EVALUATION OF NUTRIENTS AVAILABLE FROM DIFFERENT KINDS OF BREAD AND THEIR COVERAGE IN COMPARISON TO REFERENCE DAILY INTAKE IN ADULT GROUP

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Abstract

Bread is one of the most important staple food in almost all countries including Latvia and plays an important role in human nutrition but affect of time pressured lifestyle and changes in eating habits, it consumption significantly decreases and do not reach recommended amount need to be consumed. Therefore the purpose of the research was to find out and evaluate within the gender in adult group amount of nutrients covers reference daily intake (RDI) by consuming wheat bread, rye bread and sweet sour bread. Results show that by consuming rye bread female covers only 7.1 % of protein 1.2 % of fat and 11.1 % of carbohydrates from RDI while male – 5.9 % of protein, 1.0 % of fat and 9.3 % of carbohydrates which is a part of total 28.6 % of nutrients need to be taken in accordance with WHO recommendations. The same conclusion has been done in insufficient consumption of wheat bread and sweet-sour bread. Important deviations from RDI were found on mineral substances and vitamins as well.

Key words: Bread, nutritional value, RDI, adult group

Introduction

Since the earliest of times bread has been a staple food for mankind, with records of grain milling and baking stretching back over 7.000 years (Jefferson, 2000) and plays an important role in human nutrition (Al-Kanhal *et al.*, 1999; Isserliyska *et al.*, 2001) as well as is one of the most important staple foods in almost all countries us an excellent source of nutrition (Padamavathy, 2007). According to Department of Health and Food Standards Agency healthy eating guidelines, one third of our total calories should be in the form of starchy foods, such as bread, potatoes, pasta, rice and other cereals (MRC Human Nutrition Research, 2007). Dieticians suggest consuming cereal products in the same amount like potatoes which is 40 % from the total products are consumed. While changing eating patterns of the past 50 years have led to an overall fall in bread consumption (Jefferson, 2000). From the Norbagreen survey was found that large portion of the Nordic and Baltic populations do not reach the official and nonofficial guidelines for consumption of fruits, vegetables, fish and bread (Norbagreen, 2003). According to the Latvian Central Statistical Bureau (CSB) data during the last decade bread consumption is decreased by 24 kg per capita – while in 1996 bread consumed per capita was 76 kg than in 2005 it was only 55 kg. Within the type of bread most significant decrease – 15 kg was for rye bread while almost 9 kg – wheat bread but sour sweet bread decrease was not significant. Nutritional value of bread differ within the type of bread which is affected by the type of flour is used in bread preparation as well as another ingredients such us milk which is used instead of water, eggs, brains, sugar and fat. Wheat bread contains around 45–55 % carbohydrates, 6–10 % protein and 1–2 % of fat. Most rich in nutrients is wholemeal bread because containing both high amount of vitamins like thiamine, riboflavin, pyridoxine, folic acid, trace elements and fibre (Insel *et al.*, 2003). Therefore the purpose of the research was to find out and evaluate within the gender in adult group amount of nutrients covers RDI by consuming wheat bread, rye bread and sweet sour bread.

Materials and Methods

The research was divided into two stages consisting of literature review on bread consumption and nutritional value of different kind of bread as well as calculation part on recommended daily allowance on adults per gender on bread consumption and recommended amount need to be consumed. Calculations and analysis has been done based on direction about "Ieteicamās enerģijas un uzturvielas devas Latvijas iedzīvotājiem" Nr. 233 issued by Ministry

of Welfare of Republic of Latvia, 23 of January, 2003. Calculations have been done for adult group meant separately for female and male and average values were used for further results.

Results and Discussion

Latvia CSB data shows that in 2005 wheat bread consumed was 25 kg per capita while rye bread – 26 kg and sweet-sour bread – 6 kg (Table 1).

Table 1

Bread consumption per capita, CSB

Type of bread	Consumption, kg year $^{-1}$	g per day	Slices per day
Wheat bread	25	68.49	2.74
Rye bread	26	71.23	1.58
Fine rye-bred	6	16.44	0.41
Total	57	156.16	4.73

Data presented in Table 1 explains that consumption of bread in 2005 was insufficient because a bread consumption recommendation by World Health Organisation (WHO) suggests eating 250 g of bread per capita per day. To clarify the amount of basic nutrients are obtained by consuming 156 g of different type of bread calculation has been done based on direction "Ieteicamās enerģijas un uzturvielas devas Latvijas iedzīvotājiem" Nr. 233 issued by Ministry of Welfare, Latvia, 23 of January, 2003. Reference values of recommended daily allowance (RDI) are presented in Table 2 and are used for further calculations.

