

Discovery and development of yoghurt essay

[Life](#)



Industrial microbiology has helped greatly in the discovery and development of substances that we use in our day to day life. It applies scientific and bioengineering techniques to processes and materials. Microorganisms produce valuable products of industrial microbiology.(Law 15) They include; Antibiotics, fermentation beverages, enzymes for amino acids synthesis, dairy products, and recovery of minerals from low grade ores, waste and waste water management, Biodegradation of xenobiotics, synthesis of chemotherapy drugs, just to name but a few. It's a field that requires people to research on existing problems find or discover new products, get ways of producing and commercializing them.

Milk is a good media for bacteria to grow in since it contains disaccharides, proteins, fats, vitamins and minerals like nitrogen. Since it has insufficient amount of free iron microbes that require this for growth don't actually survive on it. For organisms to be able to invade milk they should be able to break down lactose or equally be associated with microbes that can. They can then utilize glucose or galactose released thereof. This can be seen in production of dairy products. (Tammie 2)

LACTOSE INTOLERANCE

Lactose is milk sugar composed of glucose and galactose. When we are young we are able to digest copious amounts of milk, but as we grow we lose the ability to digest that amount of lactose or milk. This leads to repulsion to milk or a decrease in the amount we can comfortably consume. Lactase is the enzyme for the conversion of lactose to glucose and galactose. It does this in the gut and with little activity in the intestines as we grow older.

Lactose intolerance differs from one race to another for example lactase

activity remains unchanged throughout the adulthood life of Europeans. Indications on lactose intolerance are majorly flatulence, constipation, diarrhea and rumbling in the stomach. It can be remedied by taking milk at a rate that is slower than the usual rate to give time for the limited enzyme to complete digestion. The rate at which we tolerate lactose differs. The regions that show the highest cases of lactose intolerance are Asia and amongst populations of Native Americans and Australians. These are regions where milk was rarely taken on the onset of life. Discoveries in industrial microbiology have enabled scientists to inoculate milk with microbes that breakdown lactose. Lactose could be one of the reasons that necessitated research and development of the industrial microbial production of yoghurt. (Bethesda 28)

YOGHURT

Yoghurt is as old as man and has been diversely consumed all over the world, this is evident from the different names of yoghurt in different parts of the world. (Tammie 2)

It's thought to have been accidentally produced when early man storing milk in intestines found it fermented and enjoyed it because of its unique taste. Documentation on the benefits of yoghurt was done by a Russian scientist Elie Metchnikoff somewhere in the 20th century; he found out that the good bacteria in yoghurt reduced the bad bacteria in the human gut. Yoghurt and other fermented food products have been shown to possess medicinal value. This is attributed to bacteria present in the yoghurt and that's why it's regarded as a probiotics food. Some of the lactic acid bacteria include *Streptococcus thermophilus*, *Bifidobacterium infantis*, *Lactobacillus reuteri*,

Lactobacillus acidophilus, Bifidobacteria bifidum.

Numerous studies have been done to show the potential benefits of yoghurt and fermented milk products. In the University of Medical Science in Rafsanjani Iran, a randomized control study by Mr. Mirzee V. Reza Hosseini of the department of gastroenterology was done to show the comparison of using triple therapy plus probiotics yoghurt versus standard triple therapy on eradication of helicobacter pylori. The research was done on 102 patients with H Pylori to show if probiotics yoghurt had an effect of increasing the efficacy of triple therapy that includes a PPI- proton pump inhibitor and two antibiotics. Amoxicillin, clarithromycin and pantoprazole were used as the standard triple therapy. The 102 patients were randomly grouped into three equal groups A, B and C. For group A probiotics yoghurt was given with a triple therapy, group B low fat yoghurt was given with a triple therapy and group C used as the control for the study was only given triple therapy. On conclusion of the study the groups were reviewed for presence of H Pylori. At the end of the study only 88% had finished the course. Dysgeusia was the most common side effects found in groups A and B. 25.8% of those in group A and 32.2% in group B. Group C had 30.8% complaining of dysgeusia with diarrhea and abdominal pain. The graph below is a representation of the statistics in the study;

Frequency of adverse effects observed within our groups (%) (Mirzaee7)

The rate of elimination of H. Pylori was however not changed significantly in any of the groups. It was then concluded that when triple therapy was given at the same time with probiotics yoghurt there was no effect on eradicating

H. Pylori however it helped reduce the side effects associated with taking antibiotics therefore concomitant administration of probiotics yoghurt and triple therapy was highly recommended to increase patients' tolerance. (Mirzaee 8) Other studies have shown that it exhibits antitumor properties that are associated with the cell wall of the bacteria in the starter culture. It also reduces cholesterol in serum. A combination of honey and yoghurt has been effective as an add on therapy in pregnant women with vulvovaginal candidiasis during pregnancy therefore it can be used as an alternative to antifungal medication that is contraindicated in pregnancy. (Abdelmonem 5) Yoghurt and other fermentation milk products are infused with microbes that help in breaking down lactose. Some type of yoghurt is prepared by a mixture of two microbes *Saccharomyces cerevisiae* and *Lactobacilli lactis*. *Saccharomyces cerevisiae* a non lactose fermenting microbe it breaks down galactose. The two work in association also like *Lactobacillus bulgaricus* and *Streptococcus thermophilus* that also work together associatively by providing substances that are utilized by each other. The streptococcus benefits from proteolytic action of lactobacillus which in turn give formate and carbon dioxide that benefit lactobacillus. Different microbe combination can be used to change flavor of yoghurt since they ferment different sugars.

