



Fermented foods and their health benefits

Khan Chand, Sachin Kumar, Asfaq, Divya Saxena

Department of Post-Harvest Process and Food Engg, College of Technology, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

Abstract

Fermented foods are undeniably good for us. In fact, fermentation is essentially one of the oldest forms of food preservation. Eating fermented foods helps to maintain the gut flora, about 400 bacterial species that hang out in the intestines. Consuming probiotics, which get from fermented foods, helps to maintain the balance of these organisms, providing a variety of health benefits, from promoting a healthier digestive tract to boosting immunity. Eating an enzyme-rich diet decreases the load on pancreas, preserving the body's own natural enzyme potential, thereby reducing the risk of chronic diseases.

Keywords: Fermented foods, enzyme and health benefits.

1. Introduction

1.1 Fermented foods

Food that has had its carbohydrates and sugars turned into alcohol or beneficial acids is called fermented food. Fermented foods are full of probiotics, enzymes, Vitamins and are easier to digest than non-fermented foods. They are a key part of a healthy, traditional foods diet. There are many benefits to eating fermented foods daily (Pervez *et al.*, 2006) [3]. Microbial fermentations can be either homo-fermentative i.e. single main product, or hetero-fermentative i.e. mixed products (Peter, 1999) [2].

Fermented foods defined as those foods which have been subjected to the action of micro-organisms or enzymes so that desirable biochemical changes cause significant modification to the food. However, to the microbiologist, 'fermentation' describes a form of energy-yielding microbial metabolism in which an organic substrate, such as carbohydrate, is incompletely oxidized, and an organic carbohydrate acts as the electron acceptor. Foods submitted to the influence of lactic acid producing microorganisms are considered a fermented food. Fermented foods are essential to introduce, as they provide probiotic microbes in the best possible form. Supplements of probiotics settle in the upper parts of the digestive system and generally do not make it all away down to the bowel, while fermented foods carry probiotic microbes all away down to the end of the digestive system. Fermentation predigests the food, making it easy for digestive systems to handle, that is why fermented foods are easily digested by people with damaged gut. Fermentation releases nutrients from the food, making them more bio-available for the body.

2. Various fermented foods as

2.1. Coffee

Coffee is not only one of the most important commodities in international trade but also the world's second most popular drink, after water (Ernesto and Diego, 2003) [5]. Wild yeasts and bacteria from the air they eat the slimy layer, called mucilage and still covering the beans after picking. The

fermentation deepens the flavor and body of the beans. Coffee has antioxidant and antitoxic properties at cellular level, it reduces the risk of hepatic cirrhosis and prevents the formation of gallstones.

2.2. Cheeses

Not all cheese is fermented (i.e. paneer). For those, the bacteria which are added to give cream or milk a sour flavor. After the curds and whey are separated and the cheese is formed into a solid shape, it is inoculated with specific kinds of mold to make specific kinds of cheese (like blue cheese) and fermented (aged) again.

2.3. Wine

For making the wine the yeast is added to crush grapes, or naturally occurring yeasts already on the grape skins which are allowed to thrive and this yeast convert the juice's sugar to alcohol.

2.4. Beer

The yeast is added to grains that is heated, soaked, and strained (leaving a sweet, grainy liquid called wort), which converts the sugars to alcohol. Some beers, like Belgian lambics, use naturally occurring bacteria and yeasts from the air.

2.5. Bread

For making the bread the yeast is introduced to flour and ferments the carbohydrates, leaving behind carbon dioxide, which leavens the bread. Sourdough bread also contains a souring bacterium present in the starter.

3. Different health benefits of fermented foods

3.1. Make food digestible: Fermented foods are easily digestible because of their probiotic content. The process of fermentation helps in making the meal more digestible because it breaks down, hard-to-digest cellulose in food.

3.2. Detoxification: Fermented foods help in detoxification of the body. The beneficial bacteria in these foods flush out a lot

of toxins. Restores balance bacteria in the gut. Those suffering from lactose intolerance, constipation, irritable bowel syndrome, yeast infections, allergies and asthma can live a healthier lifestyle if they include fermented foods in their diet.

