CHAPTER 5 CONCLUSIONS

5.1 Conclusion

Adsorption of caffeine, polyphenols, and tannin using natural and chemically modified corn cobs as adsorbent were studied. Chemically modified corn cob was prepared by heating in 0.1 M NaOH at 50 °C for 4 h and it was ion-exchanged into Na^+ and Ca^{2+}forms. The chemical treatment increased hydrophilicity of corn cobs, resulting in higher affinity towards the adsorbates. The experiments were carried out with tea bag and without tea bag. The results of brewing without tea bag showed that modified corn cob incorporated with Na^+ and Ca^{2+} ions were able to adsorb more caffeine and polyphenols than unmodified corn cob was. The highest reduction percent was obtained at the beginning, after 1 minute because unoccupied adsorption sites were highly available. The adsorptions using tea bag showed the higher reduction percents because higher adsorbate concentrations in tea bag resulted in greater driving forces for adsorptions. Caffeine was undetected after 1 minute of brewing. The average reduction percent was constant after from the 3 to 10 minute. Tannin and polyphenols were detected since the first minute of adsorption and no change in theirs average reduction percents were observed. The adsorbents showed higher polyphenol adsorption capacity than those of caffeine and tannin.

5.2 Recommendations

1. Main component of a pulp tea bag is cellulose. The tea bag may be chemically modified by NaOH. The increase of hydrophilicity of tea bag can improve the adsorption ability. This might eliminate the use of adsorbent in the tea bag.

2. Important anti-oxidants such as catechin and epigallocatechin gallate in green tea solution after the adsorption should be analyzed.