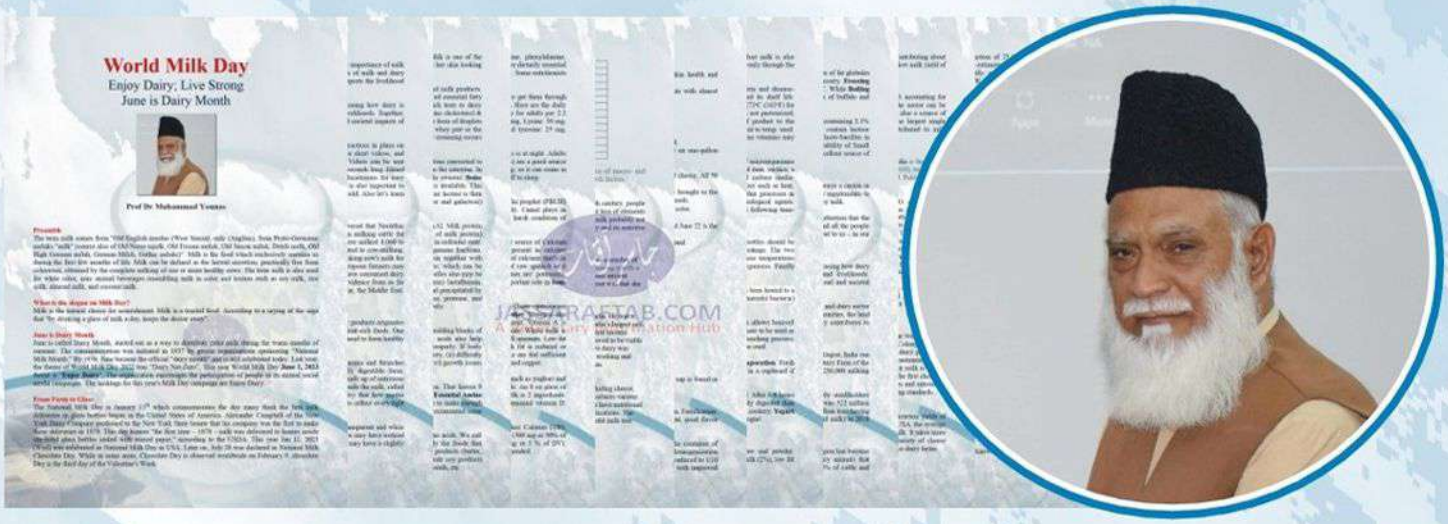
World Milk Day

Enjoy Dairy; Live Strong

June is Dairy Month



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A detailed article by Prof Dr Muhammad Younas

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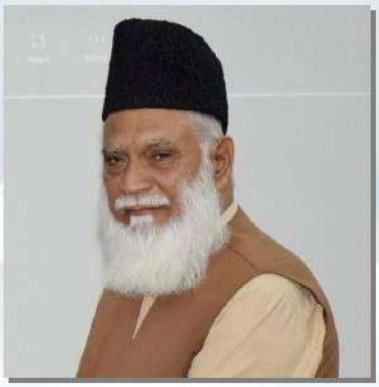

Prof Dr Muhammad Younas

Preamble

The term milk comes from "Old English meoluc (West Saxon), milc (Anglian), from Proto-Germanic meluks "milk" (source also of Old Norse mjolk, Old Frisian melok, Old Saxon miluk, Dutch melk, Old High German miluh, German Milch, Gothic miluks)". Milk is the food which exclusively sustains us during the first few months of life. Milk can be defined as the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows. The term milk is also used for white color, non- animal beverages resembling milk in color and texture such as soy milk, rice milk, almond milk, and coconut milk.

What is the slogan on Milk Day?

Milk is the natural choice for nourishment. Milk is a trusted food. According to a saying of the saga that "by drinking a glass of milk a day, keeps the doctor away".

June is Dairy Month

June is called Dairy Month, started out as a way to distribute extra milk during the warm months of summer. The commemoration was initiated in 1937 by grocer organizations sponsoring "National Milk Month." By 1939, June became the official "dairy month" and is still celebrated today. Last year, the theme of World Milk Day 2022 was "Dairy Net-Zero". This year World Milk Day **June 1, 2023** theme is "**Enjoy Dairy**". The organization encourages the participation of people in its annual social media campaigns. The hashtags for this year's Milk Day campaign are Enjoy Dairy.

