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Acceptability of pasteurized dairy cattle milk among elementary pupils in four school districts in Cagayan Valley Philippines

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Abstract

This study determined the acceptability of pasteurized dairy cattle milk among the elementary pupils of Tuao East District, Tuao West, Piat District and Sto Nino District in the Municipalities of Tuao, Piat and Sto. Nino in the province of Cagayan. This study used descriptive-correlational research method using score card with 4-point Likert Scale as the research tool. Stratified-purposive sampling was used in determining the respondents comprising of 100 pupils per district. The analysis of data revealed that the pupils extremely like the smell, texture and taste of pasteurized dairy cattle milk. When subjected to statistical analysis however, it was found that there is no significant relationship between the acceptability level of the respondents when group according to age, sex and grade level. It can be concluded that pasteurized dairy cattle milk can be used for supplemental feeding in schools to improve the nutritional level of the school children for optimum learning.

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Introduction

Milk is an emulsion or colloid of butterfat globules within a water-based fluid. Each fat globule is surrounded by a membrane consisting of phospholipids and proteins; these emulsifiers keep the individual globules from joining together into noticeable grains of fat and also protect the globules from the fat-digesting activity of enzymes found in the fluid portion of the milk. The fat-soluble vitamins A, D, E and K are found within the milk fat portion of the milk (Harold, 1994).

Milk is known to be one of the essential drinks in order to have a strong bones and teeth likewise having a strong immune system. In the existing world nowadays, there are a lot of produced dairy milk in the market. But there are still not being demanded because of the thought that it is not beneficial.

Based on the study conducted by different countries including Western countries and Eastern country particularly Japan discovered that children are more likely to appreciate dairy milk. For it is fresh and nutritious in nature.

Indeed, dairy milk has paved its way to give satisfaction to public especially the children. But, what is the factor that drives these children to like dairy milk? Ideally, children are the hardest people to please especially when it involves the sense of taste. They are meticulous and sensitive in tasting. However, with regards about those perceptions about them, their level of acceptability needs to be studied to establish a fixed record.

In terms of per capita consumption of milk and milk products, higher consumption is recorded in developed countries, but the gap with many developing countries is narrowing. Demand for milk and products in developing countries are growing with rising incomes, population growth, urbanization and changes in diets. This trend is pronounced in East and Southeast Asia, particularly in high populated countries such as China, Indonesia and Vietnam. The growing demand for milk and milk products for a good opportunity for producers (and other factors of dairy chain) in high-potential, peri-urban areas to enhance their livelihoods through increased production. By volume, liquid milk is the most consumed dairy products throughout the developing world. Traditionally, demand is for liquid milk in urban centres and fermented in rural areas, but processed products are becoming increasingly important in many countries (www.fao.org).

World milk production is almost entirely derived from cattle, buffaloes, goats, sheep and camels. Other less common milk animals are yaks, horses, reindeers, and donkeys. The presence and importance of each species varies significantly among regions and countries. The key elements that determine the dairy species kept are feeds, water, and climate. Other factors that may influence the presence of dairy species are market demand, dietary traditions and socio-economic characteristics of individual household (poorer families tend to rely more on small ruminants. There are approximately 250million cows producing milk around the world. There are approximately 10 million dairy cows in North America, 23 million in EU, and 6 million in Australia and New Zealand. Milk production is on the rise in Asia, including in countries not traditionally known for their milk consumption, such as China, which now has more than 12 million cows producing milk.

Cattle produce 83% of world milk production, followed buffaloes with 13%, goats with 2% and sheep with 1%, camels provide 0.4%. The remaining share is produced by other dairy species such as equines and yaks. About one-third milk production in developing countries comes from buffaloes, goats, camels and sheep while in developed countries, almost all milk is produce by cattle. Cattles produce about three-quarters of milk production in sub-Saharan Africa, about half in Asia with most of other half coming from buffaloes, and nearly all the milk produced in Latin America. (www.fao.org).

