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**Ensuring Quality Standards of
Milk in Schools**
General and International Issues

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Presentation overview

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...Presentation overview

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Introduction (1)

- Cow's milk is highly nutritious and is one of the few foods that can sustain a young one without supplementation.
- Milk contains essential vitamins and minerals deficiency of which can cause illness in humans.
- Various factors affect composition of milk e.g. cow's breed, nutrition, season.



Milk Composition (2)

Constituent	Average %	Range %
Butter Fat	3.7	2.5-6.0
Protein	3.3	2.9-5.0
Lactose	4.8	3.6-5.5
Mineral	0.7	0.6-0.8
Water	87.5	85.5-89.5



Vitamins in Milk (2.1)

Vitamin	Amount In 1L Milk (mg)	Recommended Daily Intake
A	0.2-2	1-2 mg
B ₁	0.4	1-2
B ₂	1.7	2-4
C	5-20	30-100
D	0.002	0.01



Vitamin deficiency Disorders (2.2)

Vitamin	Deficiency Disease
A	Night blindness, Low immunity to diseases
B1	Stunted growth
B2	Loss of Appetite, Indigestion
B12	Important for energy metabolism
C	Scurvy, Fatigue
D	Skeletal Deformation

Production and Processing of milk

(3)

- Due to its nutritious nature milk serves as an excellent medium for growth of micro-organisms.
- Some of these micro-organisms cause illness to humans.
- Others cause spoilage in milk rendering it unfit for use.
- Poor production & manufacturing practices can result in carryover of antibiotics and detergents that are undesirable.



... Production and Processing of milk (3)

- The Hazard Analysis Critical Control Point (HACCP) concept can be applied from the farm through processing to final consumption to assure safety of milk and prevent spoilage.
- Application of HACCP assumes general principles of hygiene are met.
- **Reference to the Codex texts: Code of Hygienic Practice For Milk And Milk Products CAC/RCP/57-2004**



General Hygiene Requirements (3.1)

- The site and design of milk production and processing facilities must assure prevention of contamination from dust, rodents, pests and other environmental pollutants.
- Only potable water must be used.
- Personnel must be trained in hygiene and must not be a source of contamination.
- Adequate facilities for sanitation and hand washing must be provided.



Assuring Milk Quality at the farm (3.2)

- Always maintain cows in good health and use only milk from disease free cows for human consumption.
- At milking always strip the first jet of milk from each teat into a separate container and check for mastitis. This milk should go to waste as it is highly contaminated.
- Always keep the milking parlour floor clean and clean up spillages immediately to prevent flies and build up of bacteria.



... Assuring Milk Quality at the farm (3.3)

- Always clean and sanitize milk contact surfaces (milking machine, milk cans, milking parlour etc) before and after each milking.
- Good quality raw milk should have <50,000 bacterial counts per ml.
- High temperatures encourage growth of micro-organisms.
- Always chill milk to below 4 degrees Celcius soon after milking.
- Deliver milk for processing not more than 48 hours post milking and maintain temp below 4 deg.celcius



Milk Processing (3.3)

- Milk is heat treated to render it safe for human consumption and to prolong its shelf life.
- Prolonged exposure to heat can destroy the nutrients in milk such as vitamins and protein.
- Pasteurisation is a heat treatment process designed to kill pathogens while preserving the nutritional value of milk.



....Milk Processing (3.3)

Process	Time/ s	Temperature Conditions/ °C
High Temperature Short Time	15-20	72-75
Ultra High Temperature Short Time	3-4	135 - 140



Important Quality Checks during Processing (3.4)

Process Step	Hazards	Quality Criteria
1. Milk Reception	Biological, Physical, Chemical	Antibiotic free, pass dye reduction test, lactic acid <0.19% Butter, Fat>3.0%SNF>8%.
2. Filtration	Biological, Physical	Remove all debris. Clean filters daily. Control at step 8
3. Chilling	Biological	Temperature<4 degrees C.
4. Storage	Biological	Temperature<4 degrees C.
5. Preheat	Biological	Dissolve butter fat temp 35 deg C.
6. Standardize	Biological	Meet standard specs for product
7. Homogenize	Biological	Homogenization Efficiency>95%
8. Final Heat Critical Control point	Biological	Meet desired time temp for pasteurization.
9. Cool	Biological	Temp<4 degrees C.
10. Filling/Packing	Biological	Aseptic.

Schools Milk Program in Zimbabwe

(4)

- Ran from 1996 to 1998.
- All willing schools participated throughout the country. 154 schools participating in the schools milk program; The program is national although more than half (97) the schools were in Harare.
- Parents paid for their children's milk on a monthly basis, in advance.
- Milk was supplied by Dairibord Zimbabwe Ltd and delivered daily from the nearest depot.
- Innovative and long life products developed.
- Program was hampered by decline in milk supply.



Roles and Responsibilities (4.1)

Suggestions for future programs

- Private sector to produce and process milk at affordable cost and also to promote the program.
- Government to create an enabling policy environment for the growth of the dairy industry and to actively promote nutrition education and the schools milk program through activities e.g. Schools Milk day.



... Roles and Responsibilities

(4.1)

- **International Organisations** should lobby Governments for policy development and to support monitoring and surveillance programs. There is limited research demonstrating the impact of schools milk consumption on nutrition.
- **School** to provide administrative support for distribution of milk to school children.
- **Parents** to provide funds for the purchase of milk.









DAIRIBORD
UHT MILK

NUTRITIONAL INFORMATION	
100g	
Energy	240 kJ
Protein	8.3g
Carbohydrate	3.6g
Fat	3.5g
Minerals	2.5g
	1.7g





Key Factors for success of schools milk program (4.2)

- **Involvement and support of all agencies-** Pvt sector, Govt, Schools, Parents, NGOs
- **Enabling policy environment** – Milk has to be affordable to all. This requires cost efficiency in production, processing and distribution.



... Key factors for success of schools milk program (4.2)

- **Efficient Distribution network** to be able to reach every school. Maintenance of cold chain is critical for fresh milk however UHT technology does not require cold chain.



Conclusions (5)

Schools milk program provides opportunity for improving nutrition status of young children.

Opportunities for linkage with micronutrient programs for instance fortification with iodine, calcium, iron, or vit a.

Sustainability of this program depends on concerted efforts by all stakeholders; govts, pvt sector, schools, parents and NGO's.

There is need to develop tools for effectively measuring the impact of the schools milk program on nutrition.





Thank you.