g crescent rolls (about 6.8 pieces) results the same intake. The consumption of 166 g scones has the same result; it is about one and a half from higher ones or about 5 from the small ones. The condumption of 440 g milky loads has the same effect. The bread with the highest salt content covers the recommended sodium intake with one and a half slices.

CONCLUSIONS

The examined bakery products met the requirements considering their salt contents but we found that the readings were close to the maximum values in general. This means that the producers have future issues in this product group. The changes in limit values foresee about 16% decrease in the salt content of breads in two steps: from the January of 2015 the upper limit value decreases to 2.5%w/w and from 2018 to 2.35% w/w. It means that 4 white bread products of the examined 18 will not met the requirement of the first stage of change and only 2 products would be suitable in 2018. From the semibrown breads, 33% of samples are not covers the demands of 2015, but the other 6 products has their salt content less than the limit value of 2018. The producers have two possibilities; explore changes in technology that cover the lack of salt content in the taste of products or apply salt substituents what are present in the international markets. On the other hand, it is an another question whether the consumer perceive the slight decrease or a slow change will be inconspicuous for them.

Acknowledgments

This research was realized in the frames of TÁMOP 4.2.4. A/2-11-1-2012-0001 „National Excellence Program – Elaborating and operating an inland student and researcher personal support system convergence program" The project was subsidized by the European Union an Hungary and co-financed by the European Social Fund.

Acknowledgments

The researches were carried out in the project: HURO/1001/323/2.2.2, GRAINS SAFETY Researches regarding the influence of some technological elements over the wheat and corn grains quality stored in Bihor and Hajdu Bihar counties Project founded by Hungary-Romania Cross-Border CooperationProgramme 2007-2013(www.huro-cbc.eu)

REFERENCES

1. Codex Alimentarius Hungaricus 1-3/81-1: Certain bread and bakery products
2. He, F.J., MacGregor, G. A., 2007, Reducing salt in foods. (Eds. Kilcast, D., Angus, F.), Woodhead Publishing, pp. 18–46.
3. http://www.oeti.hu/download/sotartalomoetifelmeres.pdf
4. Hutton, T., 2002, Sodium. Technological functions of salt in the manufacturing of food and drink products. British Food Journal, 104.2. pp. 126-152.

5. Jones, J. M., 2008, Salt and blood pressure – A need to reduce levels at any age. Cereal Foods World, 53. pp. 43-45.
6. Kurtzman, N. A. 2001, Should man live by low-salt bread alone? American Journal of Kidney Diseases. 37. 3. pp. 636-637.
7. Lynch, E.J., Dal Bello, F., Sheehan, E.M, Cashman, K.D., Arendt, E.K., 2009, Fundamental studies on the reduction of salt on dough and bread characteristics. Food Research International, 42. pp. 885–891.
8. Martos É. , 2010, Európai összefogás a lakosság sóbevitelének csökkentése érdekében – nemzeti sócsökkentő program. Metabolizmus, VIII. Suppl. A, pp. 23-24.
9. Mhurchu, C. N., Young, L., Lawes, C., Brooks, J., Pound, C., Duizer, L., Rodgers, A., 2003, Less salt in bread: a cost-effective way to reduce New Zealand population blood pressure levels. Journal of the New Zealand Medical Association 116. 1176. U487.
10. Mitchell, M., Brunton, N., Wilkinson, M., 2009, Optimization of the sensory acceptability of a reduced salt model ready meal. Journal of SensoryStudies, 24. pp. 133-147.
11. MSZ 20501-1:2007. Test methods for bakery products. Part 1: Chemical tests
12. Rogers, A., Neal, B., 1999, Less salt does not necessarily mean less taste. The Lancet, 353. 9161. 1332
13. Satin, M., 2008, The great salt debate. Cereal Foods World, 53. pp. 9-16.
14. Strazzullo, P., D'Elia, L., Kandala, N., Cappuccio, F.P., 2009, Salt intake, stroke, and cardiovascular disease: meta-analysis of prospective studies. BMJ 2009;339:b4567.
15. Unbehend, G., Namiljav, E., 2009, Salt in bakery goods – The influence and the possibilities for reducing. Abstract book of 5th International Congress Flour-Bread, Opatija, Croatia, pp. 36.
16. Wyatt, J. C., 1983, Acceptability of reduced sodium in breads, cottage cheese and pickles. Journal of Food Science, 48. pp. 1300-1302.