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Identification, Characterization and Prevention of Bacterial Contamination and Associated Factors Responsible For Spoilage of Milk and Milk Products

Mohammad Murtaza Mehdi [a]*, Dimpy Jamwal [b]

[a]Department of Biochemistry, School of Bioengineering and Biosciences, Lovely Professional University, Punjab-144411

[b]Department of Molecular Biology, School of Bioengineering and Biosciences, Lovely Professional University, Punjab-144411

*Corresponding Author
Dr. Mohammad Murtaza Mehdi
Assistant Professor
Department of Biochemistry,
School of Bio-engineering and Biosciences,
Lovely Faculty of Technology and Sciences,
Lovely Professional University, Phagwara-144411,
Punjab, India.
Email: murtaza.19836@lpu.co.in
Tel: +919936752001

ABSTRACT

From the ancient to recent time food plays important role in our daily life. The essential part of food that is milk globally consumed by people every day including the dairy products. Because of their nutritional quality their consumption is increasing worldwide and having a prominent role in daily diet. Contamination by microbes in milk and milk products is a universal problem as there is lots of things which leads to the contamination. Various diseases obtained because of microbial contaminants such as foodborne diseases from milk or milk products which leads to the awareness for the public health as well as economic problem developed in developing nations. This study is targeted to the identification of possible source and types of microbial contaminates of milk and characterization of harmful bacteria

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developed during improper storage conditions, prolonged transport and various temperatures before processing of milk in milk plants. The reason for this evaluation is to give an accessible logical information on the general wellbeing and dangers related with the utilization of crude dairy animal's milk; and to give counsel on methodologies which might be utilized to effect on any distinguished hazard. Reviewing the dangers coming about because of utilization of further handled crude milk items is also considered in this appraisal. The discoveries might be utilized to decide the dangers related with the crude milk proposed for handling into other milk

INTRODUCTION

From the ancient to recent time food plays important role in our daily life. The essential part of food that is milk globally consumed by people every day including the dairy products. Because of their nutritional quality their consumption is increasing worldwide and having a prominent role in daily diet (Dash et al., 2015). Various nutrients such as protein, vitamins, calcium, and phosphorus are present in milk necessary for the health of every age groups. The nutritive values of milk is usually preserved in dairy products. Basically cow or buffaloes milk is primarily used for the production of dairy products. Milk act as an excellent growth media for the growth of microorganisms because of its nutritive nature (Furnaces, 2008). Contamination by microbes in milk and milk products is a universal problem as there is lots of things which leads to the contamination. Various diseases obtained because of microbial contaminants such as foodborne diseases from milk or milk products which leads to the awareness for the public health as well as economic problem developed in developing nations.

The reason for this evaluation is to give an accessible logical information on the general wellbeing and dangers related with the utilization of crude dairy animal's milk; and to give counsel on methodologies which might be utilized to effect on any distinguished hazard. The extent of this hazard evaluation is to review the hazard to general wellbeing and security from drinking crude dairy animal's milk. Reviewing the dangers coming about because of utilization of further handled crude milk items is also considered in this appraisal. The discoveries might be utilized to decide the dangers related with the crude milk proposed for handling into other crude milk items. This study is targeted to the identification of possible source and types of microbial contaminates of milk and characterization of harmful bacteria

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developed during improper storage conditions, prolonged transport and various temperatures before processing of milk in milk plants.

MICROBIAL CONTAMINATION OF MILK

Contaminants can easily and frequently degrade the crude milk, either directly through the udder disease of animals or by the implication. Roundabout defilement may emerge from dairy animals' own particular fecal issue sullying the udder and nipples, fecal matter of different bovines debasing the udder, milking groups reaching surfaces with fecal pollution and post-reap ecological tainting. A concentrated search of distributed and unpublished writing demonstrates that globally, crude dairy animals' milk is regularly tainted with pathogens and, while information is rare, the information which is accessible affirms that crude cow milk is a wellspring of pathogenic microorganisms at low levels. Crude milk is exceedingly perishable, with both pathogenic and waste creatures anticipated that would multiply test outcomes.

