

Akshayakalpa

Raw milk Consumption made more safer than processed milk

Why move towards raw milk consumption-11. Normal milk – Pasteurized and homogenized• Normal dairy farmers milk their cows around 6 AM. The milk is collected at coop society at 8 Am Collected milk reaches chilling center around 12 noon. By this time the bacteria in milk would have multiplied several folds as the generation interval of these bacteria is around 30 minutes. After chilling at the chilling center the bacterial multiplication slows down. Bacterial multiplication results in degradation of milk protein and other nutrients• Milk reaches the processing center around 3 to 4 PM and under goes pasteurization process. The heat treatment given to milk will kill some of the bacteria- both beneficial and harmful bacteria- but results in heat degeneration of protein. Hundred percent bacteria are not eliminated. • Homogenisation results in changes in fat structure but has added benefits except that the milk looks thicker as the fat globules get dispersed in milk more homogenously. • As a cultural habit, especially in the tropics, all of us consume milk only after boiling even if it is pasteurized. Boiling is more effective against bacteria. Then why pasteurize? Raw milk also should be boiled once before consumption. • If milk can be chilled on the farm and cold chain is maintained upto the point of consumption, there is no added advantage of pasteurization. Maintaining such fool proof cold chain is not an easy job and none of the mainstream dairy operators in the country have attempted it for pure logistical reasons. As milk is collected from thousands of small producers, it is not practically possible to achieve this ideal condition. • But there is a way out. That is what Akshayakalpa has struggled to achieve and finally has succeeded in making Amruth like milk available leading a quality revolution in milk production

2. Captive production of raw chilled milk in automated dairy farms:• It took us 3 years of struggle to perfect the methodology for production and distribution of raw chilled milk in Bangalore for the first time in the country. • We do not collect milk in the villages. • We adopt farmers and establish dairy farms for captive production of organic milk following all the stringent organic production standards. • All the production processes are strictly, monitored, farmers are provided end to end solutions for quality production. There are 10 IT engineers (Ex wipro) working on the project to

provide automation solutions to ensure hygienic milk production in the safest possible manner.³ Understanding raw chilled Organic Milk and milk products

- In the modern animal husbandry practices antibiotics, female hormones etc are used indiscriminately on cows. Concentrate feeds provided to the animals contain urea and other chemical additives. These substances excreted in milk will affect the humans, especially children with very negative impact on their health• On the other hand, by adopting organic milk production protocols it will be ensured that organic milk will not have any traces of antibiotics, administered hormones, stress hormones, chemical residues, adulterants etc and hence will be highly safe for all age groups of consumers. • Under organic protocol cow comfort takes the precedence. All the animals are kept under loose housing system without any scope for congestion. Animals are not tied. Cattle sheds are designed to provide essential protection and ensure plenty of air and ventilation. Free access is provided to food and water 24 hrs a day. No restrictions are imposed for movement within the paddock area. Animals can choose to rest under tree shade in paddock area or under the shed on mattresses provided. • All the cows are provided with appropriate mattresses to avoid hard floors of cement or stone slabs. Animals are not forced to lie down on their own waste there by maintaining the highest hygiene standards in the cattle sheds. This will avoid mastitis, knee joint infections, hoof infections, diarrhea, umbilical infections of calves and other infections. Animals are regularly groomed to maintain good blood circulation and to avoid ticks, lice etc. • For all the cows only green fodder grown with organic manure will be provided. Artificial feeds, urea etc are avoided in their diets. Purely fodder based diets will also produce milk with very high omega 3 fatty acids. • Exclusive fodder production programme is adopted within each farm to grow appropriate mixture of leguminous and non leguminous fodders to meet the complete nutrient requirement of animals. • All the cows are regularly monitored, morning and evening, for any indication of temperature and other disease symptoms and appropriate treatment measures are initiated. Preferred line of treatment will be to use ayurvedic drugs and homeopathic preparations. However if for reasons beyond the control of the vets, if antibiotics and other allopathic drugs are to be used to save the life of cows, then such animals are quarantined to ensure all traces of drugs in milk disappear and

milk once again becomes safe for consumption. • No female hormones will be used on cows for any reason. Since the animals are maintained under stress free environment, release of stress hormones in milk will be avoided. Traces of these hormones in milk can change the growth pattern and maturity pattern in young boys and girls⁴. Innovations at Akshayakalpa Farms

- 300 highly motivated farmers are selected with five acres of land and minimum irrigation facility. All farmers selected for the project are required to attend training programmes planned from time to time. The initial training programme is for a period of 8 days spanning over two months. Later on they should attend monthly sessions organized in different farms to encourage cross learning among the farmers.
- The organic dairy farms are set up in coconut gardens owned by the selected farmers. Most often, farmers do not cultivate anything under the coconut orchards. These orchards are planned as fodder plots to produce the required quantity of fodders.
- All the cows under organic farming conditions are fed only with green fodders grown on their own farms. The fodder plots are manured with cow dung manure and cow urine. No chemical fertilizers or pesticides are permitted. Five acres of fodder plots can produce enough of green fodder for a herd of 25 cows. In addition Azolla is cultivated in specially designed small water bodies to meet the complete nutrient requirement of cows.
- There will be approx one ton of cow dung production per day per farm. This valuable resource will be used in biogas plants for production of methane gas to run generators. Each farm can produce approx 25 cubic meters of gas per day. The cow dung slurry coming out of the biogas plants will be taken to a bio-digester.
- The bio-digester is specially designed to produce liquid manure using cow dung and other biologically degradable waste produced on the farm like weeds, coconut fronds, wasted fodder, cow dung etc. The filtrate coming out from the bio-digester will be spread in the garden with the help of sprinklers. This avoids drudgery involved in farm operations and hence educated youth can easily take up these activities.
- All the farms will be with sprinkler irrigation to economize on the water requirement for fodder cultivation. This also helps in boosting the coconut yields as the liquid manure from the bio-digester helps to maintain the soil moisture and soil fertility. At present average yield of coconuts in the area is only 50 nuts per tree per year. This can be boosted upto 200 nuts under the new fertilization regimentation.
- The gas obtained from the biogas

