



# REVISTA PAULISTA DE PEDIATRIA

www.rpped.com.br



## ORIGINAL ARTICLE

# Homologous human milk supplement for very low birth weight preterm infant feeding

Thayana Regina de Souza Grance\*, Paula de Oliveira Serafin,  
Débora Marchetti Chaves Thomaz, Durval Batista Palhares

Universidade Federal de Mato Grosso do Sul (UFMS), Campo Grande, MS, Brazil

Received 17 February 2014; accepted 4 July 2014

### KEYWORDS

Very low-birth weight infant;  
Food supplements;  
Human milk

### Abstract

**Objective:** To develop a homologous human milk supplement for very low-birth weight infant feeding, using an original and simplified methodology, to know the nutritional composition of human milk fortified with this supplement and to evaluate its suitability for feeding these infants.

**Methods:** For the production and analysis of human milk with the homologous additive, 25 human milk samples of 45mL underwent a lactose removal process, lyophilization and then were diluted in 50mL of human milk. Measurements of lactose, proteins, lipids, energy, sodium, potassium, calcium, phosphorus and osmolality were performed.

**Results:** The composition of the supplemented milk was: lactose  $9.22 \pm 1.00$ g/dL; proteins  $2.20 \pm 0.36$ g/dL; lipids  $2.91 \pm 0.57$ g/dL; calories  $71.93 \pm 8.69$ kcal/dL; osmolality  $389.6 \pm 32.4$ mOsmol/kgH<sub>2</sub>O; sodium  $2.04 \pm 0.45$ mEq/dL; potassium  $1.42 \pm 0.15$ mEq/dL; calcium  $43.44 \pm 2.98$ mg/dL; and phosphorus  $23.69 \pm 1.24$ mg/dL.

**Conclusions:** According to the nutritional contents analyzed, except for calcium and phosphorus, human milk with the proposed supplement can meet the nutritional needs of the very low-birth weight preterm infant.

© 2014 Sociedade de Pediatria de São Paulo. Published by Elsevier Editora Ltda. All rights reserved.

\*Corresponding author.

E-mail: thayanagrance@yahoo.com.br (T.R.S. Grance).

DOI of refers to article: <http://dx.doi.org/10.1016/j.rpped.2014.07.001>

1984-1462/© 2014 Sociedade de Pediatria de São Paulo. Published by Elsevier Editora Ltda. All rights reserved.

**PALAVRAS-CHAVE**

Recém-nascido de muito baixo peso;  
Aditivos alimentares;  
Leite humano

**Aditivo homólogo para a alimentação do recém-nascido pré-termo de muito baixo peso****Resumo**

**Objetivo:** Elaborar um aditivo homólogo do leite humano para a alimentação do recém-nascido de muito baixo peso com metodologia original e simplificada, conhecer a composição nutricional do leite humano fortificado com esse aditivo e avaliar sua adequação para a alimentação desses recém-nascidos.

**Métodos:** Para a produção e análise do leite humano com o aditivo homólogo, 25 amostras de 45mL de leite humano passaram por processos de retirada de lactose, liofilização e foram diluídas em 50mL de leite humano. Foram feitas dosagens de lactose, proteínas, lipídios, energia, sódio, potássio, cálcio, fósforo e osmolalidade.

**Resultados:** A composição do leite aditivado foi lactose 9,22±1,00g/dL; proteínas 2,20±0,36g/dL; lípidos 2,91±0,57g/dL; calorias 71,93±8,69kcal/dL; osmolalidade 389,6±32,4mOsmol/kgH<sub>2</sub>O; sódio 2,04±0,45mEq/dL; potássio 1,42±0,15mEq/dL; cálcio 43,44±2,98mg/dL; e fósforo 23,69±1,24mg/dL.

**Conclusões:** De acordo com os teores nutricionais analisados, com exceção do cálcio e do fósforo, o leite humano com o aditivo proposto pode atender as necessidades nutricionais do recém-nascido pré-termo de muito baixo peso.

© 2015 Sociedade de Pediatria de São Paulo. Publicado por Elsevier Editora Ltda. Todos os direitos reservados.

**Introduction**

Although it does not fully meet the nutritional needs of very low birth weight (VLBW) infants, human milk is recommended considering the digestive, metabolic and immunological immaturity of these children.<sup>1,2</sup> The American Academy of Pediatrics, as well as the Brazilian Ministry of Health<sup>3,4</sup> recognize that human milk is beneficial and has many advantages for preterm infant feeding. However, due to its physiological characteristics, human milk supplementation is recommended for these newborns.<sup>5-8</sup>

Considering its greater availability, cow's milk protein is the most commonly used human milk supplement. The concern with the short-term prognosis and the knowledge that nutrition in childhood is related to diseases of adulthood justify the study of supplement use that offers more adequate quality amino acids and fatty acids, such as those derived from human milk itself.<sup>9-14</sup>

These studies show that it is possible to offer higher concentrations of human milk nutrients to VLBW infants with good gastrointestinal and metabolic tolerance. Among such studies, we highlight those using viable methodologies to be applied in human milk banks, such as evaporation and freeze drying of skim or non-skim human milk after removal of part of the lactose.<sup>9-14</sup> In these studies, human milk was concentrated in a rotary evaporator, a procedure that requires the milk to be on average 30 minutes at a temperature higher than room temperature, which in addition to requiring extensive manipulation of the milk, allows greater protein denaturation due to time and temperature range.

By analyzing the techniques used in these studies, it was intended to develop a homologous human milk supplement for VLBW infant feeding with an original, simplified methodology, which minimized the steps of handling and temperature change such as heating, freezing and thawing

during its production. We also sought to assess the nutritional composition of human milk fortified with this supplement and evaluate its suitability for the feeding of these newborns.

**Method**

After approval by the Human Research Ethics Committee at Universidade Federal de Mato Grosso do Sul (UFMS) (n. 1975 CAAE 0035.0.049.000-11), the homologous supplement of human milk was prepared.

The human milk used in the production and dilution of the supplement and the one used for comparison with the supplemented milk was expressed manually at home or in the human milk bank at the University Hospital of UFMS, being donated by volunteer mothers whose children were born at full-term, with a lactation period between 0 and 12 months. Milk samples that were submitted to the selection criteria of the human milk bank and that showed an index  $\leq 2$  in the acidity titration analysis (Dornic acidity) were used for supplement production.<sup>15</sup> Milk samples used in the study were not selected according to lactation period, beginning or end of feeding, or time of day when the sample was collected. Although all these characteristics influence the composition of human milk, it is known that human milk banks usually have no surplus milk supply, and therefore this study did not aim to work with selected milk samples.

The human milk samples underwent two phases of preparation: removal of lactose and lyophilization, as described below. First, 25 samples of human milk with 45mL were placed in conical plastic tubes, refrigerated at -22 °C for 24 hours. After this period, the samples were submitted to centrifugation at 3,500 rpm for 60 minutes in a NT 815 (NOVATECNICA®, SP, Brazil) centrifuge at a temperature of

Download English Version:

<https://daneshyari.com/en/article/4176236>

Download Persian Version:

<https://daneshyari.com/article/4176236>

[Daneshyari.com](https://daneshyari.com)