In crude milk, low levels of pathogens display a hazard to purchasers, and much of the time these are beneath the levels of identification. The wellbeing of crude cow milk can be impacted by control measures and administration throughout the whole dairy production network. Adherence to safe milking practices, monitoring of animal wellbeing and control over milking parlor cleanliness are critical in retreating the microbial count in crude milk. The displaying embraced exhibits that in spite of the fact that the pathogen level might be low in crude milk, there remains a danger of causing sickness if expended. The capacity to identify pathogens in crude milk relies upon the exactness of testing, aptitude of work force and the point of confinement of identification for particular testing systems and pathogens (FSANZ, 2006).

The quality of food depends upon its production as well as the presence of microbes (Rosmini et al., 2004) which shows its clean state (Guerreiro et al., 2005). There may be a poor quality of raw milk due to change in temperature (Moussa et al., 2013), contamination by microbes through milk processing (Ahmed and Abdellatif, 2013), uncleaned vessels, unhygienic surroundings leading to increase in the microbial growth (Fromm and Boor, 2004) and during transportation (Singh et al., 2012).

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RISK FACTORS ASSOCIATED WITH MILK SPOILAGE

The evaluations should talks about the danger related to the dairy milk as its utilization leads to increase in the sickness and foodborne diseases because of presence of microbial contaminants which effect the health as well as the quality of milk or their nutrients. As a result various microbial contaminants present in milk such as *Campylobacter* sp., *Listeria monocytogenes*, *Escherichia coli* and *Salmonella* sp. The key discoveries of the hazard evaluation can be compressed as the raw dairy animals' milk has been connected to sicknesses and it is related with foodborne ailment (Waak et al., 2002). The crude bovine milk has been observed to be a huge source of pathogenic microorganisms. Unpublished research proposes utilization of crude milk is probably going to be low among the all-inclusive community, notwithstanding, certain gatherings specially devour crude milk.

The weight of ailment after retail buy was anticipated to be up to 170 instances of listeriosis, 153 instances of salmonellosis, 97 instances of enterohemorrhagic *Escherichia coli* (EHEC) and under 1 instance of campylobacteriosis (in a vulnerable sub-populace). The evaluated number of cases are per one lakh daily serves of a mean day by day admission of approximately half liter of milk to a tyke. The anticipated number of sicknesses following utilization of crude milk from the mass milk tank or after ranch door deals per one lakh daily serves is 19 instances of campylobacteriosis, 16 instances of EHEC, 17 instances of salmonellosis and under 1 instance of listeriosis (in a helpless sub-populace) when milk is expended from the homestead mass milk tank. There are 55 instances of salmonellosis, 49 instances of EHEC, up to 17 instances of listeriosis and 5 instances of campylobacteriosis (in a defenseless sub-populace) when milk is expended after ranch door deal (FSANZ, 2006).

VARIOUS METHODS FOR BACTERIAL IDENTIFICATION

Microscopic organisms develop in extremely different conditions, which clarifies why they are discovered almost wherever on Earth. Despite the fact that microscopic organisms are great at adjusting to their surroundings, certain conditions advance bacterial development more than others. These conditions incorporate temperature, dampness, pH and ecological oxygen. Understanding the ideal conditions for bacterial development can conceivably enable you to decrease your hazard for bacterial contaminations and sustenance harming. After incubation they can be cultured on different media's for their isolation. Various microbial contaminants are present in milk such as *Bacillus cereus*, *Salmonella* sp., *E coli* 0157:H7,

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Enterobacteriacea species etc. The first thing for the research work should be the collection of samples from particular area or region and discussion about common problems arises due to transportation or other factors which leads to the microbial growth.

MICROBIAL TESTS FOR BACTERIAL IDENTIFICATION

Counting of Colonies

Pouring of sample should be done with different dilutions as the sample is dense in nature and there is presence of greater number of micro-organisms present in the sample which are difficult to count. So the serial dilution should be done for the counting of the colonies. For tenfold serial dilution 9 ml of distilled water and 1ml of sample should be taken in a test tube.

