CHAPTER VII
CONCLUSION

Sweet pepper (*Capsicum annuum*) is worldwide ingredient in many dishes, because of its unique taste, aroma and colors. Additionally, it also contains bioactive compounds and possesses health properties. In this study, four colored sweet peppers (green, red, orange and yellow) were analyzed the phytochemicals including flavonoids, phenolic acids, carotenoids and volatile compounds. Besides, freeze-dried sweet peppers were extracted in solvents with different polarities (hexane, ethyl acetate and 70% (v/v) aqueous ethanol). Then, anti-AD properties were determined regarding TPC, antioxidant activity and inhibitions of key enzymes relevant to AD occurrence (AChE, BChE and BACE1).

As results, yellow sweet pepper exhibited the highest quantity of quercetin and luteolin. As well, green and red sweet peppers contained the highest *p*-coumaric acid and ferulic acid contents, respectively. In addition, red and orange sweet peppers contained the highest total carotenoids. Red sweet pepper provided the highest levels of capsanthin, β-cryptoxanthin, *trans*-β-carotene and *cis*-β-carotene. Yellow sweet pepper contained the highest lutein content, while zeaxanthin and α-carotene were the highest in orange sweet pepper. For volatile compounds, many compounds were detected in sweet peppers with the highest quantity being found in green sweet pepper. The volatile compound that mainly found in sweet peppers and other peppers included 2-isobutyl-3-methoxypyrazine (especially in green sweet pepper), copaene, 1-dodecanol, benzophenone, hexadecane, heptadecane, *cis*-β-ocimene and alloaromadendrene.

According to the result of anti-AD properties, solvent extraction and colored fruit influenced on the inhibitory properties. Aqueous ethanol (70% v/v) was the efficient solvents for extraction and yielded the highest TPC, antioxidant activity and BChE inhibition in sweet peppers, followed by those with ethyl acetate and hexane, respectively. Therefore, phenolic compounds, antioxidants and anti-BChE

agents may be likely dissolved in polar solvent rather than in low polar solvent. In contrast, ethyl acetate and hexane extracts possessed higher AChE and BACE1 inhibitory activities than those extracted with 70% (v/v) aqueous ethanol. These results suggested that AChE and BACE1 inhibitors from sweet peppers might be likely dissolved in semi-polar and non-polar solvents. Under the results of TPC, antioxidant activity, anti-BChE activity and anti-BACE1 activity, green sweet pepper extracted with all three solvents showed the highest inhibitory activities. Nevertheless, TPC and antioxidant activity of hexane extracts were the highest in red and orange sweet peppers. It possessed high ability for inhibiting BACE1 activity, up to 90% inhibition at 30.56 g dry weight/L. In addition, among all three solvents, yellow sweet pepper was able to inhibit AChE activity in the highest level, up to 90% at 30.56 g dry weight/L.

The inhibitory activities of sweet peppers might be from the properties of flavonoids, phenolic acids, carotenoids, ascorbic acid and α-tocopherol, which were previously reported to possess the cholinesterase and BACE1 inhibitory activities. Interestingly, the flavonoids were previously reported to be able to cross BBB, which is useful for inhibit free radicals or enzymes regarding AD in the brain. As well, high anti-AChE and anti-BACE1 activities were detected in sweet peppers extracted with low polar solvent. Thus, anti-AChE and anti-BACE1 agents might contain hydrophobic moieties. Due to this property, these compounds were possibly capable of crossing BBB. Therefore, sweet pepper fruits might be potential natural products to prevent AD occurrences or promote healthy diet. Additionally, its bioactive compounds might be useful for developing nutraceuticals for AD treatment. This study will promote further studies on the anti-AD properties of sweet pepper. For example, the studies will be related to anti-AD properties, absorption, bioavailability or BBB transportation of sweet pepper extract or their bioactive compounds, detailed reaction and mechanism of enzyme-inhibitor complex or toxicological profile.