Raw milk and products which have not been pasteurised pose a health risk to consumers, as do pasteurised milk products but to a lesser extent, considering that they have also been implicated in

outbreaks. The consumption of raw milk and raw milk products should be avoided especially by high-risk consumer groups because the risk outweighs the sensory good taste benefits associated with it (Leedom, 2006).

Over the last fifty years, dairy farming has become more extensive in order to increase the amount of milk produced by each cow. The Holstein-Freisian, the type of dairy cow most common in the US as well as in the EU and UK, has been bred to produce large amounts of milk. Milk production per cow has more than doubled in the past forty years. In US, the average dairy cow produces more than seven gallons of milk per day. If he was producing just enough to feed her calf, a dairy cow would only produce about one gallon of milk per day.

In customer interviews, people consider sensory perceptions of food as a dominant value or limiting factor, tending to be less negotiable than other values influencing their food choices in the supermarket or restaurant [e.g. (Furst *et al.*, 1996)]. In short, if a food is not perceived as positive in its appearance, smell, texture or taste, it is unlikely to be eaten (Hetherington and Rolls, 1996).

Rozin, categorized three criteria for food acceptance or rejection: (1) sensory-affective responses (liking), (2) anticipated consequences and (3) ideational factors. Its broader context, culture, may influence eating behavior directly, but more often it plays a moderating role on other variables to determine interindividual differences in food likes and eating behavior (Chrisler, 1997). The model consists of three levels of variables and their inter-relationships. Eating behavior is viewed as the ultimate dependent variable, operationalized either as food choice/selection/preference or as food intake. The food taxonomy is situated on the intermediate level. Fallon and Rozin's category of anticipated consequences is expanded to include expectations and attitudes towards nutrition and health. Both eating behavior and the food taxonomy are dependent of food-internal and food-external stimuli, situated on the first or independent level. Flavor and other sensory food aspects are instances of food-internal stimuli. Food-external or contextual stimuli include information, the social context and the physical environment (e.g. purchase location, availability and diversity of food products). Other factors influencing liking and eating behavior are beyond the scope of our review and model.

Perception of flavor involves the integration of several sensations, both within and between sensory modalities. Although taste and smell play a central role, the appearance of a food (e.g. its color and shape), its texture, fat content and temperature, pain sensations (caused by, for example, chilli pepper), and even the sound of chewing, also contribute to the overall flavor perception (McBride and Anderson, 1999; Bartoshuk, 1991,1993). The question of interest is how these sensory food aspects interact to produce a particular flavor perception.

Other important moderating factors in the relationship between information and liking are people's attitudes towards nutrition or their concern for health consequences of ingesting specific foods. The liking ratings of people according to Engell (1998) with a higher concern appear to be more influenced by nutrition information. Mixed findings have also been reported as regard the effects of nutrition information on actual food choice. Significant shifts in prospective consumption of healthy foods (e.g. reduced-fat cookies) have been observed, as well as insignificant or even counter-productive effects on the likelihood of trying novel foods (Martins *et al.*, 1997; Engell *et al.*, 1998). It is expected that liking of the pasteurized milk is influenced by the perceived nutritional quality of the milk.

Important direct or indirect social influences (Agras *et al.*, 1988; Rozin, 1996). Indirect social influences are very broad, including beliefs, culinary traditions and occasions that set the stage for or modulate the interpretation of food encounters. Direct social influences require the mediation of another person present on the occasion, while indirect social influences do not. Social factors appear to exert their influence on eating behavior through social