From Farm to Glass

The National Milk Day is January 11th which commemorates the day many think the first milk deliveries in glass bottles began in the United States of America. Alexander Campbell of the New York Dairy Company professed to the New York State Senate that his company was the first to make these deliveries in 1878. This day honors "the first time – 1878 – milk was delivered to homes inside sterilized glass bottles sealed with waxed paper," according to the USDA. This year Jan 11, 2023 (Wed) was celebrated as National Milk Day in USA. Later on, July 28 was declared as National Milk Chocolate Day. While in some areas, Chocolate Day is observed worldwide on February 9, chocolate Day is the third day of the Valentine's Week.

Who celebrates World Milk Day?

In 2001, World Milk Day was established by the FAO of the UN to recognize the importance of milk as a global food, and to celebrate the dairy sector. Each year since the benefits of milk and dairy products have been actively promoted around the world, including how dairy supports the livelihood of one billion people.

This year **June 1, 2023 (Thu)** World Milk Day (WMD) will focus on showcasing how dairy is reducing its environmental footprint, while also providing nutritious foods and livelihoods. Together, we will drive an active narrative that integrates the environmental, nutritional and societal impacts of the sector.

The WMD encourages short videos from farmers that showcase sustainability practices in place on farm or at company or at organization level. You can help by developing these short videos, and sharing them on social media as we re-introduce dairy farmers to the world. Videos can be sent directly to milkday@emergingag.com or via WeTransfer. Videos should be 15-30 seconds long, filmed using a camera or mobile device, and in Landscape mode or shot using 1:1 dimensions for easy sharing across all social channels. Educating people and the youth, in particular, is also important to realize the significance of this day and joining the celebration across the whole world. Also let's learn more about milk and its virtues.

Who first discovered milk?

Through analyzing degraded facts on unearthed potshards, scientists have discovered that Neolithic farmers in Britain and Northern Europe may have been among the first to begin milking cattle for human consumption. Other reports say that it's possible that the first Aurochs were milked 8,000 to 10,000 years ago in two different parts of the world, since domestication is attributed to cow-milking, but it's likely that European farmers were the first. As such, humans have been drinking cow's milk for about 6,000–8,000 years. This was the time when dairying activities of these European farmers may have begun. According to some other sources, it has been reported that humans have consumed dairy products from cows, sheep and goats for at least 10,000 years. Archaeological evidence from as far back as the Neolithic revolution (8,000 BCE), points to the use of milk in Europe, the Middle East, Africa and Asia.

Here are some facts about milk.

Milk is the source of all dairy products, that why it is called Milk Tree as all other products originates from milk. Milk is **jam-packed with nutrients** and is one of nature's most nutrient-rich foods. One glass of milk gives you 30% of your daily calcium - a nutrient that growing kids need to form healthy teeth and bones.

Milk provides body-building proteins, bone forming minerals, health giving vitamins and furnishes energy giving lactose and milk fat. All these nutrients are in a very easily digestible form. Newzelander's claim that their milk is around 85% **water (**85-88%), The rest is made up of nutritious vitamins, minerals, proteins, carbohydrates and fats. Some of the smaller things inside the milk, called particles, are **white in color**. Scientists have learned though science of chemistry that how matter interacts with energy. One of the things is explained that fat and protein molecules reflect every light wavelength, giving its iconic white appearance.

The **water** in the milk is transparent, too and it's this magical combination of transparent and white particles that reflects the light and gives your glass of milk it's special color. You may have noticed that different types of milk are slightly different colors. If the milk has less fat, it may have a slightly bluer tone. Hippopotamus produces milk of blue color.

Milk is **white** because it contains casein - a milk protein that is rich in calcium. Milk is one of the world's oldest foods. Cleopatra, an ancient Egyptian queen, took milk bath's to keep her skin looking young and healthy.

Milk fat (3-4%) in whole milk provides flavor and physical properties in milk and milk products. Besides serving as a rich source of energy, it contains significant amount of so-called essential fatty acids (linoleic and arachidonic). Milk fat imparts soft body, smooth texture and rich taste to dairy products. It contains fat soluble vitamins, pigment carotene and Xanthophylls; contains cholesterol & phospholipids but is primarily Triglycerides (TGs, 95%). The fat in milk occurs in the form of droplets or globules, surrounded by a membrane, and emulsified in the milk serum part (the whey part or the watery part). Milk is an emulsion which is not naturally physically stable that is why creaming occurs if it is left to stand.

Principal carbohydrate (5%) of milk is the lactose that is to supply energy. Lactose converted to lactic acid by bacterial fermentation, also helps to establish a mildly acidic reaction in the intestine. In heated milk products, e.g., in condensed milk, there is also lactulose which is a little sweeter. **Some people are facing Lactose-intolerant issue. For these people Lactose-free milk** is available. This modified milk is made by filtering regular milk to remove half the lactose. The enzyme lactase is then added to the milk to break down the remaining lactose into simpler forms (glucose and galactose) which are easily absorbed in the small intestine with no discomfort.