Colony Forming Unit

It is a unit to measure viable cell count in a particular sample that is the number of cells which are in active cell division. Through serial dilution from 30 to 300 colonies should be counted easily. Plates with 300+ colonies are too numerous to count. Plates with less than 30 colonies are too less to count. The basic calculation of colony forming unit are:

CFU/ml = number of colonies x dilution factor/volume of culture plate

The dilution factor used for sample are 10^{-3}, 10^{-4}, $10^{-5}$and 10^{-6}. At 10^{-3} dilution there is formation of dispersed layer, as the sample still dense in nature so there is no formation of colonies is observed. At 10^{-4} dilution there is formation of colonies become prominent in number and at 10^{-5} dilution colonies formed which are significant in number. For a better observation, at 10^{-6} dilutions number of colonies increases which is considered for counting.

Isolation of Bacterial Colonies

Pour plate method is used for the isolation purpose. Pour plate method used for anaerobic microorganisms. For aerobic microorganisms spread plate method is used for isolation. Colonies of bacteria are observed in different media plates used for the enumeration as well as for the isolation of particular bacteria such as various media used are as follows.

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Nutrient Agar

It is selective and differentiate agar media. Basically used for the enumeration of bacterial growth which are non-fastidious in nature. Isolation and purification of cultures can be done through nutrient agar. Pouring of sample can be done with different dilutions. Number of colonies increases after increased concentration of dilution. Colonies can be seen clearly in 10^{-5} and 10^{-6} dilution. The Standard Plate Count (SPC) is utilized broadly into administrative and premium testing plans. Notwithstanding this test, crude milk will be conducted to various bacterial tests which utilized that how that milk was delivered. Such tests might be incorporated into deciding qualification or may be utilized to ensure additional effective affirmation instrument (Singh et al., 2012).

The bacterial tests frequently utilized as a part of expansion to the standard plate count are the Preparatory Incubation Count, the Lab Pasteurization Count and the Coliform Count. Whereas the SPC shows aggregation of microscopic organisms an example the lab pasteurization test and Coli check particular gatherings of microbes that are related with poor milking utility. Aftereffect of testing are utilized to recognize latent issues that may not be This involves the growth of bacteria in a nutrient culture Petri dish and the colonies developed in Petri dish can be counted further.

Standard Plate Count Test

This method is generally used for all types of milk products but basically used for the examination of raw as well as pasteurized milk. The milk supply quality can be determining by this method (Vose, 2008). Nutrient agar media was prepared and autoclaved. Approximately 15 to 20 mL of media was poured in the Petri Plates and 1 mL of milk samples at various dilutions were spread after cooling down of media. It was incubated for 48 hours at 37ºC and after that the colonies were counted.

Preliminary Incubation Count

The Preliminary Incubation Count (PI) gives milk creation hones. Strategy includes the milk asset at 55°F for 20 hour preceding media plate. Progression energizes, gathering of develop microorganisms which will develop at low temperature. Microscopic organisms in the brooded test checked with the standard plate count technique than contrasted with previous test from the same test to decide whether a huge increment has happened. PI tallies are by and

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large higher than the count. Tallies with a 3-4-crease increment are viewed as critical. Some consider tallies more noteworthy than 50,000 cfu/ml to be of matter paying little respect to the SPC, however now and again the tallies might be equivalent in uncommon cases this count is lower (Matak et al, 2007).

As large preliminary incubation count is regularly connected to completely perfect sterilize as the milking framework or the bovines. Microscopic organisms thought to be characteristic verdure of the dairy animal, accept those that which have mastitis and which are not able to develop at the preliminary incubation temperature. Be that as it may, PI equivalent marginally larger than a high SPC might recommend it is perhaps because of pathogen present in mastitis. Minimum cooling time or delayed capacity might likewise bring about inadmissible PI levels which permitting creatures that develop at hatchery temperatures to duplicate.

