ABSTRACT

Kombucha is a fermented beverage that involves symbiosis of microbes, specifically acetic acid bacteria and yeast. Metabolites produced during fermentation have shown beneficial health effects, including antiproliferative properties toward colon cancer. However, unstandardized microbial composition during kombucha preparation leads to differences in chemical composition and health benefits. Considering these complexities, an experimental design of kombucha preparation with two specific culture condition, single bacteria *Komagataeibacter intermedius* and mix culture of *K. intermedius* and yeast *Dekkera bruxellensis*, was set up to study their impact on chemical composition and potential antiproliferative activity against HT-29 colon cancer cells compared to uninoculated tea. The mix culture-inoculated kombucha contained higher total acidity than *K. intermedius*-inoculated kombucha, resulting in a slightly lower pH. Both kombucha cultures revealed the highest phenolic and flavonoid content on day 12. The mix culture-inoculated kombucha showed the lowest phenolic and flavonoid content but presented the highest DPPH scavenging rate, indicating that metabolites produced might have a key role in exerting antioxidant activity in addition to their phenolic contents. Both kombucha cultures also demonstrated selective inhibition of HT-29 cell proliferation, although the amount of sugar content at higher concentration might contribute to the increased cell viability compared to the effect observed at lower concentration. Fermentation conditions should be improved so the microbes can optimally convert and consume all sugar contents, increasing the concentration of metabolites with antiproliferative activity. Therefore, *K. intermedius* and *D. bruxellensis* could be utilized for production of more standardized kombucha with potential antioxidative and antiproliferative activity on colon cancer cells.

Keywords: Kombucha; *Komagataeibacter intermedius*; *Dekkera bruxellensis*; antiproliferative activity; HT-29 colon cancer cells