3.3. Nutritional value of fermented foods: One of the reasons, fermented foods are so great because the fermentation process increases certain nutrients. For example, sauerkraut has increased vitamin C content. On the other hand the traditional fermented food products show a big jump in vitamin content i.e. traditional fermented plant sap ferment by the name of Pulque. It is also clear that the fermentation process actually enriches foods with higher amounts of nutrients source.

3.4. Probiotics: Eating fermented foods and drinking fermented drinks like Kefir and Kombucha introduced beneficial bacteria into digestive system and help the balance of bacteria in digestive system. Probiotics also help to slow or reverse some diseases, improve bowel health, aid digestion, and improve immunity.

3.5. Absorb food better: Having the proper balance of gut bacteria and enough digestive enzymes helps to absorb more of the nutrients in the foods when we eat. Pair of this with healthy real food diet, we don't need as many supplements and vitamins, and we shall be absorbing more of the live nutrients in the foods.

3.6. Preserves food easily: Preservation of food and beverages resulting from fermentation were an effective form of extending the shelf-life of foods for millennia. Traditionally, foods were preserved through naturally occurring fermentation, however, modern large scale production generally now exploits the use of defined strain starter systems to ensure consistency and quality in the final product (Pourahmad and Golestani, 2016) [4]. Lactic acid microorganisms produce a wide variety of antagonistic primary and secondary metabolites including organic acids, diacetyl, CO₂ and even antibiotics such as reuterocyclin produced by *Lactobacillus reuteri*. In addition, members of the group can also produce a wide range of bacteriocins, some of which have activity against food pathogens such as *Listeria monocytogenes* and *Clostridium botulinum*.

3.7. Improve flavor: Fermentation improve the flavour and appearance of food. One important area is the creation of meat-like flavour. Over the years, Sudanese women developed products to replace meat in their diets. These include "kawal", fermented wild legume leaves, "sigda" (fermented sesame press-cake) and "furundu" (fermented red sorrel seeds). The strong flavours of fermented food products can enhance a dull diet. Fermented vegetables such as pickles, *gundruk* and sauerkraut are used as condiments to enhance the overall flavour of the meal.

3.8. Effects on immune system: Infant formulas influence the development of the gut microbiota. Besides the probiotic and prebiotic-containing formulas, fermented milk-based infant formulas offer an additional means for modulation of gut immunity or gut microbiota. These formulas are produced by the fermentation of cow's milk with specific lactic acid

bacteria strains, followed by heat treatment; they do not contain viable bacteria or added prebiotic oligosaccharides but contain specific products resulting from the fermentation process reported by (Heller, 2001) [1]

3.9. Budget friendly: Incorporating healthy foods into the diet can get expensive, but not so with fermented foods. We can make own whey at home, and using that and sea salt, ferment many foods very inexpensively. Drinks like Water Kefir and Kombucha can be made at home also and cost only pennies per serving. Adding these things to diet can also cut down on the number of supplements we need, helping the budget further.

4. Conclusion

It was concluded that we have explained the various fermented foods and highlighted their different health benefits. We also know that fermentation is a low-cost, low-energy process for efficient food preservation and production.

5. References

1. Heller Knut J. Probiotic bacteria in fermented foods: Product characteristics and starter organism. *American Journal of Clinical Nutrition*. 2001; 75:374-379.
2. Peter Sahlin. Fermentation as a Method of Food Processing production of organic acids, pH development and microbial growth in fermenting cereals. Division of applied Nutrition and Food Chemistry center for Chemistry and Chemical Engineering. Lund Institute of Technology, Lund University, 1999, 1-56.
3. Parvez S, Malik KA, AhKang S, Kim YH. Probiotics and their fermented food products are beneficial for health. *Journal of Applied Microbiology*. 2006; 100:1171-1185.
4. Pourahmad Rezvan, Golestani Mozhddeh. Comparison three treatments (two fermented treatment and one non fermented treatment) in production of synbiotic ice cream. *Journal of Food Processing and Preservation*. 2016; 10.1111/jfpp.12839.
5. Ernesto Illy, Diego. Coffee and health, new research findings. Proceedings of the International Seminar on Coffee and Health 40th Anniversary meeting of the ICO Cartagena, Colombia, 2003, 5p.
6. Steinkraus KH. Fermentations in World Food Processing, comprehensive reviews in food science and food safety, 2002; 1:1-10.