plants will be used for operating the generators to generate captive power required to operate various machineries installed in these automated dairy farms. This gas will also be used for cooking on the farms for the farmer's family and the farm labors. Hot water required for operating the dairy farm will also be generated using this gas. • The cattle sheds under the project are specially designed to provide maximum comfort to the cows at the same time ensuring highest efficiency in operations. All the cows are provided with mattresses to avoid hard floors. The sheds are designed to ensure loose housing is possible for all the cows with 24 hrs access to clean water and food. Animals are free to roam in the paddock with enough shade provided around the shed. • Each shed will have a milking parlor maintained under very hygienic conditions. All the cows will be milked in these parlors only to ensure highest quality standards. • Automated milking systems are fitted in these milking parlors. Milk from the milking system directly gets pooled into a milk chiller kept on the farm. Milk from 37 degree centigrade will be immediately brought down to 4 degrees there by arresting any possible bacterial growth. All the chillers are remotely controlled with solenoid valves to avoid any chances of adulteration, pilferage etc. There will be a cleaning in place systems set up in every farm to ensure highest standards of hygiene maintained at the point of production. • The milking systems are fitted with sensors to monitor milk volume, cow temperature and milk conductivity. The data generated is relayed to the central control room where veterinarians are stationed to assess the health status of the cows. This enables them to take appropriate interventions in time. All the animals are monitored for the milk volumes twice a day. This data helps in planning the breeding programme to ensure right kind of progeny is selected for future replacements in the farm. This is an innovation being introduced for the first time at the farmers' level. • The project adopts animal treatment policy to use only Ayurvedic and Homeopathic drugs for animal treatment in routine course. However in case of some emergencies if allopathic drugs including antibiotics are to be used, strict quarantine measures are observed to segregate the treated animal and milk from such animals for a prescribed number of days following international standards. • All the farms will be certified by IMO, an international organic certification agency. As India is yet to adopt organic standards for dairy and livestock, we will be following the European standards.

5. Safety issues concerning Raw chilled milk. • If proper precaution is taken in milk production protocol on the farm we can keep the bacterial load to barest minimum at the point of production. We can arrest further bacterial growth by chilling milk on the farm. And the continuous cold chain will make the milk bacterially safe. • Boiling milk once before use will eliminate rest of the bacteria. • Raw milk is more nutritious and safe than the pasteurized milk.

6. Built-In Protective Systems in Raw Milk

Lactoperoxidase - Uses small amounts of H₂O₂ and free radicals to seek out and destroy bad bacteria In all mammalian secretions—breast milk, tears, etc. • Lactoferrin - Steals iron away from pathogens and carries it through the gut wall into the blood stream; stimulates the immune system. • Polysaccharides - Encourage the growth of good bacteria in the gut; protect the gut wall • Medium-Chain Fatty Acids – Disrupt cell walls of bad bacteria; levels so high in goat milk that the test for the presence of antibiotics had to be changed. • Enzymes – Disrupts bacterial cell walls. • Antibodies - Bind to foreign microbes and prevent them from migrating outside the gut; initiate immune response. (British Journal of Nutrition (2000) 84. Suppl. 1, S3-S10, S11-S17) • White Blood Cells – Produce antibodies against specific bacteria • B-lymphocytes – Kill foreign bacteria; call in other parts of the immune system • Macrophages – Engulf foreign proteins and bacteria • Neutrophils – Kill infected cells; mobilize other parts of the immune system • T-lymphocytes – Multiply if bad bacteria are present; produce immune-strengthening compounds. • Lysosyme – Kills bacteria by digesting their cell walls. • Hormones & Growth Factors – Stimulate maturation of gut cells; prevents “leaky” gut. • Mucins – Adhere to bacteria and viruses, preventing those organisms from attaching to the mucosa and causing disease. • Oligosaccharides – Protect other components from being destroyed by stomach acids and enzymes; bind to bacteria and prevent them from attaching to the gut lining; other functions just being discovered. • B12 Binding Protein – Reduces vitamin B-12 in the colon, which harmful bacteria need for growth • Bifidus Factor – Promotes growth of *Lactobacillum bifidis*, a helpful bacteria in baby’s gut, which helps crowd out dangerous germs • Fibronectin – Increases antimicrobial activity of macrophages and helps to repair damaged tissues. • Heat resistant bacteria in milk Johne’s bacteria (paratuberculosis bacteria)– Suspected of causing Crohn’s

disease, now routinely found in pasteurized milk
B. Cereus spores survive pasteurization
Botulism spores survive pasteurization
Protozoan parasites survive pasteurization

- Effect of pasteurization on vitamin availability

A No significant change
B-1 Down 3-20%
B-6 Inactivated
B-12 Down 10% but carrier proteins destroyed
Riboflavin Heat stable, but light sensitive
Sodium No significant change
C Down 77% upon storage
D Down, fortified
E Down 15%
K No significant change

- Effect of pasteurization on mineral availability

Selenium Down 9.7%

Iron Down 66%

Copper Up 44%

Zinc Down 69.4%

Sodium No significant change

Potassium No significant change

Calcium Down 21%

Magnesium No significant change

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