Milk protein (3-4%) are complete proteins, consists of Essential Amino Acids (EAA). Milk protein mainly consists of casein, beta-lactoglobulin, alpha-lactalbumin, etc. Casein (80% of milk protein) only exists in milk (in calcium caseinate-phosphate complex form). Casein is present in colloidal state. It forms about more than 8% of total protein. Casein composed of alpha, beta and gamma fractions. The casein is arranged in super-structures called micelles, which consist of protein together with phosphate, citrate and calcium. The caseins are actually a group of similar proteins, which can be separated from the other milk proteins by acidification to a pH of 4.6. The casein micelles also may be coagulated by addition of the enzyme rennin. Whey proteins (20% of milk protein) lactalbumin, lactoglobulin & immunoglobulin are more hydrated than casein and are denatured and precipitated by heat rather than by acid. Other protein components include enzymes such as lipase, protease, and alkaline phosphatase, which hydrolyses TGs, proteins, and phosphate esters, respectively.

Essential Amino Acids

Our body needs 20 different amino acids to function properly. Amino acids are the building blocks of proteins, which is what our bodies use to build and maintain muscles. Amino acids also help synthesize hormones and neurotransmitters, which keep our bodies functioning properly. If body doesn't get enough of the right amino acids, we may experience: (i) decreased immunity, (ii) difficulty in thinking clearly, (iii) digestive issues, (iv) depression, (v) fertility problems and (vi) growth issues in children.

Of the 20 Amino Acids that exist, healthy bodies can manufacture 11 on their own. That leaves 9 amino acids that we *can't* produce and have to get through our food which are called **Essential Amino Acids**. If, however, someone is ill or under increased stress, the body may be unable to make enough of the 11 naturally occurring amino acids you need. In those cases, your doctor may recommend some supplements.

It's also important to note that there are some foods that contain all 9 essential amino acids. We call those 'complete proteins,' and they include meat, poultry, eggs and dairy. Luckily the foods that contain all 9 essential amino acids are from animal origin including: milk, dairy products (butter, cheese, etc.), fish, poultry, eggs, beef, etc. For vegans, complete proteins may include soy products (tofu, edamame, tempeh, miso), quinoa, buckwheat, nutritional yeast, chia and hemp seeds, etc.

Nine amino acids which are: histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine, are not synthesized by mammals and are therefore dietarily essential or indispensable nutrients. These are commonly called the Essential Amino Acids. Some nutritionists add Arginine in these also.

Because your body cannot produce essential amino acids (EAA), it's important to get them through your diet. Many foods are rich in EAA, making it easy to meet your daily needs. Here are the daily required intakes for the essential amino acids, according to the WHO. These are for adults per 2.2 pounds (1 kg) of body weight: Histidine: 10 mg, Isoleucine: 20 mg, Leucine: 39 mg, Lysine: 30 mg, Methionine: 10.4 mg, Phenylalanine combined with the nonessential amino acid tyrosine: 25 mg, Threonine: 15 mg, Tryptophan: 4 mg and Valine: 26 mg.

Drinking Milk at Night

According to the ancient science of Ayurveda, the best time to take Milk for adults is at night. Adults should drink it to keep their bodies fit and healthy. Milk (and other dairy products) are a good source of tryptophan. It is an amino acid that can help promote healthy and peaceful sleep, so it can come in particularly handy especially if you are used to tossing and turning before getting off to sleep.

Which milk is best in Islam?

Also, prophet Muhammad (PBUH) has recommend camel in his speech (hadith). The prophet (PBUH) has recommended camel milk for some diseases such as skin disease as remedy. Camel plays in important livestock which produced milk longer than any other ruminant under harsh condition of desert ecosystem.

Mineral matter or Salts of milk present in small quantities. Milk is an excellent source of Calcium and Phosphorus (approx., 1 % of milk, essential for bone formation). Ca is present as calcium caseinate, calcium phosphate and calcium citrate form. To get the same amount of calcium that's in one cup of milk you would need to eat 12 servings of whole grains, 10 cups of raw spinach or 6 servings of legumes. Other major salt constituents present in appreciable quantities are: potassium, sodium, magnesium, citrate, chloride, sulphate and bicarbonate. These have an important role in **bone health**.

