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Consumption of a milk low in lactose high in intrinsic fiber is associated with improved nutrient intake adequacies in Chinese adults: a diet modelling study

F. Zhang[1], C. Debras[2], J. Matta[2] and D. Wang[2]
[1]*Nestlé Institute of Health Sciences, Nestlé Research, Beijing, China*
[2]*Nestlé Institute of Health Sciences, Nestlé Research, Lausanne, Switzerland*

Despite national dietary guidelines, dairy intakes remain low in China, partially because of high prevalence of lactose malabsorption[1]. The fibre intake adequacy is also low comparing to the recommendation in China[2]. Milk-N is a new range of fortified and non-fortified low-lactose/highfibre milk products. In this study we analyzed the associations between consumption of Milk-N products and nutritional status using diet modelling[3].

We used data from China Health and Nutrition Survey-2011[4], participants above 20y were included in the analysis (n = 12127, 47% men, 53% women). Nutrient intakes were estimated through 3 days dietary record and household food inventory. Two diet scenarios were modelled: A) Adding a serving (200ml) of generic milk or of Milk-N to participants not meeting the dairy recommendation, and B) Substituting dairy food intakes with Milk-N in equivalent amount for dairy consuming participants. Paired t-test and Pearson's Chi-squared test were used to compare the amount of intake and prevalence of nutrient intake adequacy between the two types of addition, and before and after the substitution.

Overall, 17.4% of participants consumed dairy foods with an average intake of 160.5g/day, among those 81.2% consumed milk. Only 1.1% of the population met dairy intake recommendations.

In the addition scenario, compared to the addition of generic milk, adding one serving of fortified or non-fortified Milk-N increased fibre intake by 25-35% (from 17.6g/day to 22-23.8 g/day), leading to increased fibre intake adequacy from 16.4% to 27.0-32.8%, i.e. 65-100% increase. Addition of fortified Milk-N improved daily average intakes of calcium, iron, zinc, vitamins A and C by 27-31%, 9%, 8%, 3%, and 16%, respectively. Consequently, the proportion of the population with inadequate intakes decreased ($p<0.01$) for generic milk vs fortified Milk-N as follows, for calcium (66.3% vs. 23.4-29.6%), iron (5.5% vs. 2.2%), zinc (28.1% vs. 18.9%), vitamin A (61.7% vs. 52.7%) and vitamin C (62.4% vs. 51.5%).

In the substitution scenario, replacing current dairy food intake with fortified or non-fortified Milk-N increased fibre intake by 20-27% (from 18.4 to 22.0-23.4g/day), leading to increased proportion of dairy consumers with adequate fibre intake from 18.7% to 28.2-32.3%, i.e., 51-73% increase. Substitution with fortified Milk-N improved intakes of calcium, iron, zinc, vitamins A and C by 2327%, 7%, 7%, 10%, and 12%, respectively. Consequently, the proportion of dairy consumers with inadequate micronutrient intakes significantly decreased ($p<0.01$) for calcium (from 72.9% to 50.353.3%), iron (from 7.5% to 4.7%), zinc (from 33.0% to 26.1%), vitamin A (from 56.9% to 47.4%), and vitamin C (from 60.2% to 50.8%).

In addition to the reduced lactose that helps to address lactose malabsorption, consumption of any Milk-N alternative could improve fibre intake, while fortified Milk-N could also contribute to reducing micronutrient inadequacies in Chinese adults.

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