Lab Pasteurized Count

Despite the fact that most microorganisms are demolished by purification, there are sure shot specific stages of bacteria which are most certainly not. The Lab Pasteurized Count shows the survival of bacterial quantity in sanitization procedure. Milk tests are warmed to reproduce clump purification at 145°F for 30 minutes. Microscopic organisms which are exist in sanitization are at that point tallied utilizing the SPC technique. LPC are for the most part lesser than SPC, with tallies more noteworthy than 300 considered high.

In common vegetation of the dairy animals, microorganisms additionally those related with mastitis, are for the most part not thermoduric. High LPC esteems are regularly related with an unending or relentless cleaning disappointment in some range of the framework or huge levels of tainting from dirtied dairy animals. Other regular reasons for large LPC are pumps that are cracked, pipeline gaskets, swellings, elastic parts &milk stone stores.

Coliform Count

The Coliform Count (Coli Count) system gives those microscopic organisms that are generally normally related to natural defilement. Milk tests can be done on media plates that energizes coliform microbes for their development, while keeping the development of remaining. In spite of the fact that coliforms are regularly utilized as markers of fecal sullying, certain strains already exist in the earth (Vose, 2008). Microbes of coliform enters in

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the milk supply as a result of the hook getting to be plainly dirty with fertilizer amid milking. By and large, checks more noteworthy than 100 cfu/ml should demonstrate low quality milking cleanliness different wellsprings of tainting. Greater coliform checks all the more frequently result from filthy gear and in uncommon cases come about because of milking bovines with natural coliform mastitis. Violet Red Bile Agar is used for the coliform identifications, isolation as well as the enumeration of bacteria. It is a selective and defined media as the composition of the media is defined. Pouring of sample canoe done with different dilution.

Sub-culturing and Purification

For the sub culturing of isolated bacteria streak plate method is used in which single bacterial colonies isolated from the cultured colonies which is isolated from the samples. Streak plate method isolates pure strain of bacteria by diluting the large concentration of bacteria to a smaller concentration. Decrease in the concentration of bacteria results into colonies which shows sufficiently spread apart to affect the separation of the different types of microbes. Choosing a streak method depend upon the concentration of bacteria present in the sample. There are different types of streak plate method such as:

Quadrant Streaking

Isolated colony should be taken from the agar plate culture and spread it over the first quadrant streaking should be in parallel way. Immediately streak the inoculating loop very gently over a quarter of the plate. Flame the loop again and allow it to cool and again streak the other quarter of the plate repeat the step two times more and then streak into the center fourth of the plate. Media used for streaking are selective media's which supports the growth of specific bacteria. Media's such as Eosin Methylene blue and Macconkey agar used for the streaking purpose. Nutrient agar can also be used for streaking.

Macconkey Agar

It is a selective as well as differential medium act as indicator for the growth of gram negative bacteria. It consists of crystal violet and bile salts which do not allow the growth of gram positive bacteria. Basically, Macconkey agar used for the isolation of non-fastidious, gram negative rods, particularly member of the family of *Enterobacteriacea* and the genus *Pseudomonas*.

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Eosin Methylene Blue Agar

This is selective media used for the specific bacterial growth from the isolated culture. It consist of Eosin Y and Methylene blue dye act as an indicator in the media. It will inhibit the growth of gram positive bacteria and allow the growth of gram negative bacteria such as *E coli*. Growth of coliforms take up Methylene blue and gives purplish black colonies on the media.

Nutrient Agar

Sub-culturing of isolated colonies from the poured sample can be cultured again for the purification purpose. Streaking method can also be done on the nutrient agar.

BIOCHEMICAL TESTING FOR CHARACTERIZATION OF PURIFIED CULTURE

Every sanitized bacterium is inspected visibly as settlement structure, infinitesimally afterward decide to recolor the gram status. Portrayal of segregation of bacteria is done by various standard biochemical tests. Maturation test of sugar were likewise complete and then recorded. The outcomes coordinated with a bacteriology. The biochemical tests including Catalase, Indole, methyl red etc.