Milk is an excellent source of **Vitamins**, like Vitamins A, B_6, B_{12}, C, D, K and E. These vitamins are essential for healthy eye-sight, nerves, blood and also help with digestion. **Other** Vitamins like thiamine, niacin, biotin, riboflavin, folates, and pantothenic acid are also present. Vitamin A is naturally in the fat component of whole milk and more may be added prior to sale. Whole milk is generally (98%) fortified with vitamin D because it is naturally present only in small amounts. Low-fat and non-fat milk are fortified with both these fat-soluble vitamins because milk fat is reduced or absent. Milk is a good source of Vitamin A and D (because the cow and buffalo are fed sufficient green feed and fodder), Thiamine and Riboflavin but deficient in Vitamins C, iron and copper.

Nutritionists recommend that people should have milk and other dairy products, such as yoghurt and cheese, every day as part of a balanced diet. Whole Milk is virtually 97% Fat Free. An 8 oz glass of milk has 21 minerals, 13 vitamins and provides 13 essential nutrients. Whole milk is 2 ingredients. Real whole milk has a clean and simple label just 2 ingredients: milk and supplemental vitamin D. **Table 1** shows the milk composition of different varieties of milk.

Another study reveals that one cup of 240 ml serving of whole cow's milk supplies: Calories (150), Fat (8 gm), Protein (8 gm), Carbohydrates (12 gm), Cholesterol (36 mg), Calcium (300 mg or 30% of the daily value (DV), Potassium (349 mg or 7.4% of the DV), Sodium (125 mg or 5 % of DV), Vitamin A (68 meg) and Vitamin D (2.45 meg). Three servings per day are recommended.

Table 1. Showing Composition of milk from different species

Nutrients (in 100 g)	Cow	Human	Buffalo	Goat	Sheep
Water (%)	87.99	87.50	83.39	87.03	80.70
Calories	61	70	97	69	108
Protein (g)	3.29	1.03	3.75	3.56	5.98
Fat (g)	3.34	4.38	6.90	4.14	7
CHO (g)	4.66	6.99	5.18	4.45	5.36
Cholesterol (mg)	14	14	19	11	--
Calcium (mg)	119	32	169	134	193
Phosphorous (mg)	93	114	117	111	158
Sodium (mg)	49	17	52	50	44
Potassium (mg)	152	51	178	204	136
Vit C (mg)	0.94	5.00	2.25	1.29	4.16
Vit A (IU)	120	241	178	185	147
Riboflavin (mg)	0.162	0.036	0.135	0.138	0.355

Bovine colostrum is the first milk produced after birth and is a rich natural source of macro- and micro-nutrients, immunoglobulins, and peptides with anti-microbial activity and growth factors.

Milk Fun Facts:

Milk has been enjoyed by humans for an incredibly long time. Up until the early 20th century, people drank milk in its whole and non-homogenized form. With that shift came a significant loss of elements such as a rich flavor profile, until recently. There are many interesting facts about milk probably not known to many, so let's put together several that showcase milk's fascinating history and its nutritive values.

What does a milk bath do?

A milk bath is simply a bath that you add milk to, in liquid or powder form to help ease a number of skin conditions that cause irritation. Milk lactic acid, helps gently exfoliate the skin, leaving it with a much smoother texture and easing the symptoms of dry, rough skin. Cleopatra, an iconic ancient Egyptian queen, took milk bath's to keep her skin looking young and healthy. Her secret was that she soaked in baths of fresh milk and honey.

Father of White Revolution

Verghese Kurien (1921-2012) is known as the "Father of the White Revolution" in India. He was a social entrepreneur whose "billion liter idea" (operation flood) made dairy farming India's largest self-sustaining industry, and the largest rural employment sector providing a third of all rural income. Producers cooperative for processing and marketing of milk was developed which proved to be viable and sustainable in India like some developed countries. On their analogy a cooperative dairy was established successfully in India called the Anand Milk Producers Union (AMUL) is working and serving the participating dairy farmers, landless livestock farmers, women and children.

Milk Tree

The dairy and wider food sector processes raw milk into a wide array of products including cheese, butter, yoghurt, cream, condensed milk and dehydrated milk. The dairy sector also produces various byproducts including butter milk, whey, ghee, and skim milk. These dairy byproducts have nutritional value and have applications in many in many food industries as well as non-food applications. The different ways that milk and milk products are developed and used with the IDF's useful milk tree infographic.

Milk in Facts and Benefits

- Milk is one of the world's oldest foods.
- Milk is the source of all dairy products.

