A Comparison of the Nutritional Value of Cow's Milk and Nondairy Beverages

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ABSTRACT

Objectives: Nondairy beverages are advertised as a healthy alternative to cow's milk. There is an increased availability and consumption of nondairy beverages and a decrease in consumption of cow's milk. The aim of the present study is to review and compare the contents and nutritional value of nondairy beverages to cow's milk.

Methods: Information about the nondairy beverages on the shelves at stores in Buffalo, New York was collected. The Web pages of several manufacturers were assessed for product contents. The nutrient contents including the protein quality of the nondairy beverages and cow's milk were compared. The nutrient contents of nondairy beverages and cow's milk were also compared to recommended dietary allowance or adequate intake for toddlers and young children.

Results: Commonly available nondairy beverages are derived from almond, cashew, coconut, hazelnut, hemp, oat, rice, and soy. Cow's milk has higher protein content and quality compared with most of these products. It was noted that most of these beverages are fortified with calcium and vitamin D. The bioavailability of these substances after fortification is, however, not available.

Conclusions: Nondairy milk beverages vary in their nutritional profiles. These should not be considered nutritional substitutes for cow's milk until nutrient quality and bioavailability are established.

Key Words: cow's milk, nondairy beverages, nutrition, protein quality

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What Is Known

- Cow's milk consumption by children is decreasing.
- There is an increased availability and consumption of nondairy beverages.
- Nondairy beverages are perceived to be healthy by the consumers.

What Is New

- Nondairy milk beverages vary in their nutritional profiles.
- The nutritional value of cow's milk is well documented, whereas that of nondairy beverages has not been thoroughly studied.
- Cow's milk should not be removed from the diets of young children unless there is a medical indication.

Cow's milk, a rich source of several macro- and micronutrients, is consumed by many children. Recently, the United States Department of Agriculture (USDA) survey showed a progressive decrease in per capita consumption of cow's milk (1). At the same time, there was a proliferation of nondairy beverages, which are now marketed to parents for young children. According to Mintel consumer trends report, dairy milk dominates the segment of dairy and nondairy beverages with 90.5% of market share, but consumer interest in nondairy beverages is growing. Mintel research finds that half of respondents purchase nondairy beverages in some form and consumers drink nondairy beverages because they see them as nutritious, and perceive them to be more nutritious than dairy milk. Mintel has revealed that sales of dairy milk decreased 7% in 2015 ($17.8 billion) and are projected to drop another 11% through 2020. Seen as a better-for-you alternative to dairy milk, nondairy beverages offerings continue to see strong growth, with gains of 9% in 2015 to reach $1.9 billion. There is continued popularity of nondairy beverages with Mintel research revealing that half (49%) of Americans consume these products, including 68% of parents and 54% of children younger than 18 years. They also report that 7 in 10 (69%) consumers agree that nondairy milk is healthy for kids compared with 62% who agree that dairy milk is healthy for kids. ''Among nondairy milk consumers, nearly half (46%) drink it at least once a day, including 57% of parents. When looking at reasons for consumption, nondairy milk is more likely than dairy milk to be consumed for heart health (29% nondairy milk vs 20% dairy milk) and weight loss (23% nondairy milk vs 8% dairy milk)'' (2,3). According to the Dairy Management Inc. report of January 2016, nondairy beverages continue to show an increasing sales trend in 2015 (4). If this trend continues, it is important to understand how these beverages compare to cow milk, not only in product content, but also in bioavailability of the nutrients so children can be exposed to healthy food, grow optimally, and develop good eating behaviors.

Nondairy beverages are manufactured by extracting plant material, such as soy, nut, rice, and so on in water. The plant materials are homogenized and thermally treated to improve suspension of particles and to increase shelf life (5). They are made to visually resemble cow's milk and often include the word ''milk'' in the beverage name. The nutritional contents of these plant-based products depend on the source, methods of processing, and whether the products are fortified (5). It is, however, unclear whether these

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beverages provide any advantage over cow's milk. On the contrary, inappropriate substitution of cow's milk with nondairy beverages can lead to nutritional deficiencies (5–7).