There are different types of yoghurt namely: set yoghurt, stirred yoghurt, drinking yoghurt and thermised yoghurt.

Set yoghurt – its prepared into the retail container inoculation is done followed by flavoring and color. It's incubated at a suitable temperature either 40 to 43 degrees Celsius for short incubation for a span of 3-4 hours. Long incubation occurs at 30-32 degrees Celsius for 10 -12 hours. The retail

packs are cooled and this forms a gel that is in solid hence “ set” because the coagulum is undisturbed.

Stirred yoghurt – it’s done in a fermentation container where incubation and inoculation take place. During cooling and packaging stages the coagulum is broken hence “ stirred”. For short incubation 3-4 hours at 40-43 degrees Celsius is used. Longer incubation is done for 10-12 hours at 30 degrees Celsius. The coagulum is cooled after being removed from fermenting vessels. Cooling is done twice and during the second cooling stage its put in retail containers after fruiting.

Drinking yoghurt- this is done like stirred yoghurt but the lower solids are used. Fruit juice is used instead and coagulum is broken before being put in retail containers.

Thermised yoghurt- it involves pasteurization and fruit concentrate is used. The heat destroys the starter microorganism. Shelf life is increased since unwanted microbes are killed. (Law 79)

If heat is used like in thermised yoghurt the vitamins are affected while the other components of milk remain the same. The sweeteners used like aspartame and saccharin work to decrease the acidity in fermented milk by lactic acid and the low sugar content in fruit additive. Most of the sweeteners are added in the fruit concentrate. Stabilizers and thickeners that are usually starch in nature, agar or cellulose are also added. They cause yoghurt to be smooth and flowing. They also reduce separation of the yoghurt during storage and transit. Fruit particles are suspended in it and also cause the creamy feel. (Law 104) Stabilizers vary from one manufacturer to another. Some manufacturers have been unethical by replacing milk solid with stabilizers in order to decrease overhead cost while increasing profits.

<https://assignbuster.com/discovery-and-development-of-yoghurt-essay/>

Preservatives and chemicals used in controlling microbial activity are used to increase shelf life. Examples include sodium benzoate and sulphur dioxide. Their amounts and limit should be low. A negative effect of yoghurt has been noted. Studies link consumption of low fat yoghurt to an increase in asthma and atopic dermatitis cases in children born when taken by pregnant mothers.

POTENTIAL FOR IMPROVEMENTS OF YOGHURT IN THE FUTURE

Different types of fermented milk occur in different parts of the world. This majorly depends on the starter culture involved. The future holds a lot for yoghurt and fermented milk products in general. The future could see introduction of yoghurt in powder form in an effort to increase shelf life and ease of portability. We could also see human probiotics used in yoghurt since this would decrease incidents of GIT disturbances and immune reactions. Increasing nutritional value by fortifying yoghurt with vitamins or using starter cultures that would be able to synthesize vitamins is a possibility.

(Law 132)

Emphasis has been laid on low fat yoghurt and those with low calories, extended shelf life and those that are thick and creamy. Industrial microbiology could be used in selecting starter micro-organisms that have better flavors.

In conclusion, unlike traditional spontaneous fermentation; modern production of yoghurt involves industrial microbials like *Sacharromyces* species and *Lactobacilli* species. Traditional fruit yoghurt is the most popular but overall for good quality yoghurt to be produced we need to ensure that

good quality milk is used, good culture is used to inoculate and the appropriate time required in inoculation followed. The heat treatment during fermentation should also be right while after manufacture storage should be done below 5 degrees Celsius. (Tamime 102)

Works cited

- TAMIME, A. Y., & ROBINSON, R. K. (1999). Yoghurt science and technology. Boca Raton, Fla, CRC Press. <http://www.knovel.com/knovel2/Toc.jsp?BookID=158>.
- LAW, B. A. (1997). Microbiology and biochemistry of cheese and fermented milk. London, Blackie Academic & Professional.
- Abdelmonem AM et al (2012). Bee-honey and yogurt: a novel mixture for treating patients with vulvovaginal candidiasis during pregnancy. Arch Gynecol Obstet. 2012 Feb 8. [Epub ahead of print] PMID: 22314434 PubMed
- Mirzaee V, Reza Hosseini O (2012). Randomized control trial: Comparison of Triple Therapy plus Probiotics Yogurt vs. Standard Triple Therapy on Helicobacter Pylori Eradication. Iran Red Crescent Med J. 2012 Oct; 14(10): 657-66. . [Epub ahead of print] PubMe.
- NATIONAL DIGESTIVE DISEASES INFORMATION CLEARINGHOUSE (U. S.). (2002). Lactose intolerance. Bethesda, MD, NIDDK, National Digestive Diseases Information Clearinghouse.