Methylene Blue Reduction Test

The method is based upon the ability of microorganism to lower the oxidation reduction potential of the media. The change in oxidation reduction potential is detected by the change in the color of dye (Magee, 1993). The dye in media is blue in color in oxidized state become colorless in reduced state. Greater number of microorganisms in milk, shorter time for reduction of methylene blue.

Catalase Test

The basic principle of this test is that it breakdowns the hydrogen peroxide into oxygen and water. The bacterial culture introduce to the hydrogen peroxide and if the bacterial culture having catalase enzyme then it will be produce oxygen bubbles rapidly. Lack of bubble formation results into absence of catalase enzyme (Cowan, 1978). The basic purpose of catalase test is to differentiate various bacteria's from each other. As streptococcus and staphylococcus having same morphologically similarity to differentiate both of them from

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each other catalase test should be done. As streptococcus is catalase negative and the staphylococcus is catalase positive. Aerobic and obligate anaerobic bacteria's can also be differentiated. Species of Enterobacteriacea can also be identified by catalase test. Smear is made on a clean slide and 2-3 drops of hydrogen peroxide (3%) is added, a loop full culture from the culture plate is applied for further observation.

Oxidase Test

It is used to determine bacteria that possess cytochrome-c which is an enzyme of electron transport chain (Cowan, 1978). When a bacterial culture is exposed to reagent tetra methyl-p-phenylene diamine than it is oxidizes there will be formation of purple color. When the bacterial culture is not oxidizes than the color remains same. Whatman filter paper is taken and cut into small disc shapes, the culture is spread on filter paper through sterilize wire loop, the filter paper is dipped into reagent, the results within 3 minutes is further observed. The bacterial culture which results into oxidase positive are aerobic containing an enzyme cytochrome-c. Oxidase negative bacteria may be anaerobic, aerobic, faculatative that is simply they do not oxidize cytochrome-c. There are other oxidases present in electron transport chain oxidase negative bacteria may respire through them. If there is formation of purple color than it is oxidase positive and if there is no change in color than there is oxidase negative.

Gram staining

It is the very first step for the identification of bacterial organism. This test is used to differentiate the bacteria in two large groups that is gram negative bacteria and gram positive bacteria (Cowan and Steel, 1965). A clean slide is taken to make a smear on it with bacterial culture, the slide is dried and heat fixed, crystal violet is put on it for one minute, iodine is added for one minute, further 95% alcohol is added to it for de-colorization, safranin is added to the slide for 30 seconds to observe the result. Gram Staining The bacteria can be differentiate by their physical and chemical properties of their cell wall having peptidoglycan layer which is present in gram positive bacteria. Gram negative bacteria also have peptidoglycan layer but very small as it is dissolved when alcohol is added. Gram positive bacteria blue color and Gram negative bacteria pink color.

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Urease Test

Urea is a product of decarboxylation of amino acids. When the urea hydrolysis takes place it produce ammonia and carbon dioxide. The medium will be alkalinizes due to formation of ammonia and there will be change in the pH of the medium which can be detected by adding phenol red which results into light orange having pH 6.8 to magenta that is pink at pH 8.1 (Finegold and Baron 1986). Christensen urea agar is prepared and autoclaved, urea base to the agar solution is added, the media is poured into sterile test tubes and slants are made. After solidify, the surface of urea agar is streaked with a portion of well isolated colony, it is kept into incubator for 24 to 72 Hours to observe the results. By performing this test the ability of organism to split urea can be determined by the production of an enzyme urease. Urease positive development of pink color in 24 hours. E.g. Cryptococcus sp., proteus sp. Urease negative results into no color change. *E coli*, Shigella, Salmonella etc.

