KOMBUCHA AND ITS THERAPEUTIC EFFECTS - A REVIEW

S.Madumitha\*, Assistant Professor, Department of Food Science and Nutrition,

Dr.N.G.P Arts and Science College, Coimbatore

ABSTRACT

Kombucha is a beverage made by fermenting tea (Camellia sinensis) that has been cultured with the SCOBY strain of bacteria and yeast. The ingredients used to make the traditional beverage or even different ones that give it a unique character; chemical and microbiological composition and variations; the traits, the potential advantages associated with Kombucha consumption. To comprehend the significance of Kombucha Tea's impacts on health intricate mechanisms that promote health are summarized.

KEYWORDS: Kombucha, SCOBY, Fermentation, Therapeutic effects, Health.

INTRODUCTION

The development and application of technology in contemporary medicine are evidence that people are continuously looking for ways to enhance their general health and well-being. In recent times, scientific societies and public demand have been furnishing a new definition of beverages. More number of information’s has been published concerning the effects of tea and its major constituents on human health.

Tea was primarily introduced in the European countries from China by Portuguese and Dutch explorers as a medicinal herb. This Kombucha tea beverage has been consumed in many countries for a very long time, whereas the interest towards KT is growing because scientific reports indicate that tea could bring benefits for health and may help prevent chronic diseases. (Hollman, et al., 1996). Tea is the second most popular beverage in the world after water (Yang &Wang, 1993).

Kombucha beverage is a naturally fermented beverage that is acquired from sugary tea with a dependent Symbiotic Culture of Bacterium and Yeast (SCOBY) C. (M. Hasler and A. C. Brown,2009) via a fermentation process usually lasting for 7–10 days. Kombucha, one of the popular drinks of recent years, is a fermented product that first became widespread in China, traditionally using black or green tea [Camellia sinensis (L.)] as substrates. When it started to become popular in Japan, it was named "kombucha" and created with the combination of the word "kombu" and "cha", meaning algae and tea, respectively. Kombucha found non-alcoholic and low-alcohol versions (less than 0.5% (v/v) of alcohol) on the market, or even alcoholic versions (Nummer, 2013). In the current commercial market, Kombucha is sold as a tea-type beverage (Oz H.S et. al., 2017),

The consortium is a symbiotic system of viable yeasts (such as Saccharomyces cerevisiae, S.ludwigii, S. apiculate, Schizosaccharomyces pombe, Torulosporadelbrueckii, Brettanomyces bruxellensis, B.lambicus, B. custerii, Candida krusei, C. albicans, Zygosaccharomyces bailii, Z.rouxii, Z. kombuchaensis, Kluyveromyces africanus, Pichia membranaefaciens, P.fermantans, Kloeckeraapiculata, Torulopsis sp., Dekkera sp.) and acetic acid bacteria (Acetobacter xylinum, A.xylinoides, A. ketogenum, A. suboxydans, A. pasteurianus, A. aceti, A. acetiformis, Gluconobacterliquefaciens, G.oxydans, Bacterium gluconicum,) which varies depending on the climatic and geographic conditions (Velic´anskiet al.2013; De Filippiset al. 2018)

Kombucha contains different chemical components such as metallic elements (e.g., Fe, Mn, Ni, Cu, and Zn); carbon dioxide; organic food acids; polyphenols; many water-soluble vitamins like vitamin C; amino acids such as lysine; fiber; sugars; antibiotic substances; different types of vitamin B; hydrolytic enzymes; and ethanol. Several benefits, such as antioxidant activity and anti-inflammatory potential, make Kombucha popular as a functional beverage or food (S. A. Villarreal‐Soto, et al., 2018)

The type of tea used and the conditions during the fermentation determines the chemical composition of kombucha. The health benefits of different tea leaves are attributed to their high content of phenolic which has been described as a potent antioxidant. (Cardoso et al. 2020).

Kombucha has the potential to improve gut health as a probiotic drink. Probiotics are microorganisms that provide health benefits to the host when given in sufficient concentrations (Bergström, H. 2018). Now-a -days the use of raw materials such as coffeeberry, leaves, fruits, milk, vegetables, by-products as an alternative for the fermentation process of Kombucha has been proposed by researchers.

KOMBUCHA AS A PROBIOTIC

Kombucha is a fermented beverage that is popular among traditionally fermented foods (Villarreal-Soto, et al., 2018). A symbiotic relationship between bacteria and yeast, as well as their effect on the human microbiota of kombucha, has to be validated. (Reva et al., 2015)

ANTIDIABETIC

Antioxidant-rich foods have been researched as a defense against diabetic oxidative stress, and it has been found that some antioxidants are crucial in the reduction of oxidative stress in diabetes mellitus (B A Nummer, 2013).

The pancreatic, renal, cardiac, and hepatic tissues of diabetic animals were found to contain higher levels of glutathione, lipid peroxidation end products, protein carbonyl content, and antioxidant enzyme activities after kombucha tea administration (Chakravorty et al., 2019). According to Chakravorty et al. (2016), it was also discovered that KT's antiglycation activity increased with fermentation time.