- Milk is almost a complete food. It doesn't contain Vit C, iron and copper.
- Milk is white because it contains casein - a milk protein that is rich in calcium.
- Milk helps your skin glow. Whole fat goat and cow milk are better for skin health and moisturizing.
- Cleopatra, the Egyptian queen took bath of milk and honey to keep her skin with almost perfect feminine features and vital statistics.
- The first milk bottle was invented in 1884, that's over 140 years ago.
- Frogs were put in milk to keep it from going sour (in some parts of the world).
- Drinking whole milk over low-fat milk helps you avoid gaining weight.
- Milk can be made into a bioplastic.
- Pennsylvania State made it illegal to use milk crates for anything other than milk.
- In European countries the average cow produces enough milk each day to fill six one-gallon jugs, about 55 pounds of milk.
- It takes more than 21 pounds of whole milk to make 1 pound of butter.
- The fastest-growing variety of cheese produced in the US is Hispanic-style soft cheese. All 50 states in the United States have dairy farms.
- Holstein breed originated in Germany, developed in Holland (Dutch), and was brought to the U.S. by Dutch settlers. This breed has the highest milk production of all dairy breeds.
- Yak produces sweet and fragrant milk and hippopotamus produces milk of blue color.
- Verghese Kurien (1921-2012), is the father of white revolution in India.
- January 11 is the National Milk Day in USA. June 1 is the World Milk Day, and June 22 is the World Camel Day all over the world.
- The founder of Nestle Co was Henri Nestle, founded in 1866 at Veyey, Switzerland.
- Milk was considered 'food of the gods' in ancient cultures.
- Milk is a great post-workout recovery drink.
- Milk reduces the risk of obesity.
- Milk provides exceptional hydration.
- Milk is the official state beverage of 21 states of USA.
- Milk is one of the most nutritionally-dense foods on the planet.
- Almost mostly milk produced today comes from family farms.
- Milk is good for bone health improvement.
- Milk might reach your weight loss goals.
- Milk might lower your Diabetes risk.
- Milk helps your heart health, prevents heartburn.
- Milk can help fight depression.
- Milk promotes sperm health.
- Milk has hair hydrating properties.
- Milk might lower your risk of Cognitive Decline.
- Milk Tree (African milk tree or African milk bush) is a plant producing milky sap is found in Central and South Africa, technically called as *Euphorbia trigona*.

Milk Handling and Processing

Milk Processing includes Clarification, Bactofugation, Homogenization, Pasteurization, Fortification, Bleaching and Dehydration. Processing is done to produce milk of low bacterial count, good flavor and with sufficient keeping quality.

Homogenization function is to prevent creaming, or the rising of fat to the top of the container of milk. The process of homogenization permanently emulsifies the fine fat globules. Homogenization mechanically increases the number and reduces the size of the fat globules. The size is reduced to 1/10 of their original size. Resulting in the milk that maintains more uniform composition with improved

body and texture, a whiter appearance, richer flavor, and more digestible curd. Most milk is also **homogenized** which means that it has been treated so that the milk fats are spread evenly through the liquid and stops them rising to the top of the bottle.

Pasteurization is a relatively mild heat treatment, sufficient to destroy bad bacteria and disease-causing microorganisms and inactivate enzymes are removed from milk to extend its shelf life. Pasteurization is the process of heating up milk [63°C (150°F) for at least 30 min] or [72°C (162°F) for at least 15 seconds] and then quickly cooling it down killing any bugs. Raw milk is not pasteurized, but the other types of milk are. It should be followed by immediate cooling of product to the temperature sufficiently low to check the growth of microorganisms which are resistant to temp. used. Pasteurization causes minimal sensory and nutritive changes in the food, loss of some vitamins may occur, mainly Vit B_1 and C.

Sterilization process is defined as any process that eliminates or decay all forms of microorganisms and other biological agents (such as spores) present in a specified region, such as food item, surface, a volume of fluid, packaging material, medication, instruments or in a biological culture media. Sterilization can be accomplished with one or combination of these food technologies such as heat, chemicals, irradiation, high pressure and filtration. Sterilization is different from other processes in that sterilization eradicates, disables or removes all forms of life and other biological agents. Autoclave is the widely used method for heat sterilization and is generally uses the following time-temperature combination 121°C at 100 kpa for about 3 to15 minutes, to sterilize milk.

What is sterilization time of milk?

Usually the milk is sterilized at 108-111°C for 25-35 minutes. The sterilized milk bottles should be gradually cooled to room temperature. Any sudden cooling may lead to bottle breakage. The two common steam-sterilizing temperatures are 121°C (250°F) and 132°C (270°F). These temperatures (and other high temperatures) must be maintained for a minimal time to kill microorganisms. Finally the milk-in-bottles should be stored in a cool place (De, 2001).