Methyl Red Test

In this test there is formation of acid production. It is a qualitative test (Goodfellow and Board, 1980). This test is used to determine the ability of bacteria which produce and maintain end product of acids from glucose fermentation and help to overcome the buffering capacity of system. Methyl broth is Prepared and autoclaved, it is poured into sterilize test tube and the bacterial culture is inoculateed into the broth by wire loop, it is incubated it at 35^0C for 48 to 72 hours, and after incubation 5 drops of MR reagent is add to observe the results. Positive test indicates the red color and negative test indicates no color change.

Indole Test

By performing this test the ability of bacterial organism can be determine by producing tryptophan into indole (Finegold and Baron 1986). Tryptophan is amino acid and indole is a degradation product of tryptophan. Basically this test used to differentiate species of Enterobacteriacea. Tryptone broth is prepared and autoclaved, the broth is poured into sterilize test tubes and the bacterial culture is inoculated into broth through wire loop, the test tubes is incubated for 18 to 24 hours at 37 ^{0}C. After incubation 15 drops of kovac's reagent is added to observe the results. There will be formation of red color ring on the interface of the broth which results into positive indole test. Negative indole test do not show any color. Indole test is positive for *E coli* and it is negative for *Salmonella* sp.and *Enterobacter aerogens*.

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Citrate Utilization Test

If there is a presence of sodium citrate, an ammonium salt and the indicator bromothymol blue in the media in which the organism cultured. The change in color occurs after the growth of bacteria as well as turbidity shows due to alkaline reaction following citrate utilization (Murray, 1999). Media is prepared and autoclaved, further poured into test tubes and slants are made, after the media solidification the bacterial culture on slants streak, it is incubated at 37 °C for 24 to 48 hours to observe the results. Citrate Utilization Test In this test there is utilization of citrate by the organism as it is the only source of carbon and ammonia which is only source of nitrogen. Positive results shows the change in the color of the media from light green to blue and negative results shows no change in the color of media that is it remains light green.

Mannitol Salt Agar Test

This test is selected for those organisms which are salt tolerant. Through this test the ability of bacteria should be check to tolerate 7% salt concentration and ferment mannitol (Dureden et al, 1998). Mannitol Salt Agar (MSA) media is prepared and autoclaved, it is poured into sterilize petri plates, after the media solidification the bacterial culture on media plates streaking is done with wire loop, further incubated at 37 °C for 24 hours before observation. If there is fermented mannitol by salt tolerant organisms the yellow zones present around the colonies. If there is no fermented mannitol than the color of remains pink.

PREVENTION AND COUNTER MEASURES OF MILK SPOILAGE

There are various processes through which milk can be easily preventive from microbes such as by exposing milk at low temperature but the time is short, by exposing milk at high temperature but the time is long (Gedam et al., 2007), treatment through waves or radiations (Tremonte et al., 2014) and bright treatment (Matak et al., 2007, Reinemann et al., 2006). Film preparation and filters having membrane can also be used to decrease the number of contaminants and easy for the consumption of humans as well as to increase the shelf life of milk (Elwell and Barbano, 2006, Eckner and Zottola, 1991). Among different methods, sanitization is generally embraced however it isn't intended to disinfect drain and microbiological nature of purified drain is represented by the underlying vegetation of crude drain, the handling conditions and post-warm treatment tainting. Satisfactory sustenance control program must be actualized in all nations around the globe to guarantee safe

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nourishment with worthy nutritious traits at a reasonable cost. Dairy items must conform to the microbiological criteria set around the administrative experts, which could be accomplished through purification or more serious warmth medications and counteractive action of post-warm treatment pollution (NRC, 1985).