Table 2

Average amount of energy and nutrients recommended for adults per day

Gender	Average body mass, kg	Average high, cm	Energy (E), kcal day	Protein E%	Fat E%	Carbohydrates E%
Male (average)	75	175	2400	10-15 (12.5)	25-30 (27.5)	55-60 (57.5)
Female (average)	65	165	2000	10-15 (12.5)	25-30 (27.5)	55-60 (57.5)

Achieved results (Table 3) are compared with the amount of nutrients suggested by consuming bread (Fig. 1). Since RDI of nutrients for female is less than for male (Table 2) segmentation of the nutrients, within each type of bread consumed, automatically will be more for female than male.

Table 3

Nutrient segmentation in % from RDI per each type of bread per capita

	Protein, %		Fat, %		Carbohydrates, %	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
Wheat bread	8.3	6.9	1.3	1.1	11.1	9.3
Rye bread	7.1	5.9	1.2	1.0	11.1	9.3
Sweet-sour bread	1.8	1.5	0.3	0.2	2.9	2.4
Total	17.2	14.4	2.8	2.3	25.1	20.9

From the data presented in the Fig. 1 can be concluded that in 2005 till present time consumer do not reach recommended amount of nutrients from bread because results show significant deviation from recommended numbers.

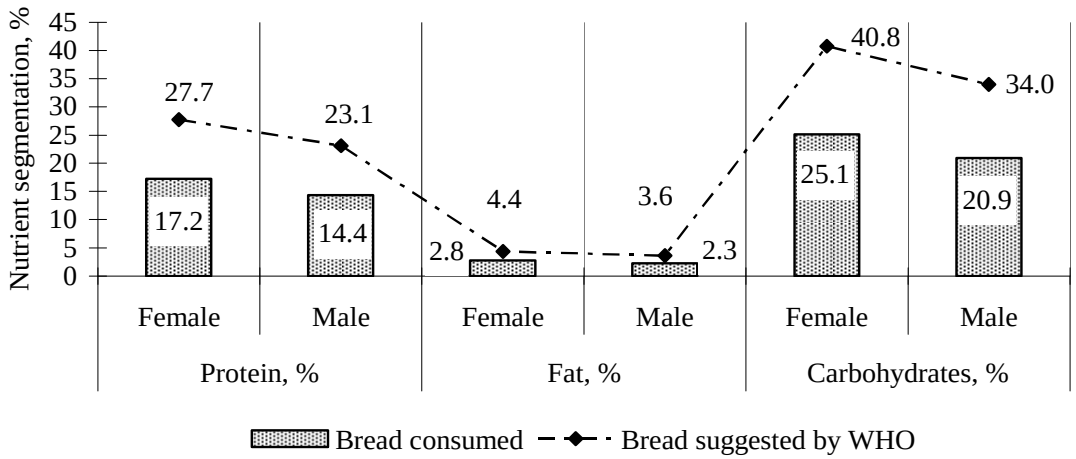

Figure 1. Nutrient segmentation in comparison between consumed and suggested amount of bread

Regarding to the fibre content, well known is statement that cereal products are good source of fibre. In average wheat bread contains 4 g 100 g^{-1} fibre whereas rye bread contains 8 g 100 g^{-1} and sweet-sour bread around 6 g 100 g^{-1} fibre. Based on the Latvia CSB data about the consumption of the bread by wheat bread was ingested 2.74 g of fibre however by rye bread – 5.70 g and by sweet-sour bread only 0.99 g of fibre. In comparison with suggested portion of fibre – 30 g per day with bread has been ingested 9.43 g (31%).

In addition to nutrients, as well as energy source nutrients, macro-elements, trace elements and vitamins play an important role in the human body. Since bread consumption is not reaching the amount of bread need to be consumed inorganic nutrient and vitamin intake will be less than it should be (Figure 2 and 3). RDI for Na, K and Mg both for female and male is the same therefore segmentation of mentioned nutrients will be the same, but for Ca, Fe and P it is different. Significant distinction was found on Fe segmentation within gender.