facilitation, resulting in increased food intake when eating in the presence of others (de Castro, 1991; de Castro and Brewer, 1992; Redd and de Castro, 1992), through the establishment of family food rules at a younger age (De Bourdeaudhuij, 1997a) The physical environment The last category of food-external determinants in our model consists of food availability and accessibility. There is a whole sequence of steps leading to the availability of foods in the final consumption situation (Baranowksi, 1997). First, foods should be available in the neighborhood (stores). Next, selection in the store brings foods to the home situation. When access to a certain food (e.g. a highly liked high-calorie food) becomes increasingly limited, people will shift their food choice to another food (e.g. a lesser liked low-calorie food) (Smith and Epstein, 1991). Innate and acquired food likes and dislikes have mainly depended on facial reflexes of the neonate offered tastes or smells (the major elements of flavor), as reflections of hedonic responses towards these stimuli (Cowart, 1981; Birch, 1990).

Several studies have failed to discover innate pleasures or displeasures associated with olfaction (Engen, 1982). However, there are so many distinct olfactory sensations that no single experiment can sample them all and the possibility remains that some other odorants then those targeted by the experimenter might have produced effects in human infants. Moreover, studies in the Social learning mechanisms describe dietary experiences of the individual, human eating behavior can only be fully understood in a social context. Particularly for the young child, eating implies an occasion for social interaction and learning about food.

The degree of participation or intention of the social agent in the learning task may vary. Peers, siblings, parents and other adults serve as models who cajole, wheedle and coerce the child to eating (Rozin, 1999).

The social-affective context in which foods are presented is extremely important in the formation of young children's food preferences. When children are presented neutral foods (i.e. neither highly preferred nor non-preferred) as rewards or paired with adult attention, the foods appear to produce significant increases in preference, whereas no consistent changes are noted when foods are offered in a non-social context or at snack time (Birch *et al.*, 1989). Apparently, the positive affective processes elicited by the reward and attention context become associated with the foods.

Materials and methods

Research Design

The study used the descriptive-correlational research design as the level of acceptability is correlated to the profile of the respondents.

Locale of the study

This study was conducted at Sto. Nino District, Piat District, Tuao East and Tuao West Districts in the Division of Cagayan.

Respondents and Sampling Procedures

The respondents of the study were the elementary pupils. One hundred (100) respondents per district were taken as respondents using the purposive sampling technique.

Instruments

The instrument in gathering data is score cards using 4-point likert scale with variables; taste, smell and texture. Moreover, these characteristics are measured from 4 with the descriptive "Extremely like" 3 as "moderately like" 2 as “slightly like" and 1 as "dislike".

Data Gathering Procedure

Approval for the conduct of the study is sought from the authorities of the four districts and upon approval, the researcher personally met the respondents’ and conduct the taste tests after which score cards were distributed to ensure 100% retrieval.

Statistical Treatment of Data

The researcher use descriptive-correlational statistics particularly the group frequency distribution counts and percentages to describe the data. The statistics used to analyse the differences are the following.

Analysis of Variance (ANOVA)

A statistical models to analyse the differences among group mean and their associated procedures (such as "variation" among and between groups).

t- test

Is any statistical hypothesis test in which the less statistic follows a pupils' and distribution under the null hypothesis. It can be used to determine if two sets of data are significally different from each other.

Frequency and Percentage Distribution

Used to determine the respondents profile in terms of age, sex and grade level.

Weighted Mean Distribution

Is used to determine the respondents' perception on the acceptability of children on dairy cattle milk.

Results and discussion

Presented in this chapter are the data which have been analysed and interpreted following the sequence of the specific problems enumerated in Chapter1.

Respondent's Profile.

Table 1. shows the Frequency and Percentage Distribution of the Respondents' profile in-terms of SEX. Findings reveal that majority or 60% of the respondents are male while 40% are female. It can be inferred that male is none frequent to accept dairy cattle milk rather than female.

Table 1. Frequency and percentage distribution of the respondents profile in-terms of sex.

Profile	Frequency (N=400)	Percentage 100%
Sex		
Female	160	40%
Male	240	60%
Total	400	100%

Table 1.1 shows the Frequency and Percentage Distribution of the Respondents' profile in terms of AGE. Findings reveal that most or 33% of the respondents are 8-9 years old. Only 17% of the respondents are 12-13 years old. Findings also show that their mean age is 9.30.