The recent things should be highlighted for the safety of pasteurized milk as it is the worldwide consumption. Raw milk present in the udder of cow or buffalo is sterile or without contaminants as the contamination udder (Tolle, 1980) takes place during its processing by using machines or from the surrounding sources which contain microbial contaminants (ICMSF, 1998). Generally sanitization embraced drain procedure to guarantee totally decimation of contaminants and deterioration microbes and inactivate microbes (Teka, 1997). Murphy (1997) ascribed unclean hardware, ill-advised sterilizing rehearses and milk stone statement for higher aggregate reasonable tally in research center sanitized drain. FAO/WHO (2001) characterized sanitization as microbicidal warm treatment went for decreasing the quantity of any pathogenic microorganisms in drain and fluid drain items, if exhibit, to a level at which they don't constitute a huge wellbeing peril. Sanitization conditions are intended to viably decimate the living beings Mycobacterium tuberculosis and Coxiella burnetii. At first, sanitization state M. tuberculosis is inoperative (North and Park, 1927); however in this way, C. burnetii showed up as the most warmth safe creature introduce in the drain and subsequently, purification was upgraded to accomplish no less than a 5-log diminishment of C. burnetii in entire drain (Hudson et al., 2003).

By exposing at high temperature short time maximum of the pathogens kills and is successful in decreasing the number of Mycobacterium avium subsp. paratuberculosis, however its viability relies upon the aggregate feasible fixation (Okura et al., 2012, FDA, 2009). It was noted more prominent warm devastation because of sanitization of Ultrahigh-temperature drain vaccinated with greater focuses of M. paratuberculosis, paying little heed to time-temperature blends embraced (Stabel and Lambertz, 2004). Amid purification the underlying fast decrease in populace of M. paratuberculosis in bovine's drain isn't because of warm demise however ascribed to collection of cells into clusters (Grant et al., 1996). Sanitization proficiency can be controlled by Phosphatase test. A compound normally introduce in drain of all well evolved creatures have a warm protection more prominent than that of the most warmth safe pathogens which do not form spores ordinarily found in milk and its devastation affirms appropriate sanitization (Sharma et al., 2003, Ludikhuyze et al., 2000).

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Positive Phosphatase action is the demonstrative of deficient purification or tainting of sanitized drain with crude drain or post-process bacterial pollution (Vega-Warner et al., 1999). Microbiological investigation of sanitized drain showed nearness of pathogens like Salmonella sp., Staphylococcus sp. (Singh et al., 2011), Salmonella from Nigeria (Okpalugo et al., 2008), coliform from India (Aglawe and Wadatkar, 2012), Enterobacter sp., Escherichia coli from Jamaica (Anderson et al., 2011), coliform, *E coli* and *S aureus* from Iran (Vahedi et al., 2013), B. cereus from Kuwait (Al-Mazedia et al., 2013) and Staphylococcus aureus from Brazil (De Oliveira et al., 2011). There was deactivation of phosphatase and Salmonella sp. along with nearness of coliform in 57.5% examples of purified drain from Brazil (Silva et al., 2010). Frequency of pathogens in purified drain (Ryan et al., 1987; Upton and Coia, 1994; Silva et al., 2010) and nourishment borne flare-ups because of insufficient purification or post-sanitization tainting have been accounted (Da Silva et al., 1998; ICMSF, 1998). Nearness of Salmonella in sanitized drain because of disgraceful purification coming about because of breaking down of a pasteurizer valve (Bergquist and Pogosian, 2000) and post-sanitization tainting of sanitized drain with Bacillus cereus from bundling paper and board (Vaisanen et al., 1991; Pirttijarvi et al., 1996) and filling machine have additionally been accounted (Eneroth et al., 2001).

Pathogen defilement of crude milk might be decreased by practicing upgraded sterile control all through the milk gathering stage. Practices, for example, plunging and nipple washing, great milking cleanliness and foremilk stripping will diminish the quantity of living beings (deterioration and pathogenic) entering the milk from ecological sources. The milk defilement by transient microscopic organisms situated on the outside surfaces of the udder is lessened by pre-milking udder washing with clean water and drying utilizing hand towels lessens. Post-milking nipple sterilization lessens the inhabitant nipple skin bacterial populace, which is the primary wellspring of disease for the mammary organ. Powerful administration of this would require continuous observation of individual creatures in a crowd and abnormal state veterinary supervision. Such measures include critical and regularly escalated mediations with attendant authorization specialist oversight. The appraisal draws upon the discoveries of the Outline which distinguished microbiological dangers in crude milk, essential creation hones and other data significant to crude bovine milk (FSANZ, 2006).

