18. Ципко А. О родовых травмах посткоммунистического российского патриотизма (Размышления на полях размышлений Никиты Михалкова) //[Электронный ресурс]: Режим доступа:http://www.nkj.ru/archive/articles/19174/ - 14.03.2016.

19. Ципко А. Перестройка. Двадцать лет спустя. // [Электронный ресурс]: Режим доступа:http://tsipko.ru/2010/01/17/%d0%bf%d0%b5%d1%80%d0%b5%d1%81%d1%82%d1%80%d0%be%d0%b9%d0%ba%d0%b0-%d0%b4%d0%b2%d0%b0%d0%b4%d1%86%d0%b0%d1%82%d1%8c-%d0%bb%d0%b5%d1%82-%d1%81%d0%bf%d1%83%d1%81%d1%82%d1%8f-2/- 14.03.2016.

УДК 613.221

I.I. Astryukhina, N.A. Belokonova, I.V. Volgina

ANALYSIS OF INFANT FORMULA PROPERTIES DILUTED WITH DIFFERENT TYPES OF WATER

Department of General Chemistry
Department of Foreign Languages
Ural State Medical University
Yekaterinburg, Russia

E-mail: Iria.5@mail.ru

Annotation. The composition of Infant Formula in Russia is regulated by State Standard 25101-82 for the organoleptic characteristics, protein and fat content and acidity. International Expert Group of European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) recommends to use a general index of properties of Infant Formula – the osmolarity, which is determined after diluting the Infant formula with water. The experimental values show that osmolarity significantly varies according to the type of water, which is used for its preparation.

The Keywords: Infant Formula; osmolarity

Infant formula is an essential product of artificial feeding (bottle-feeding) of newborn babies. Therefore, it ought to have the similar composition and properties as breast milk. The composition of Infant Formula in Russia is regulated by State Standard 25101-82 [1] for the organoleptic characteristics, protein and fat content and acidity. The school of Nutrition of professor Sannikova N. E. emphasizes necessity of optimization of the mineral part of Infant Formula [2,3], while foreign researches pay attention to organic part of the Formula [4,5]. International Expert Group of European Society for Paediatric Gastroenterology, Hepatology and Nutrition

(ESPGHAN) recommends to use a general index of properties of Infant Formula – the osmolarity, which is determined after diluting the Infant formula with water [6].

Aim – measuring of the osmolarity of Infant Formula diluted with distilled water and estimate the influence of different types of water on this quantity.

Materials and methods

Materials: Infant Formula: «Similac 1», «NAN-1», «Nestogen-1», « Similac Premium», «Bellakt»; Water: «Ugorskaya», «Aqua-Crystal», «Chusovskaya», «Novokurinskaya», boiled tap water, distilled water

Methods: Cryoscopy (cryoscopic medical osmometr OSCR-1M); Potentiometry (pH-metr pX-150); Conductometry (Conductometr Anion 7020)

Results and discussions

Osmolarity is a collective property, estimating a total quantity of osmotically active particles. Osmotically active particles are ions of inorganic substances like electrolytes or organic substances such as proteins (whey proteins and casein) and carbohydrates like lactose. Lipids has no influence on osmolarity. Osmolarity mark helps to capture the impact on water-electrolyte balance, loading of gastrointestinal tract and urinary system.

Osmolarity of breast milk varies from 260 to 300 mmol/kg. These values correspond to blood plasma osmolarity marks: 285-295 mmol/kg.

You can see the results of the experimental measuring of osmolality of the Infant Formula of different marks in (Table 1). Osmotic pressure was also counted.

Table 1

Indications of Formula osmotic properties diluted with different type of water

Infant Formula	π, atm	π, atm on the pack	Osmolality, mmol/kg	
			Osmometer	Pack
Similac 1	7,32	8	288	315
NAN-1	5,36	8	211	315
Nestgen -1	6,66	6,71	262	264
Similac Premium	6,71	8	275	315
Bellakt	6,81	7,37	268	290
Breast milk	6,61-7,63		260-300	

According to the data in the table, the experimental values significantly differ from the packing ones. The most adapted formula is Similac Pre, because its osmotic properties are close to blood.