Sterilized milk or UHT milk. UHT or ultra heat-treated milk is a form of milk that has been heated to a temperature of at least 135°C in order to kill off any harmful micro-organisms (e.g. harmful bacteria) which may be present in the milk. The milk is then packaged into sterile containers.

Bleaching carotenoid or chlorophyll pigments in milk may be desirable. The FDA allows benzoyl peroxide or a blend of it with potassium alum, calcium sulphate, or magnesium carbonate to be used as a bleaching agent in milk. Vitamin A or its precursors may be destroyed in the bleaching process; therefore, sufficient Vit A is added into the milk, or in the case of cheese- making to the curd.

Milk powder is created when the water is taken out of the milk, a process called **evaporation**. Fresh milk can last up to 10 days in the fridge. Long-life milk can last up to 6 months in a cupboard if unopened. And a sealed packet of milk powder can last up to one year.

Curd prepared by cooling boiled milk to body temperature and adding 5-10% starter. After 6-8 hours an acidity of 0.9-1% is formed which coagulates the casein and curd is set. Easily digested than normal milk. Contains more vit B than milk. Used as marinating and souring agent in cookery. **Yogurt** is a variety of curd. whole, low fat, skim milks and even cream can be used to make yogurt.

Milk Types

Milk can be grouped into five different types: fresh, concentrated, long-life, raw and powder. Generally speaking milk is of four types: whole milk (3.25 % milk fat), reduced fat milk (2%), low fat milk (1%) and fat free or skim milk.

Other Physical Properties of Milk

Acidity, fresh milk pH is 6.5-6.7 at 25°C. **Viscosity**: depends on the amount of fat, size of fat globules and extent of clustering of globules. Homogenization and ageing increases the viscosity. **Freezing point**: -0.55°C addition of 1% of water to milk decreases freezing point by -0.0055°C. While **Boiling point**: 100.2°C. **Standardized milk**: fat is maintained at 4.5% and SNF 8.5%. Mix of buffalo and skim milk.

Good quality protein and BV is over 90%. Lysine is abundance. Easily digestible fat containing 2.1% linoleic acid, 0.5% linolenic acid & 0.14% Arachidonic acid. Only substance that contain lactose which is essential for: Synthesis of myelin sheath (galactose). Favors the growth of lacto-bacillus in intestine and decrease the pH thus favoring Ca absorption. Also increases the permeability of Small Intestine for Ca+2. Poor source of iron and vit C. Not a good source of niacin but excellent source of tryptophan. Major source of Calcium & riboflavin.

A CAMPAIGN TO CELEBRATE WMD

We say 'Cheers', 'Mma manu', 'Yam sing' to the parents who make sure there's always a carton in the fridge, to the hard-working dairy farmers, to the organisations who provide dairy supplements to help tackle famine and malnutrition, to the huge network of people who help us to enjoy milk.

As we share our love for milk, we connect with others and invite them to join the celebration that the goodness represents. It allows us to share the stories about all the goodness of milk and all the people who produce it. It offers a simple, natural way to recognize the people who matter most to us – in our communities, schools and home.

World Milk Day

World Milk Day is on Thursday, June 1 (2023). This year's theme will focus on showcasing how dairy is reducing its environmental footprint, while also providing nutritious foods and livelihoods. Together, we will drive an active narrative that integrates the environmental, nutritional and societal impacts of the sector.

We need to encourage everybody to talk about the important contributions of the milk and dairy sector to (1) Good food, health and nutrition, (2) Farmers caring responsibly for their communities, the land and their animals, (3) Sustainability practices in the dairy sector and (4) How dairy contributes to economic development and livelihood.

Biggest Dairies of the World:

The biggest dairy of the world is **Dudhsagar Dairy** established in 1963 at Mehsana, Gujrat, India run under Division of Gujrat Cooperative Milk Marketing Federation. While the biggest Dairy Farm of the world is owned by China Modern Dairy on an area of more than 4 M hectares with 230,000 milking cows at Anhui China.

Over 750 million people are engaged in milk production around the world, mostly smallholders fulfilling their livelihood needs, food security and nutrition. World milk production was 522 million tons in 1987 while it escalated to 828 million tons in 2017 and augmented to 838 million tons having the share (82% cow milk, 14% buffalo milk, 2% goat milk,1% sheep and 0.3% camel milk) in 2018 (FAO,2019).

Milk Production over the Globe

Milk production in developing countries of South Asia jumped after 1970, and the region has become a key player in world milk production. The region consisted of 745 million dairy animals that accounted for 21% of dairy animals in the world. The region was also home to 25% of cattle and

buffaloes, 15% of sheep and goats, and 7% of camels in the world. Currently it is contributing about 200 million tons of milk that accounts around 20% of global milk production despite low milk yield of the dairy animals (Siddiqui, 2017).