The most likely medical reason for consumption of nondairy beverage is cow's milk protein allergy (CMPA) (5). CMPA is one of the most common food allergies in early childhood and a true indication for substituting the cow's milk in the diet (7). The incidence is approximately 2% to 3% in developed countries. Many children are, however, perceived to be CMPA by their parents without a confirmed diagnosis (6,7). Sometimes, CMPA is confused with lactose intolerance (7). Cow's milk elimination from the diet during infancy and childhood for CMPA should be recommended only after confirming the diagnosis. Appropriate substitution is important to minimize the risk of nutritional inadequacy and poor growth.

Here, we review the content and nutritional value of nondairy beverages and compare them to cow's milk, the traditional beverage for toddlers and children.

METHODS

We visited several markets, both large chain and small local food shops in Buffalo, NY and noted the non-dairy beverages on the shelves that had the word 'milk' in their name. We randomly selected stores in the Buffalo area that represent the major multi-outlet and convenient stores based on the IRI (Information resources Inc) custom DMI (Dairy Management Inc) Market advantage database (8). According to this database, the stores that were included cover approximately 68% of USDA fluid milk sales. The stores that were surveyed included grocery (Wegman's), drug (Walgreens, CVS, RightAid), C-stores, Walmart, Club (BJ's, Sam's), Dollar stores (Dollar general, Family Dollar), and Mass merchandiser (Target, Kmart). The beverages available were categorized based on their major derivative as follows: almond milk, cashew milk, coconut milk, hazelnut milk, hemp milk, oat milk, rice milk, and soy milk. Several products from manufacturers were available in each category with minimal variation in nutrient content. Therefore, we included for further analysis only beverages labeled as ''original'' in each category.

We then accessed the Web pages of the individual manufacturers and the USDA Research Service National Nutrient Database for Standard Reference Release 28 for product content (9). The nutrient content of the nondairy beverages was compared to the nutrient content of cow's milk and the recommended dietary allowance (RDA) or adequate intake for toddlers (1–3 years) and young children (4–6 years) (10). The protein quality of cow's milk and nondairy beverages was calculated based on the Digestible Indispensable Amino Acid Score (DIAAS). The DIAAS scores the digestibility of amino acids in the ileum and is a measure of both protein content and absorption (11).

RESULTS

Table 1 shows the nutrient profile of cow's milk and each of the nondairy beverages. The nutrient profile contains available information on the macronutrients and micronutrients. It is important to note that amongst macronutrients, there is a remarkable difference in the quantity of protein (Table 1). Our results show that one serving (240 mL) of Cow's milk provides protein equivalent to 59% of the RDA in toddlers and 40.4% of the RDA in young children (Tables 2 and 3). This is clearly high as compared with all the nondairy beverages, except soymilk, which contains protein equivalent to 53% and 36.8% of RDA in toddlers and young children, respectively. Figure 1A and B shows protein content in all products compared with the RDA in toddlers and young children, respectively. The protein quality of most of the nondairy beverages could not be calculated because their amino acid composition was not available. Most of the nondairy beverages contain almost equal amount of energy when compared with cow's milk.

The quantity of several micronutrients is available for cow's milk. Similar information is, however, not available for most nondairy beverages. Amongst micronutrients, we were able to compare only calcium and vitamin D content in cow's milk and nondairy beverages. It was noted that most nondairy beverages are supplemented with equal or greater amounts of calcium and vitamin D compared with the cow's milk (Table 1). Nondairy beverages provide 30% to 45% RDA of calcium and 25% to 20% RDA of vitamin D for toddlers and young children (Tables 2 and 3). Figure 2A and B shows calcium content in all products compared with RDA in toddlers and young children, respectively. Nondairy beverages with equal content of fortified micronutrients, however, cannot be considered as nutritionally equivalent to cow's milk as the bioavailability of the fortified products vary in different beverages.

DISCUSSION

Nondairy beverages primarily derived from plants that contain the word ''milk'' are increasingly available (6).