Table 1.1. Frequency and Percentage Distribution of the Respondents' Profile in terms of Age.

Profile	Frequency (N=400)	Percentage 100%
Age		
6-7	84	21%
8-9	132	33%
10-11	116	29%
12-13	68	17%
Total	400	100%
Mean Age= 9.30		

Acceptability Level of Dairy Cattle Milk

Table 2 shows the Acceptability Level of Dairy Cattle Milk in terms of taste, smell and texture. An overall mean of 3.47 further indicate the pupils "extremely like" the pasteurized Dairy Cattle Milk considering all the parameters.

As reflected in the table, all of the pupils "extremely like" the smell of a dairy cattle milk with a weighted mean of 3. 58 followed by the texture with a weighted mean of 3. 47.

Table 2. Acceptability Level of Dairy Cattle Milk.

Characteristics	Weighted mean	Descriptive Value
Taste	3.36	Extremely like
Smell	3.58	Extremely like
Texture	3.47	Extremely like
Overall Weighted mean	3.47	Extremely like

Scale/Legend

3.25- 4.0= extremely like

2.50- 3.24= moderately like

1.75- 2.49= slightly like

1.00- 1.74= dislike

Significant differences in the Acceptability of the Respondents

Table 3 shows the Analysis of Variance on the significant difference in the Acceptability of the Respondents. As reflected in the table, the sum of synaris is 48.72 while the degree of freedom is 99 and the critical value at 0.05 is 2.11 which means that there is no significant difference between Respondents' Acceptability Level of Dairy Cattle Milk as affected by age.

Table 3A. Analysis of Variance between the Differences in the Acceptability Level of the Respondents; when grouped according to AGE.

Source	Sum of Synaris	Degree of freedom	Mean of squares	F- value	Critical value at .05	Decision
Within	4.447	7	0.6353	1.32	2.11	Not significant
Between	44.27	92	0.4812			
Total	48.72	99				

Table 3.B. Computed T- value between the Differences of the Acceptability Level of the Respondents' when grouped according to SEX.

Computed t- value	Degree of Freedom at .05	Decision
0.637	1.984	Not significant

Table 3.C. Analysis of Variance between the Differences in Acceptability Level of the Respondents' when grouped according to GRADE LEVEL.

Source	Sum of Synaris	Mean of Squares	Degree of Freedom	F- value	Critical Value at .05	Decision
Between	3.390	0.678	5	1.4059	2.31	Not significant
Within	45.328	0.482	94			
Total	48.718		99			

Table 3.B shows the computed T- value between the Differences of the Acceptability Level of the Respondents' when grouped according to SEX. As reflected in the table, the computed T- value is 0.637 while the degree of freedom at 0.05 level is 1.984 which means that there is no significant difference between the Respondents Acceptability Level of Dairy Cattle Milk as influence by sex. Table 3.C shows the Analysis of Variance between the Differences in Acceptability Level of the Respondents' when grouped according to GRADE LEVEL. As reflected in the table, the sum of synaris is 48.718 while the degree of freedom is 99 and the critical value at .05 is 2.31 which means that there is no significant difference between Respondents' Acceptability Level of Dairy Cattle Milk as affected by grade level.

Conclusions

Based on the findings of the study, it is concluded that the pupils in the public elementary schools extremely like the pasteurized dairy cattle milk regardless of age group and sex. It is further concluded that there is no significant difference between the acceptability level of the respondents' when group according to age, sex and grade level. It can also be deduced that pasteurized dairy milk is highly acceptable to the elementary pupils in the public schools. This means that pasteurized dairy cattle milk can be given to the elementary pupils as part of the feeding programs of the government to improve the nutritional level of the pupils especially those that are below the normal level.

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