Dairy Situation in Pakistan

In Pakistan, livestock plays an important role and grew at a rate of 4% in 2018-19, accounting for about 60.5% of agriculture value added and 11.2% of GDP. The importance of the sector can be realized from the fact that it is not only a source of foreign exchange earnings, but also a source of income for over 8 million rural families. Within the livestock sector, milk is the largest single commodity. Overtime, the higher growth in the livestock sector was mainly attributed to milk production (GOP, 2018-19).

Which country is richest in milk production?

According to production data of FAO Corporate Statistical Database (FAOSTAT), India is the highest milk producer i.e., rank first position in the world contributing 196.18 million tons (2019), twenty-four (24%) percent of global milk production, USA produced 99.16 million tons, and Pakistan 47.30 million tons in the year 2019-20.

Pakistan was ranked as the 3rd largest milk producer in the world according to FAO. Approximately 80% milk is produced at small scale in rural areas, 15% peri- urban and 5% in the urban areas. Average annual milk production during 1960s and 1970s was 6.6 million tons and 8.1 million tons, respectively. This increased from 12 million tons (1985-86), to 48 million tons in 2018-19, a qaudrupling in three decades. About 97% of the milk consumed is in the fresh form and remaining 3 % is processed (UHT) with 15-20% wastage in some areas. Most of the dairy farms are smallholding with subsistence (70%), with market-oriented-level (20%) farming followed by rural commercial (2.9%), peri-urban production system (2%) and large peri-urban commercial farming (0.005%) (Dawn, 2021). Milk composition has also changed between 1985-86 with a marginal increase in cow milk and reduction in buffalo milk (67% buffalo, 31% cow and 2% goat, sheep and camel in 1985-86, to 60% buffalo, 36% cow and 4% goat, sheep and camel in 2018-19.

Population of livestock in Pakistan is to the tune of Buffalo (43.7 M), Cattle (53.4 M), sheep (31.9 M), goat (82.5 M), Mules (0.2 M), donkeys (5.7 M), Horses (0.4 M) and camel (1.1 M). Per capita availability of milk is 168 liters per annum, meat is 22.5 kg, fish 2.9 kg, eggs are 8.1 dozen and calories 2735 per day (GOP, 2021-22).

Milk Production and Processing in Pakistan?

Landhi Dairy Colony (also known as Bhains Colony or Landhi Cattle Colony), is the world's largest buffalo colony, located in Bin Qasim Town in Karachi, Sindh, Pakistan. Bhains Colony regularly supplies more than 80% of the milk in Karachi. Currently, there are more than 20 dairy processing plants operating in the country. The major product produced by them is UHT or pasteurized milk. Mostly they have a capacity of 50,000 liters per day. All UHT plants claim that their milk is 100 % Fresh, Pure & Nourishing and having the contents written as per their labels. This is the first choice of all purity & health conscious households. Produced at a state of the art dairy facilities and untouched by human hand, every drop of milk ensures highest production, processing & packaging standards.

How much production?

The indigenous breeds of buffalo and cows are considered as poor producers with lactation yields of 1800 and 1195 liters that remained constant across years. In advanced countries like USA, the average cow produces enough milk each day to fill six one-gallon jugs, about 55 pounds of milk. It takes more than 21 pounds of whole milk to make 1 pound of butter. The fastest-growing variety of cheese produced in the US is Hispanic-style soft cheese. All 50 states in the United States have dairy farms.

The Punjab and Sindh are the major milk producing provinces, with annual production of 25.62 million and 9.35 million liters respectively. Khyber Pakhtunkhwa (KPK) produces an estimated 4.88 million liters per year, and Baluchistan 0.81 million liters (PDDC, 2006). Provincially, annual per capita consumption is highest in Sindh, at 246 kg. In Punjab it is about 132 kg, in KPK about 86 kg, and in Baluchistan about 108 kg. The average milk yield of the cow and buffalo is 14 and10 liters per day, respectively. It is still 5-6 times less than the developed countries.

It rose to 70 kg per annum during 1990's and was 100 kg/annum in 2017-18. During the last three decades, per capita milk availability has risen almost 3X in Pakistan. Imports of milk and milking products were Rs. 0.3 billion in 1975-76, which rose to Rs.1.4 billion in 1990-91 and Rs. 3 billion in 2007-08 while Rs. 20 billion in 2017-18.
Thus, the question arises that despite *being the 3rd (or 4th) l*argest *milk producing country, why a*re *we spending Rs.20 billion per year on the import of milk and milk products? The question looks very simple but its answer is very tedious and tiresome. My knowledge and experience has dictated me the answer is very elaborate but to mark as beginning, I hereby present some of the reasons as follow* for our import of milk and milk products. This is the answer to our imports of Rs 20 billion per annum.