Our results show that the commonly available nondairy beverages are derived from almond, cashew, coconut, hazelnut, hemp, oat, rice, and soy. Many manufacturers add the word ''milk'' to their product's name, suggesting a healthy beverage that would provide an advantage to their product. We show that these beverages manufactured differ from cow's milk in nutritional content. Inappropriate substitution with these beverages increases the risk of nutritional deficiency (6,7). The quantity of several nutrients in cow's milk has been described in detail (9). Similar data for most of the nondairy beverages is, however, not available. Therefore, it is difficult to compare all the nutritional constituents with cow's milk. Another matter of concern is the bioavailability of the fortified nutrients in the nondairy beverages. The physical state of the substance in the fortified beverage and its interaction with the food matrix are important determinants of absorbability (12). There is, however, no information about the bioavailability of fortified nutrients in nondairy beverages. These issues raise concerns over the trend toward increased consumption of nondairy beverages among children.

Protein Content

Protein is an essential structural component of cells and also plays an important role in functions of various enzymes, hormones, nucleic acids, and other molecules essential for life (13). The most important aspect of a protein from a nutritional point of view is its quality. Protein quality is based on the amino acid composition, digestibility, bioavailability, and specific protein-derived components (13,14). Several methods of evaluating protein quality have been used in the past such as biological assays (Biological Value, Net Protein Utilization, Protein Efficiency ratio), chemical assays (Chemical score, Amino Acid Score), and mixed assays such as protein digestibility–corrected amino acid score (15). In 2011, FAO Expert Consultation on Protein Quality Evaluation in Human Nutrition recommended a new protein quality measure DIAAS to replace protein digestibility–corrected amino acid score. DIAAS is defined as DIAAS % = 100 × [(mg of digestible dietary indispensable amino acid in 1 g of the dietary protein)/(mg of the same dietary indispensable amino acid in 1 g of the reference protein)] (11). DIAAS is based on true ileal amino acid digestibility determined for each amino acid individually, and lysine availability estimates, using nontruncated scores. In calculating DIAAS, the ratio should be calculated for each dietary indispensable amino acid and the lowest value designated as the DIAAS (11).

TABLE 1. Nutritional composition of cow's milk and nondairy beverages (per 240 mL = 1 serving)

Nutrition content	Unit	Cow's (whole milk added vitamin D)	Almond (silk original)	Cashew (silk)	Coconut (silk original)	Hazelnut (Pacific)	Hemp (living harvest)	Oat (pacific)	Rice (rice dream)	Soy (silk, plain, original)
Energy	kcal	149	60	60	80	110	80	130	120	99.6
Protein	g	7.69	1	<1	1	3.5	2	4	1	7
Total lipid (fat)	g	7.98	2.5	2.5	5	2	7	2.5	2.5	4
Carbohydrate	g	12.8	8	9	7	19	8	24	23	8
Fiber, total dietary	g	0	1	0	0	1	0	2	0	1.5
Sugars, total	g	12.32	7	7	6	14	0	19	10	6
Minerals										
Calcium, Ca	mg	276	450	450	450	300	300	350	20	450
Iron, Fe	mg	0.07	0.7	1.2	0.7	0.1	0.36	0.6	0.2	1.1
Magnesium, Mg	mg	24	16	1.3	16	N/A	33	N/A	N/A	38.9
Phosphorus, P	mg	205	20	N/A	20	N/A	N/A	N/A	N/A	N/A
Potassium, K	mg	322	N/A	30	35	N/A	N/A	N/A	N/A	299
Sodium, Na	mg	105	150	170	30	N/A	20	N/A	86	119
Zinc, Zn	mg	0.9	1.5	0.94	1.5	N/A	N/A	N/A	N/A	0.6
Vitamins										
Vitamin C, total ascorbic acid	mg	0	0	0	0	0	0	0	1.2	0
Thiamin	mg	0.112	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Riboflavin	mg	0.412	0.4	0.3	0.4	0.3	0.27	0.3	N/A	0.5
Niacin	mg	0.217	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vitamin B6	mg	0.088	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Folate, DFE	μg	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24.3
Vitamin B12	μg	1.1	3	1	3	N/A	N/A	N/A	N/A	N/A
Vitamin A	IU	395	500	N/A	500	N/A	0	N/A	0	501
Vitamin D	IU	124	150	150	150	150	150	150	0	180
Vitamin K	μg	0.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vitamin E	mg	0.15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lipids										
Fatty acids, total saturated	g	4.55	0	0	4.5	0	0.5	0	0.1	0.5
Fatty acids, total monounsaturated	g	1.98	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fatty acids, total polyunsaturated	g	0.476	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cholesterol	mg	24	0	0	0	0	0	0	1.3	0

N/A = not available.

