

VARIATION OF BIOLOGICALLY ACTIVE COMPOUNDS OF KOMBUCHA PREPARED FROM LITHUANIAN MEDICAL HERBS

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Kombucha beverage considered to have originated in Northeast China (Manchuria) in 220 BC. After that, it spread around the world [1]. It is a sweet and sour taste beverage originally produced with symbiotic culture of bacteria and yeasts (SCOBY) by fermenting, sugared black or green tea (*Camellia sinensis* L.) [2]. Kombucha tea contains culture of acetic acid bacteria (e.g., *Gluconobacter* sp. and *Acetobacter* spp.), lactic acid bacteria (e.g., *Lactobacillus* sp. and *Lactococcus* sp.) and yeasts (e.g., *Schizosaccharomyces* sp., *Brettanomyces* spp. and *Zygosaccharomyces* spp.). The culture has a variable microbiological composition according to its origin, the weather, geographical location. During the fermentation process, floating cellulose biofilm is formed on the surface of medium due to the activity mainly of *Acetobacter xylinum* bacteria, for this reason kombucha culture often called as a “tea fungus” [3].

Kombucha consumed for its beneficial effects on health. The composition and concentration of the biologically active compounds in this beverage, are the main reasons for the health benefits. Chemical assays of kombucha beverage have indicated the presence of a variety of compounds, including organic acids, polyphenols and phenols, water-soluble vitamins, amino acids, ethanol, carbon dioxide, minerals and other metabolic products of yeasts and bacteria [4].

The aim of this research was to evaluate total amount of phenolic compounds and antioxidant activity of kombucha prepared from different Lithuanian medical herbs infusions. To our knowledge, there is no information in the literature of using specific Lithuanian herbs for kombucha fermentation, so this work gains new knowledge on the use of Lithuanian herbs, which have never been considered as a substrate for kombucha beverage.

For this research fermentation was performed using the local domestic starter culture. All experiments were done with sugared lemon balm, linden flowers, oak bark and caraway seeds infusions. Black tea was used for comparison reason. All tested herb infusions were mixed with fermentation broth containing kombucha starter culture and left for 60 days.

The total amount of phenolic compounds and antiradical activity were evaluated using spectrophotometric methods [5]. The highest amount of phenolic compounds before and after fermentation were found in lemon balm tea, 983.7 ± 52.3 mg/L (expressed in rutin equivalents) and 417.1 ± 22.2 mg/L, respectively. Antiradical activity varied from 222.2 ± 6.74 to 733.3 ± 9.7 mg/L in the herbal infusions before fermentation. The highest activity was observed in the black tea. In kombucha beverage antiradical activity varied from 102.03 ± 3.40 mg/L to 320.97 ± 3.16 mg/L. The highest activity was also observed in the kombucha made from black tea. The pH of tested kombucha decreased from 7.68-6.88 to 3.43-3.34 after 60 days fermentation.

According to Jayabalan et al. the concentration of the biologically active compounds in the kombucha depends on the type of tea, temperature, fermentation period, etc. [4]. Gaggia et al. using different teas (green, black and rooibos) for kombucha preparation found that the content of polyphenolic compounds reaches a maximum value on day 7 of fermentation and then decreases statistically with the duration of fermentation [6]. A similar tendency was observed in the antioxidant activity of the kombucha drink [6].

Both total phenolic compounds content and antiradical activity reduced after fermentation of herbal infusions by kombucha culture for 60 days. The results obtained in this study do not fully coincide with those published by other scientists. The biodegradation of some specific compounds might occur due enzymes excreted by yeast or bacteria during prolonged fermentation [7]. Different types of herbs need to be evaluated and tested at more frequent intervals to evaluate the optimal fermentation time.

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