Flour fortification in Kyrgyz Republic: actual status and problems

Mamyrbayeva T.T., Dr. Scient. Med., professor

MHC KR, nutritional consultant

National laws and standards on flour fortification

Law of KR «On Fortification of Baking Flour» dd. March 11, 2009 №78. As amended on 12.03.2015 № 54:

- ✓ Flour of first and higher grade to be fortified.

Premix composition:

- ✓ Iron (NaFeEDTA)
- ✓ Zinc (zinc oxide)
- ✓ Vitamin B_9 (folic acid)
- ✓ Vitamin B_1 (thiamin)
- ✓ Vitamin B_2 (riboflavin)
- ✓ Vitamin B_3 (niacin)

In Q1 2016, NSC:

- In Q1 2016 manufactured 47,7 thousand ton of flour.
- Including the fortified flour – 7,2 thousand tons – 15,1%.
- 100% of produced flour is fortified in Bishkek only.
- In 2 regions 5-13% of produced flour is fortified, in 5 regions the flour is almost not fortified.

Evidential basis of objectives for premix composition

The premix composition is approved on the following grounds:

- High incidence of anemia among women of childbearing age (35%) and folic acid deficiency (39%), MDI, 2012, NSC, UNICEF, 2010.
- NaFeEDTA better absorbed, not affected by tannins and phytates.
- There are evidences of clinical and economical effectiveness of flour fortification with iron and folic acid for prevention of anemia and neural tube defects caused by folic acid deficiency:
- Sources:

Tinker SC, Hamner H, Crider KS. Red blood cell folate concentrations among non-pregnant United States women of childbearing age, National Health and Nutrition Examination Survey, 2007–2010. Available at http://epiresearch.org/wp-content/uploads/2014/08/abstract-book-printed.pdf

Grosse SD, Ouyang L, Collins JS, Green D, Dean JH, Stevenson RE. Economic evaluation of a neural tube defect recurrence-prevention program. // Am J Prev Med 2008;35:572–7.

Evidential basis of change in premix composition

- Prevalence of vitamin B12 deficiency in Kyrgyzstan never been studied;
- In Kyrgyz Republic there are no methods of vitamin B12 determination in premix and flour, that is why the monitoring and quality assessment for premix and flour fortification are not possible;
- Currently, there are some problems with purchasing of premix (which is expensive due NaFeEDTA); inclusion of vitamin B12 will lead to further increase in cost of premix;
- Increasing in cost for premix and flour may suspend the flour fortification;
- Standards of flour of high and low extraction are not suitable to our GOST;
- Revision of regulations takes time and money.

WHO/NMH/NHD/MNM/09.1 Recommendations on Wheat and Maize Flour Fortification
Meeting Report: Interim Consensus Statement

- 3. vitamin 12
- An unpublished pilot study testing the feasibility of adding B-complex vitamins and iron to flour in Israel showed that vitamin B12 added to flour was stable during baking, did not affect the quality of the bread, and increased plasma B12 concentrations slightly within six months (Allen Let al,2008). However, **evidence is still lacking about the population impact of fortification of wheat flour with vitamin B12 to improve vitamin B12 status.** Nevertheless, fortifying flours with vitamin B12 could be a feasible approach to improve vitamin B12 intake and the status of populations as there are no known adverse consequences of vitamin B12 fortification, and there are no known adverse effects of high intakes of the vitamin.

Requirement for vitamin B12 and sources available in the country

Age	Reference intake	In 100 g of product	For adults
Infants 0 to 6 months	0,4 µg/day	Lamb (2 – 3 µg);	100 g of meat
Children 7 to 12 months	0,5 µg/day		
Children 1 to 3 years	0,9 µg/day	Egg (1,95 µg);	2 eggs or
Children 4 to 8 years	1,2 µg/day	Farmer cheese (1,32 µg);	100 g of farmer cheese +100 g of milk or yoghurt
Teens 9 to 13 years	1,8 µg/day		
Older than 14 years	2,4 µg/day	Milk and cream (0,4 µg);	Or 400 g of milk + 1 egg
Pregnant women	2,6 µg/day	Yoghurt (0,4 – 0,7 µg)	Or 400 g of yoghurt + 1 egg
Breastfeeding mothers	2,8 µg/day		

- In poor rural areas of Guatemala the prevalence of vitamin B12 deficiency among women of childbearing age ranged between 12,3 and 26,1%.

Source: Rosenthal, J., Lopez-Pazos, E., Dowling, N.F. et al. Folate and Vitamin B12 Deficiency Among Non-pregnant Women of Childbearing-Age in Guatemala 2009–2010: Prevalence and Identification of Vulnerable Populations //Maternal and Child Health J (2015) 19: 2272. doi:10.1007/s10995-015-1746-6; DOI: 10.1007/s10995-015-1746-6

Implementation period

By decision of Working Group, amendment to premix composition in Kyrgyz Republic is postponed because:

- There is no data of prevalence of vitamin B12 deficiency in population of the country,
- There are no laboratory monitoring methods to control the vitamin B12 in premix and flour,
- Cost increase for premix can lead to cost increase for flour – this can lead to rejection to fortify the flour.
- There are no evidences of effectiveness of flour fortification with vitamin B12 at the global level.

Thank you!