TABLE 2. Nutritional content in cow's milk and non-dairy beverages compared to recommended dietary allowance/adequate intake in toddlers (1–3 years) (per 240 mL = 1 serving)

Nutrition content	Unit	RDA/AI	Cow's (whole milk with added vitamin D) (% of nutrient in a single serving)	Almond (silk original) (% of nutrient in a single serving)	Cashew (silk) (% of nutrient in a single serving)	Coconut (silk original) (% of nutrient in a single serving)	Hazelnut (Pacific) (% of nutrient in a single serving)	Hemp (living harvest) (% of nutrient in a single serving)	Oat (Pacific) (% of nutrient in a single serving)	Rice (rice dream) (% of nutrient in a single serving)	Soy (silk, plain original) (% of nutrient in a single serving)
Energy*	kcal	1000–1400	15	6	6	8	11	8	13	12	9.9
Protein*	g	13	59	7	0	7	26.9	15	26	7	53
Carbohydrate*	g	130	9.8	6	6.9	5.3	14.6	6.1	18.4	17.6	6
Fiber, total dietary†	g	19	0	5.2	0	0	5.1	0	10.5	0	7.8
Calcium*	mg	700	39.4	64.2	51.4	51.4	34.2	34.2	41.4	2.8	42.7
Iron*	mg	7	1	10	17.1	10	1.4	5.1	8.5	2.8	15.7
Vitamin D*	IU	600	20.6	25	25	25	25	25	25	25	30

AI = adequate intake; RDA = recommended dietary allowance.
*RDA.
†AI.

TABLE 3. Nutritional content in cow's milk and nondairy beverages compared to recommended dietary allowance /adequate intake in young children (4–8 years) (per 240 mL = 1 serving)

Nutrition content	Unit	RDA/AI	Cow's (whole milk with added vitamin D) (% of nutrient in a single serving)	Almond (silk original) (% of nutrient in a single serving)	Cashew (silk) (% of nutrient in a single serving)	Coconut (silk original) (% of nutrient in a single serving)	Hazelnut (Pacific) (% of nutrient in a single serving)	Hemp (living harvest) (% of nutrient in a single serving)	Oat (Pacific) (% of nutrient in a single serving)	Rice (rice dream) (% of nutrient in a single serving)	Soy (silk, plain original) (% of nutrient in a single serving)
Energy*	kcal	1400–1600	10.6	8.4	4.2	5.7	7.8	5.7	9.2	8.5	7.1
Protein*	g	19	40.4	5.2	5.2	5.2	18.4	10.5	21	5.2	36.8
Carbohydrate*	g	130	9.8	6	6.9	5.3	14.6	6.1	18.4	17.6	6
Fiber, total dietary†	g	25	0	0.4	0	0	0.4	0	0.8	0	0.06
Calcium*	mg	1000	27.6	45	45	45	30	30	35	2	45
Iron*	mg	10	0.7	7	12	7	1	3.6	6	2	11
Vitamin D*	IU	600	20.6	25	25	25	25	25	25	25	30

AI = adequate intake; RDA = recommended dietary allowance.
*RDA.
†AI.

