ARE PRETERM HUMAN MILK FORTIFIERS GOOD SOLUTION FOR PRETERM INFANTS NUTRITION?

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Introduction

Breast milk is the best dietary choice for infants [1]. However, preterm human milk that is not complete in its composition (nutritional and biological value), and is not appropriate food for preterm infants. There are attempts to overcome disadvantages of breastfeeding by using fortifiers in preterm human milk [2].

The paper presents the results of chemical and biochemical tests of the mature preterm milk from 30 mothers. Samples, which includes different modes of storage, were collected from a milk bank from Institute for Neonatology in Belgrade and considered the benefits and challenges of providing human milk to premature infants, approaches to human milk fortification, and the advantages and challenges of donor milk products.

Materials and methods

Milk was collected from 30 healthy mothers of preterm infants (gestational age 28–36 weeks; birth weight 900–2470 g), within the 6 weeks after the delivery (mature milk). The mothers were asked to express milk between 8:00 and 10:00 AM. Milk was aliquoted and examined prior and after Holder pasteurization (62.5°C for 30 minutes) and/or storage at -20°C (for 7 or 30 days). This study was approved by the Ethics Committee of the Institute for Neonatology, N82401/4 (April 18th, 2014). Informed consent was obtained from all participants.

The FRAP assay, developed by Benzie and Strain as a direct method for measuring the total antioxidant power of biological fluids, was adopted in this study. The results were expressed as FRAP value (μM Fe (II)) of the samples.

Results

The basic nutritional components and properties and biochemical indicators of the antioxidative capacity and PRLS (potential renal solute load) of comparative tests of the preterm milk and preterm milk with fortifiers (made in Serbia) indicate deficiencies in the composition of mature preterm milk as compared to the results obtained from the term mature breast milk, majority of which can be compensate by high-quality fortifier. Addition of fortifier satisfie the needs of preterm infants for the progress of growth.

Conclusions

Pasteurization and storage affect nonenzymatic and enzymatic antioxidative agents in human milk. It appears that nonenzymatic antioxidative systems in colostrum and milk are different [3]. The effects of processing may be partially compensated by fortification/spiking with ascorbate before use.

Fortified human milk has tremendous benefits in improving the growth and short and long term outcomes for premature infant. Mother's own milk has clear advantages to donor human milk both the composition and the lack of necessity for pasteurization, Increased efforts to establish and maintain milk supply in women delivering preterm are likely to have greater benefits than providing pasteurized donor human milk.

Finally, the use of preterm fortifiers for human milk is good solution for wide application in relation to the nutritional needs of preterm infants. The best and promoted strategy, in order to most effectively support nutritional needs of infants would be optimization of nutritional needs of each individual preterm infant[4, 5].

The basic nutritional components and PRLS	Native PBM	Pasteurized PMB	7 days stored -20°C PBM	7 days stored -20°C and pasteurized PBM	30 days stored -20°C PBM	30 days stored -20°C and pasteurized PBM	Fortified PBM with Fortifier (made in Serbia)	Native term BM	"ESPGHAN" Recommendation For HM fortification
Protein (g/dL)	1,23 ± 0,14	1,14 ± 0,09	1,13 ± 0,21	1,13 ± 0,15	1,14 ± 0,15	1,14 ± 0,13	2,27 ± 0,13	1,3	2,7-3,0
Carbohydrate (g/dL)	7,80 ± 0,53	7,39 ± 0,62	7,42 ± 0,83	7,80 ± 0,59	7,65 ± 0,60	7,76 ± 0,55	10,77	7,80	-
Lactose (g/dL)	6,12 ± 1,09	6,12 ± 0,48	6,04 ± 0,71	6,10 ± 0,79	5,70 ± 0,61	6,04 ± 0,26	7,56 ± 0,51	7,6	7,7-8,0
Fat (g/dL)	3,65 ± 0,73	3,50 ± 0,74	3,59 ± 0,84	3,02 ± 0,90	3,63 ±0,56	2,85 ± 0,62	3,85 ± 0,72	3,8	3,2-4,0
Energy [kcal/dL]	70 ± 7	66 ± 6	69 ± 7	64 ± 8	69 ± 4	63 ± 5	90 ± 7	70	73-90
PRLS (mOsm)	137	137	139	141	147	144	207	123	219

Table 1 .Protein, carbohydrate, fat and energy of premature breast milk (PBM) and premature breast milk with fortifier "Impamil" (PBMF) for measurements of macronutrients and PRLS

Data show mean ± standard deviation. Though native BM contains only lactose, levels are labeled as carbohydrates, because fortifiers contain carbohydrates other than lactose. PRLS Potential Renal Solute Load) calculated according FDA reccomendation (2002). ESPGHAN (The European Society for Pediatric Gastroenterology Hepatology and Nutrition) Recommendation have been adjusted for a milk volume intake of 150 ml/kg/day.

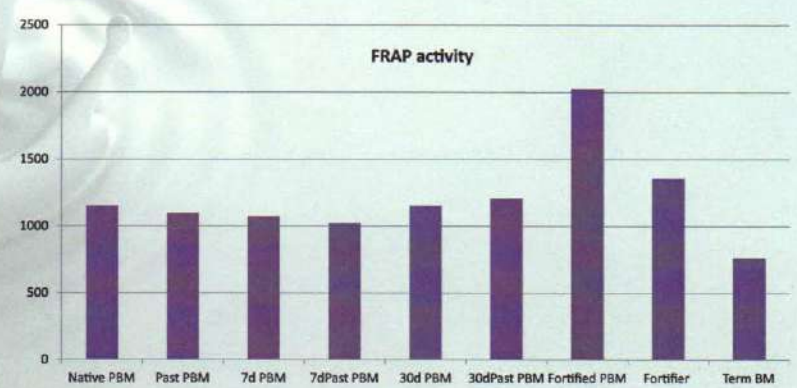

Figure 1: FRAP(ferric reducing power activity) : Biochemical indicator of the antioxidative capacity in raw and pasteurized preterm breast milk and PBM with IMPAMIL Fortifier, expressed as FRAP value (μM Fe (II)) of the samples.

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