Other than the weight of sickness information, the quantitative displaying established that:

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- Increased utilization of crude dairy animals milk relates to an expansion in the anticipated number of ailments
- Inclusion of deterioration in the model brought about a general reduction in the quantity of anticipated ailments
- Growth of pathogens happened overwhelmingly amid household transportation and capacity of crude milk
- The event and constancy of disease inside groups or individual creatures is frequently discontinuous, which demonstrates hard to identify and routinely screen
- The capacity to recognize low levels of pathogens in crude milk is restricted unless exhaustive examining plans are utilized.
- The hazard appraisal of crude dairy animals' milk unites data on the general wellbeing dangers related with the utilization of crude bovine milk, and gauges the subsequent weight of ailment that may happen under current generation and promoting conditions.

With a specific end goal to gauge the probability of ailment for purchasers following utilization of crude dairy animals' milk, quantitative microbiological displaying was embraced. All the steps associated with the milking and collection procedure can be discussed targeted by the questions about the dangers to general wellbeing and security postured by the utilization of crude bovine milk and the components that would have the best effect on general wellbeing and security along the generation chain. The safe and purified dairy milk can be utilize by avoiding the post sanitization process.

The safety should be done during its production process. The dairy milk which is not safe for consumption are not allowed to purchase or if the industry data is inaccessible. The hazards obtained because of unpublished sources on milk generation frameworks, transportation manner and level of contaminants present in it. While the acquaintance of sanitization has assisted with guarantee the security of dairy items, advance have been slower in keeping the waste of microbe's cheddar also, milk items. The timeline provided as a basis for discussion and development of the planning process and should be modified and customized to meet our needs. Further discuss alternate approaches and plan work with brief summary of the previous history and accomplishments, current situation leads to the identify information needed for strategic planning.

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CONCLUSION

Overall institutionalized sanitization practices would be a viable initial phase in dispensing with or decreasing the levels of numerous decay microorganisms. Notwithstanding, averting post process tainting by deterioration microorganisms furthermore, hindering the development of surviving life forms be a test. Advancements or additives are expected to keep the development microorganisms which are decayed furthermore, expand the timeframe of realistic usability of dairy items. Restricted relevance of current endorsed antimycotics, for example, sorbic corrosive and natamycin gives a noteworthy chance to grow the weapons store of additives accessible for the present dairy processor. Moreover, concentrates to decide the connection of current additive innovations against waste microorganisms are additionally required. Enhanced strategies for recognizing deterioration organisms, particularly the moderate developing psychrotrophs and parasites, could help with finding the specialty situations in handling offices that prompt post process pollution. The current time may convey many difficulties to the milk industry, however keeping up the effectiveness and timeframe in realistic usability of this very nutritious nourishment ought not to be one of them.

TERMINOLOGY

Pasteurization: It is a process which kills the microbes in food and drink which is harmful for their quality, texture etc. E.g. milk

Sterilization: It is a process which kills or remove the microbes whether it is good or bad, from the surface of anything such as in case of equipment's**.**

Serial dilution: It is a process through which the more dense substance is diluted in solution that is its concentration decreases from higher to lower.

Colony: It is a mass of bacteria growing on a media plate.

SNF solids-not-fat: Components present in milk other than fats are solids-not- fat such as carbohydrate, protein, vitamins and minerals.

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Incubation: It is a process in which the microbiological culture can be maintained at specific temperature for specific time for their growth.

Microbial contaminants: These are those which introduce into the media accidently such as milk during various production process.

Pouring: It is a method used to counting the number of colonies in a liquid specimen.

Streaking: It is a method used to isolate the pure strain of bacteria for their further identification.

Colony forming unit: It is a unit which count the number of viable cells in a media plate that is the number of cells which are in active division form.

Biochemical testing: It is a testing used to identify the characteristics of microbes such as structure, shape, morphology etc.

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