HEPATOPROTECTIVE

Hepatoprotection is the ability to prevent damage occurring to the liver by toxic substances. Studies on cell lines and animal models show the hepatoprotective activity of KT against various environmental pollutants and toxins such as carbon tetrachloride cadmium chloride, TBHP (tertiary butyl hydroperoxide), trichloroethylene, acetaminophen, aflatoxin B1 (Jayabalanet al., 2010), and paracetamol (Pauline et al., 2001).

The harmful effects of these liver toxins can be effectively mitigated by kombucha tea. According to Dufresne and Farnworth (2000), the enzymes, bacterial acids, and other secondary metabolites created by the microorganisms during the fermentation of Kombucha have the power to detoxify the body. According to studies, the presence of glucuronic acid, which can bind to liver toxins and encourage their removal from the body, is primarily responsible for the detoxifying properties of kombucha tea (Nguyen et al., 2014).

ANTIBACTERIAL

Kombucha tea has been classified as an antimicrobial source and many researchers have studied its inhibitory capacity against various pathogenic microorganisms. Studies have shown greater antimicrobial activity against Gram-positive organisms such as Staphylococcus aureus and Bacillus cereus and Gram-negative organisms such as Escherichia coli, Salmonella choleraesuis serotype typhimurium and Agrobacterium tumefaciens. Kombu tea, prepared by fermenting both green and black tea for 21 days, has shown antimicrobial activity against various human pathogenic microorganisms such as Gram-positive Staphylococcus epidermidis, S. aureus, Micrococcus luteus and Listeria monocytogenes and Gram-negative E. coli, P .. . aeruginosa, S. Typhimurium (LT2) and KT using green tea showed the highest antimicrobial potential (Chou et.al., 1999).

ANTIFUNGAL

Sreeramuluet et al., (2001) reported the inhibitory effect of KT prepared from black tea against Candida albicans but not against Z. bailii. KT from both green and black tea fermented for 21 days inhibited the growth of C. albicans, Candida tropicalis, Candida parapsilosis, Candida glabrata, Candida dubliniensis, and Candida sake, in addition to Candida krusei (Chou et.al., 1999).

ANTIINFLAMMATORY

KT prepared from black tea fermentation was found to have significant activity against chromate (VI) treatment-induced oxidative stress in male Sprague-Dawley albino rats. Dawley albino rats reduce lipid peroxidation (MDA levels) and DNA damage, increasing levels of antioxidant enzymes involved in glutathione depletion, and increasing glutathione peroxidase activity (Dipti et al., 2003). KT obtained from black tea also showed a protective effect against trichloroethylene-induced nephrotoxicity in male albino rats (Gharib, 2009). The anti-inflammatory effect of KT is mainly due to its various phenolic compounds and flavonoids (Banerjee et al., 2010; Tamer et al., 2021).

ANTICANCER

KT has been claimed to possess anticancer activity for many years based on personal observations and testimonials. A recent study also showed that lyophilized KT extract prepared from black tea which is fermented significantly reduced the survival of prostate cancer cell line PC-3 by reducing the expression of angiogenesis stimulators such as cyclooxygenase-2, matrix metalloproteinase, endothelial growth factor, interleukin-8 and human inducible factor-l α. (E. Zubaidah et al., 2019). Therefore, KT can alter the expression of various angiogenic stimulators, leading to inhibition of angiogenesis (Srihari et al., 2013). The presence of various compounds such as polyphenols, glucuronic acid, gluconic acid, lactic acid, vitamins such as (vitamin C) and d-saccharic acid-1,4-lactone (DSL) may contribute to the anticancer properties of Kombucha Tea (Sinir, G. Ö. et al., 2019).

OTHER THERAPEUTIC PROPERTIES

In addition to the aforementioned health benefits of KT, the fermented drink is also known to have other therapeutic effects. Drinking KT has been reported to have anti-stress effects (Pauline et al., 2001). KT was also found to have hypocholesterolemic effects as demonstrated by its ability to lower total cholesterol and low-density lipoprotein (LDL) cholesterol in hypercholesterolemic mice (Yang et al., 2009). KT can inhibit pancreatic alpha-amylase in the small intestine, which contributes to starch digestion and net glucose absorption. In particular, all this evidence supported the health properties of KT and confirmed it as a functional food (Chakravorty et al., 2019).

Conclusion

Kombucha has received more recognition across the globe due to its health benefits, which may be easily acquired on the market or homemade. Different tea sugar concentrations, SCOBY strains, and a range of temperatures and weather patterns can be used to make the beverage, resulting in Kombucha with a variety of properties. Kombucha Tea procedure differences suggest the chemical and microbial makeup, determining the beverage's useful characteristics. No systematic human trials employing Kombucha tea have been done, according to the literature. The establishment of this beverage as a functional food may require further study in this area. Although there are a few safety concerns, the safe manufacturing and consumption of this beverage can support its claim to be a carbonated beverage substitute.

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