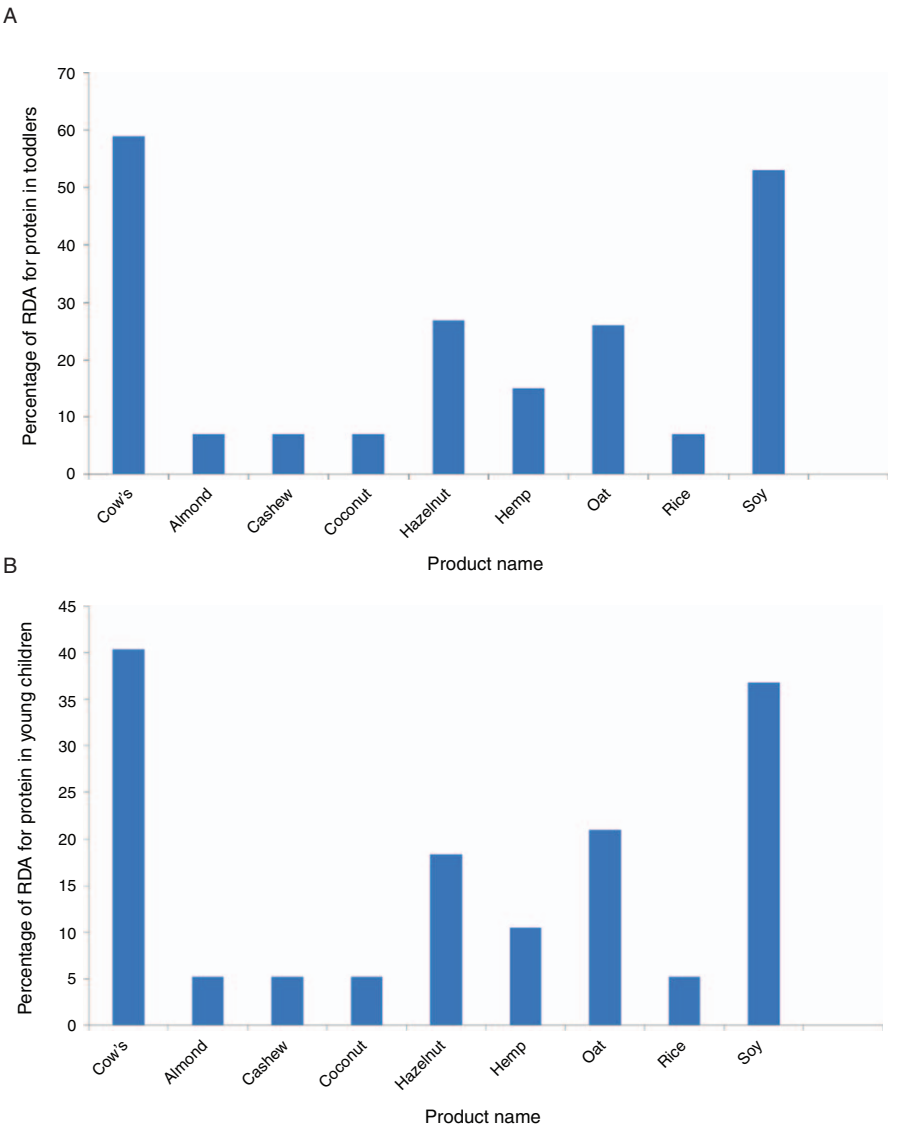

FIGURE 1. A, Graph showing protein content in 1 serving (240 mL) of all products compared with RDA in toddlers. RDA = recommended dietary allowance. B, Graph showing protein content in 1 serving (240 mL) of all products compared with RDA in young children. RDA = recommended dietary allowance.

Rutherfurd et al reported DIAAS values for the individual amino acids in milk protein concentrate, soy protein isolate, rice protein concentrates, and various other proteins in growing rats. Based on the present study, the soy protein isolate has a DIAAS value >100% for most individual indispensable amino acids when calculated using the amino acid requirement pattern for the 0.5- to 3-year-old child. The nutritive value of soy protein is limited by lower content of methionine and cysteine with lowest DIAAS value of 90.6% (16). Fortification with methionine significantly improves nutritional quality of soy-based products (15). Addition of methionine to soy infant formula has shown benefits. Adding methionine to soy protein consumed by adults with an adequate nitrogen intake, however, has no significant effect on the nutritional value (17). Soy protein also contains endogenous inhibitors of digestive enzymes and lectins. These inhibitors and lectins are either inactivated by heat treatment or eliminated by fractionation during food processing to improve the nutritional quality of soy-based products (17). Rutherford et al also reported that the lowest DIAAS for rice protein isolate is 37.1% when calculated using the amino acid requirement pattern for the 0.5- to 3-year-old child (16).