1. Our population has limited knowledge about milk and its products. Not managing the milch animals properly.
2. Summer months are really terrible for milking cows and buffaloes. Appropriate technologies for management in tropical climate conditions don't exist.
3. Regional and seasonal fluctuations that affect the production and distribution of milk.
4. Milk supply to plants reaches with mix of milk from cow, buffalo, camel and goat, with varying quality and contents. This species-wise variation in milk quality received by dairy plants, cause some issues of processing.
5. Shortage of power supply also hinders in proper management, feeding, milking, processing and breeding as well.
6. Feeding issues are not resolved. Our animals are mostly underfed. We don't provide them ample feed and fodder and hardly meet their physiological requirements.
7. Water is not offered ad lib and what we give, may not be fit for drinking.
8. Animal health coverage is marginal and usually mis-reported. Instead of improved animal health, more profits of the companies are cherished.
9. Reproductive management is misunderstood. We can't breed the animal at proper time and get a calf per year.
10. Dry cow therapy is rarely understood. Dry cow therapy helps animal to replenish its body reserves, maintain good health and prepares to produce maximum in coming lactation.
11. Obviously milk production of local animals is not fully exploited, and production is very low, not matching with our requirements.
12. Our emphasis is on increasing animal numbers, not their productivity per unit.
13. Each year some of the best producing animals especially around the river banks are lost in flash floods. No preparation for such disasters, which keep on knocking after every 4-5 years.
14. Our demand is unmatched. About 10-15 % milk is lost/wasted during handling, transportation, processing, other than calf feeding.
15. Less encouragement of small farmers to have their cooperatives to be heard at right forums to represent their stance.
16. Baby milk formulas are the major imports. Mothers are reluctant to breast feed, so they rely on imported milk formulae.
17. Most of the international community in the country wants baby formula, and milk products like milk formula, baby feeds, butter, cheese, etc. are to be imported.
18. Skirmish between open milk and UHT milk need to be taken care of through knowledge and research, rather making it talk of the town.

19. Which animal is the requirement of the country local or imported. All whats and whys need to be resolved with proper reasoning and zoning.
20. UHT plants and big companies be asked to give some space to local dealers, investors, small farmers, landless livestock farmers, women, children and retailers of loose milk handlers.
21. Lack of awareness for hygienic clean milk production. There are no strict law enforcement on clean milk production, milk handling, raw milk collections, processing and sales & purchases, with condiment of sincerity among the officers, workers and staff of offices and field.
22. Some rapid and positive changes need to be brought in the market.
23. Change of mindset and perception of public for UHT milk through awareness, education, and proper extension campaigns.
24. Big organizations and MNC should play a helping role with small farmers giving some space to small holders without pushing them to further poverty, hunger and malnourishment.
25. Change of government priorities also hamper the development of the livestock and dairy sector.
26. Half-baked and ill planned dairy schemes and programs could not yield the desirable results in different agro-climatic zones.
27. Lack of awareness and preparations about the WTO opportunities.
28. Lack of infrastructure for offering Dairy Business Planning and Management programs to train dairy personnel.
29. Lack of marketing infrastructures and avenues for the dairy produce.
30. Lack of proper zoning and agro-climatic zones and their implementation.
31. Lack of software for preparing needed dairy schemes/projects.
32. Less encouragement of people to invest in the sector to fill the supply gap at a competitive cost.
33. Our statistics and data recording procedures need much improvement. Our data are not reliable and dependable and can't be used to analyze our professional developmental program and strategies.
34. Political stability is also a big factor in investing dairying. Import of machinery and export of dairy animals or products suffer over time.
35. Scarce capital for investment in the dairy development programs on a priority basis.
36. Will of the Government and Dept priorities need to be stabilized, channelized and focused.
37. Milk is not only the basic source of nutrition for a whole range of products (milk, butter, deli ghee, lassi) but also livestock rearing and breeding are critical livelihood components for small producers.
38. Last but not the least, our population is exploding at a high speed. We have failed in preparing our farmers to become steward of the environment, natural vagaries. And frequent occurring disasters.
39. We have also failed to prepare our youth to act as army to save and safeguard our nation to become proactive to save our population.
40. The only factory which is multiplying year round is population manufacturing, others may close or shut down but this factory has met no power shortage. We are producing more mouths to fill rather than more hands to work.

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