In order to consider the acid-base properties of Bellakt pH, B_a and B_b (buffer tank for acid / base) were estimated including osmotic properties. It is clear from the table 2 that pH value differ 2,91units in different types of water. However, this distinction was reduced and became 0,29 units, when Bellakt and Nestogen were dissolved. Therefore, pH of the Fomula close to neutral. The reasons are the buffer properties of proteins and hydrocarbonates, contained in Formula.

Table 2

pH, buffer tank and osmotic properties of Bellakt

Type of water / Indications in different Formulas	Distilled	Ugorskaya	Aqua-Crystal	Chusov skaya	Novo kurinskaya	Boiled tap water
Щ, mmol/l	-	2.70	1.00	2,55	1.1	1.4
pH initial.	5,56	8,10	7,26	7,63	7,08	8,47
Nestogen-1 Bellakt	6,99 6,90	6,88 6,94	6,82 6,83	6,80 6,83	6,79 6,85	6,70 6,98
Вк , mmol equiv/l	1,19	8,74	5,99	10,33	6,68	5,68
Во , mmol equiv/l	1,56	8,12	3,65	3,44	2,58	2,27
Osmolality, mmol/kg	268	294	287	293	281	279
π, atm	6,81	7,47	7,30	7,45	7,14	7,09

Macro and micro elements, included in Formula content, are grouped into complexes with proteins. Active digestion of proteins occurs in stomach, with acid pH (4-5 newborn babies) Consequently, primary meaning of acid buffer was estimated (Table 2). The highest B_a criteria was in Bellakt diluted with Chusovskaya and Ugorskaya types of water, which have the highest alkalinity and pH. It is expected that Infant Formula diluted with this types of water has a bad influence on the gastro-intestinal system reducing an active acidity of gastric juice and increasing flatulence. It has the highest osmatic properties, too. We assume Aqua Crystal may be an appropriate water for Bellakt.

Conclusions:

1) Measured osmolality significantly differs from those indicated on the pack. Similac 1 diluted with distilled water is the most adapted Formula for the osmotic properties.

2) The osmotic properties of Infant Formula depends on the water type using for preparation.

Literature:

1. Государственные стандарты. Молоко. Метод определения точки замерзания. МКС 67.100.10 Постановление Госкомитета СССР по стандартам от 25 января 1982 года N 231.

2. Стенникова О.В / Патофизиологические и клинические аспекты дефицита кальция у детей. Принципы его профилактики. / О.В. Стенникова, Н.Е. Санникова// Вопросы современной педиатрии; 2007, Т. 6. № 4, с. 59

3. Санникова Н.Е . / Современные возможности диетотерапии для профилактики и коррекции дефицита кальция у детей раннего возраста./ Н.Е. Санникова, О.В. Стенникова// Вопросы современной педиатрии; 2007, Т. 6. № 1, с. 29-34

4. Coulet M. / Pre-clinical safety evaluation of the synthetic human milk, nature-identical, oligosaccharide 2'-O-Fucosyllactose (2'FL)./ M. Coulet, P. Phothirath, L. Allais, B. Schilter// Toxicology and Pharmacology; 2014, 68 (1), pp. 59-69

5. McCarthy N.A. / Sensitivity of emulsions stabilised by bovine β-casein and lactoferrin to heat and $CaCl_2$./ N.A. McCarthy, A.L. Kelly, J.A. O'Mahony, M.A. Fenelon // Food Hydrocolloids; 2014, №59. pp. 420-428

6. Medical Position Paper Global Standard for the Composition of Infant Formula: Recommendations of an ESPGHAN Coordinated International Expert Group./ Journal of Pediatric Gastroenterology and Nutrition. November 2005, №41? p.584–599

УДК 81 (035)

Х.И. Бани, О.Г. Олехнович

ТЕРМИНЫ АРАБСКОГО ПРОИСХОЖДЕНИЯ В РУССКОЙ МЕДИЦИНСКОЙ ТЕРМИНОЛОГИИ

Центр довузовской подготовки,
Кафедра иностранных языков
Уральский государственный медицинский университет,
Екатеринбург, Российская Федерация
Тунисская Республика

H.I. Bani, O.G. Olekhnovich

THE TERMS OF ARAB ORIGIN IN RUSSIAN MEDICAL TERMINOLOGY

Center of Pre-University Training
Department of Foreign languages
Ural state medical university
Yekaterinburg, Russian Federation
Republic of Tunisia

E-mail: benihamed@live.fr

Аннотация. В статье рассмотрены заимствования из арабского языка в русской медицинской терминологии.