Cow's milk has >100% DIAAS value for all the indispensable amino acids with lowest DIAAS of 118% (11,16). The high protein quality in cow's milk arises both from its nutritional value and from its physiological properties (14). Cow's milk also contains proteins with biological activities including enzymes, immunoglobulin, bactericides, hormones, mediators, and growth factors (14,18). We could not compare the protein quality in other nondairy beverages, except soy and rice protein, because the information about DIAAS and the amino acid composition in those products is not available. This raises unanswerable questions about the protein quality of those products.

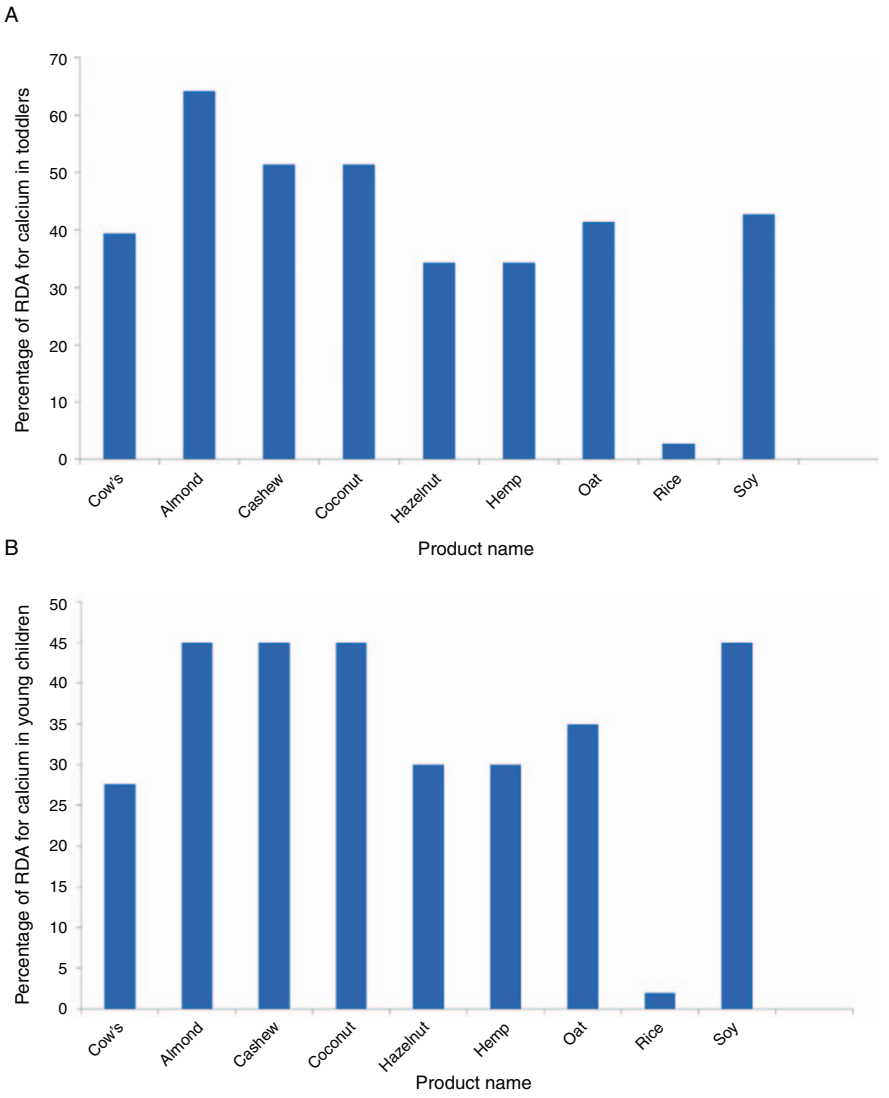

FIGURE 2. A, Graph showing calcium content in 1 serving (240 mL) of all products compared with RDA in toddlers. RDA = recommended dietary allowance. B, Graph showing calcium content in 1 serving (240 mL) of all products compared with RDA in young children. RDA = recommended dietary allowance.