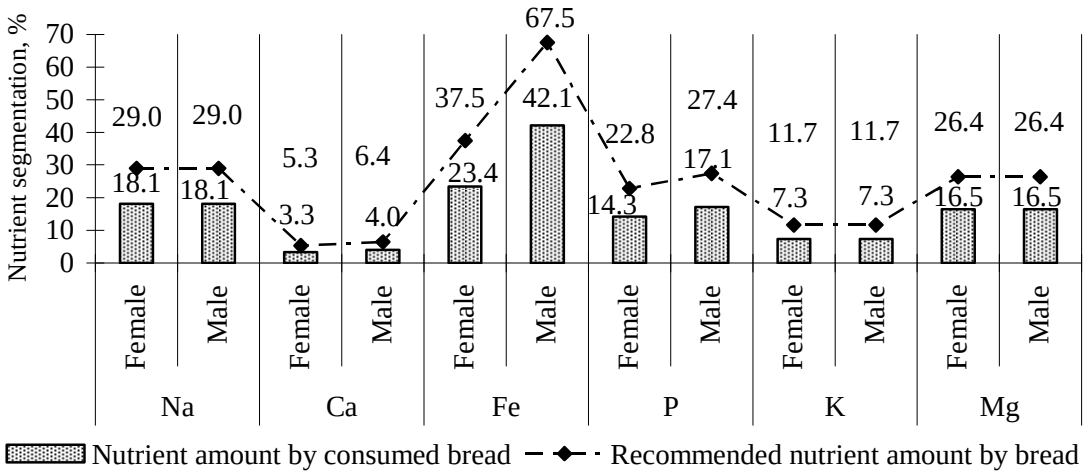

Figure 2. Inorganic nutrients consumed and recommended per day per capita

RDI of vitamins between female and male is the same; therefore segmentation is calculated in general.

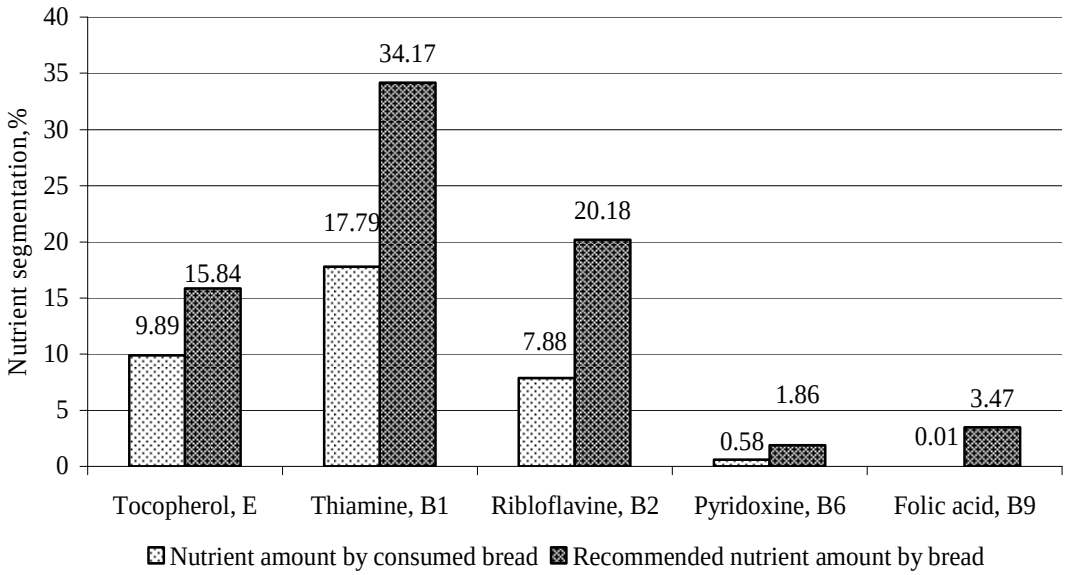

Figure 3. Vitamins consumed and recommended per day per capita

From Figure 3 can be concluded that significant differences are found within each vitamin group which means that bread consumption need to be increased to reach suggested amount of nutrients from bread.

Conclusion

Bread consumption needs to be increased to reach the amount of nutrients coming from suggested amount of bread by WHO. To raise consumption of bread, one of the fields would be suggested to pay attention is advertisement as well as popularisation of bread as good source of nutrients in schools by developing special nutritional/health education programmes where one of the topics would be bread and its importance in human health. It is already approved that bread as sandwich (e.g. bread, butter, salads, slice of meat, slice of cheese and vegetables) can be as one basic meal in one of four/five meal times.

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