Carbohydrate and Fat Content

Fat content in cow's milk is energy dense and a rich source of cholesterol and saturated fatty acids (19) and is thought to be important for the developing brain. After 2 years, a switch to low-fat or fat-free milk is recommended to reduce saturated fat intake (20–22). Newer studies, however, suggest that a high intake of dairy fat can be associated with a lower risk of developing central obesity while a low intake of dairy fat can be associated with a higher risk of central obesity (23). One recent pediatric study showed that consumption of low-fat milk was associated with increased risk of overweight/obesity between 2 and 4 years of age (22). Although nondairy beverages are low in saturated fats, most of the products contain energy equivalent to milk, which is derived mostly from sugars and other carbohydrates.

Several micronutrients including vitamins and minerals are essential for growth and development. Nine shortfall nutrients identified in the 2015 Dietary Guidelines Advisory Committee report are vitamin A, vitamin D, vitamin E, folate, calcium, magnesium, potassium, fiber, and iron for the premenopausal females. Among these shortfall nutrients, calcium, vitamin D, fiber and potassium were classified as nutrients of public health concern because their under consumption is linked to adverse health outcomes (24).

Calcium Content

Calcium is essential for healthy bones and teeth. It also has several vital functions within cells predominantly as a second messenger (25). Most of the nondairy beverages are fortified with calcium (Fig. 2A and B). Adding calcium to a product, however, does not guarantee nutritional equivalence with other products containing similar amounts of calcium because the bioavailability of calcium varies significantly in fortified beverages (12). Cow's milk provides more than half of the RDA for calcium in a typical diet of toddlers and young children. Cow's milk has a high content

of calcium and that calcium is highly bioavailable (14). Other milk constituents such as lactose and casein phosphopeptides are known to increase the intestinal permeability for calcium salts and increase intestinal absorption, respectively (14,18).

Magnesium Content

Magnesium, a cofactor for several enzyme systems that regulate diverse biochemical reactions, is required for energy production, and membrane transport. Soy and hemp-based beverages are good sources of magnesium. Zinc is essential for the function of several enzymes and plays a role in DNA repair, cell growth and replication, gene expression, and protein and lipid metabolism. Cow's milk is a good zinc source and the zinc is more bioavailable than nonmilk sources (18).

Vitamins Content

Cow's milk is a rich source of vitamins including riboflavin, vitamin E, vitamin A, folate, thiamin, niacin, vitamin B6, and vitamin B12. It contains higher amount of riboflavin compared with other products. Fortified cow's milk is also a key dietary source of vitamin D in early childhood. Replacing cow's milk with nondairy beverages could put children at unnecessary risk of complications from low dietary vitamin D. Severe rickets has been described in children who did not drink cow's milk (6).

Nondairy milk beverages are perceived to be healthy but the products available vary remarkably in their nutritional profiles; most have low protein, mineral, and vitamin content and the quality of the protein is less than cow's milk. If these products are portrayed as substitutes for cow's milk in the diets of young children, then protein content and bioavailability of the nutritional additives need to be considered by manufacturers and consumers.

The present study presents information on nondairy beverages in a way that they can be compared with dairy milk, the preferred beverage for children recommended by the American Academy of Pediatrics, the Centers for Disease Control, the US Department of Agriculture and provided in WIC packages unless there is a medical contraindication to its use.

The present study does have limitations. The first is the local nature of the survey for the products. The Web sites for all the products, however, indicate they are distributed nationally. Each and every product were not assessed, because the number is overwhelming. The focus was on the product labeled as ''original'' in the major categories identified. The Web pages of the manufacturers did not contain complete information and because of this, important attributes, such as protein quality and nutrient bioavailability could not be assessed for all the products. In conclusion, cow's milk plays an important role in the diet of toddlers and young children as it is a rich source of nutrients primarily protein, fats, vitamins, and minerals. Cow's milk should not be removed from the diets of young children unless there is a medical indication to do so. In that circumstance a dietitian can review the entire diet to be sure, it satisfies the nutrient requirement. It is also important that nondiary beverages should not be considered a nutritional substitute for cow's milk until nutrient quality and bioavailability is established.

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2. Read the article titled ***"A Comparison of the Nutritional Value of Cow's Milk and Nondairy Beverages".*** Singhal S etal. 2017. JPGN. 64(5) and answer the questions.
3. Indicate your answers to the questions by making an "X" in the appropriate block at the end.
4. You will earn 1 CEU if you answer 70% or more of the questions correctly. A score of less than 70% will unfortunately not earn you any CEU's.
5. Make a photocopy for your own records in case your answers do not reach us.
6. Cut and paste the area indicated below into an e-mail message and e-mail it to maretha@dairycep.co.za or post to P.O. Box 36332 Menlo Park 0102
7. The closing date for this activity is 30 December 2017. Answer sheets received after this date will not be processed. Certificates will be sent within two months from receipt of the answer sheet.

PLEASE ANSWER ALL THE QUESTIONS
(There is only one correct answer per question.)

1. When evaluating the nutritional information of cow's milk compared to non-dairy beverages there are some facts that are new. These are:
[a] Non-dairy milk beverages vary in their nutritional profiles
[b] The nutritional value of cow's milk is well documented, whereas that of non-dairy beverages has not been thoroughly studied
[c] Cow's milk should not be removed from the diets of young children unless there is a medical indication
[d] All of the above

2. It is important to understand how non-dairy beverages compare to cow's milk, in _____ of the nutrients so that children can be exposed to healthy food, grow optimally, and develop good eating behaviours.
[a] nutrient density and absorbability
[b] product content and bioavailability
[c] taste and availability
[d] all of the above

3. The nutritional contents of plant-based products depend on the source, methods of processing, and whether the products are fortified.
.[a] true
[b] false

4. The protein quality of cow's milk and non-dairy beverages was calculated based on the Digestible Indispensable Amino Acid Score. The DIAAS scores the digestibility of amino acids in the ileum and is a measure of both _____
[a] protein quantity and absorption rate
[b] protein quality and bioavailability
[c] protein content and absorption

5. Inappropriate substitution with plant-based beverages increases the risk of nutritional deficiency. Full data of most of these products' nutrient content is not yet available. It is therefore difficult to compare all the nutrient constituents to that of cow's milk. The (a)_____ of the substance in the fortified beverages and its (b)_____ are also important determinants of absorbability
[a] (a) bioavailability (b) interaction with other nutrients
[b] (a) physical state (b) interaction with the food matrix
[c] (a) chemical structure (b) pH

6. Non- dairy beverages with equal content of fortified micronutrients, can be considered as nutritionally equivalent to cow's milk as the bioavailability of the fortified products in different beverages is the same.
[a] true
[b] false

7. Protein quality of most plant-based beverages is not known, except for soy and rice protein. Using the DIAAS method to determine the nutritive value of soy, rice and cow's milk it is clear that plant-based product do not deliver the same quality of protein than that of cow's milk. Comparing the lowest DIAAS values of cow's milk, soy and rice beverages:
[a] Cow's milk > 100%; soy milk > 100%; rice drink 37%
[b] Cow's milk 118%; soy milk 90.6%; rice drink 37.1%
[c] Cow's milk > 118%; soy milk >100%; rice milk < 37%

8. Although non-dairy beverages are low in saturated fats, most of the products contain energy equivalent to milk, which is derived mostly from _____ and other carbohydrates**.**
[a] sugars
[b] protein
[c] poly-unsaturated fats

9. Milk constituents such as _____ and casein phosphopeptides are known to increase the intestinal permeability for calcium salts and increase intestinal absorption thereof.
[a] 1,25- dihydroxy-vitamin D
[b] galactose
[c] lactose

10. Non-dairy milk beverages are perceived to be healthy but the products available vary remarkably in their nutritional profiles; most have low _____content and the quality of the protein is less than cow's milk.
[a] protein, vitamin and mineral
[b] protein, fat and vitamin D
[c] protein, sugar and vitamin A

Consumer Education Project of Milk SA - CPD activity for Dietitians

"A Comparison of the Nutritional Value of Cow's Milk and Nondairy Beverages"
Ref number: DT/A01/2017/00099

Cut and paste the section below into an e-mail message

PLEASE WRITE CLEARLY

HPCSA number: DT_____

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I hereby declare that this is my own unassisted work.

Please make an "X" in the appropriate block for each question:

1. a [ ] b [ ] c [ ] d [ ]
2. a [ ] b [ ] c [ ]]
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