

Thesis	Effects of vacuum frying and pretreatment methods on the quality of banana chips
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ABSTRACT

The objectives of this study were to investigate the effect of frying temperature and time as well as pre-treatment methods on the physicochemical and sensory quality of banana chips prepared by vacuum frying and to compare the quality of banana chips prepared by vacuum and conventional frying. The sliced banana was fried under vacuum at (60 mmHg) temperature 90, 100 and 110 °C and for 10, 20 and 30 min. The banana chips obtained were analyzed for moisture content, oil content, color parameters; L*, a*, b* and ΔE^* values and sensory test by 7 – point Hedonic scale method. Increasing of frying temperature resulted in the reduction of moisture content and L* values and the increase of oil content, b* and ΔE^* values of the banana chips ($p \leq 0.05$) However, only a* values and oil content of the banana chips increased when the frying time was increased from 10 to 30 min ($p \leq 0.05$). According to the sensory evaluation and physicochemical quality, it could be concluded that frying temperature at 110 °C for 10 min was the suitable condition for the vacuum frying of banana chips. In addition, banana chips prepared by vacuum frying under the suitable condition exhibited higher content of total polyphenol, DPPH scavenging activity vitamin C and carotene content but lower ΔE^* value when compared to the samples prepared by conventional frying (150 °C, 10 min).

Effect of pre-treatment of banana slices by dipping in different antibrowning solutions; cysteine, calcium chloride or ascorbic acid before vacuum frying was investigated. It was found that dipping of banana slices in cysteine solution resulted in banana chips with significantly higher lightness (L^*) and lower color difference value (ΔE^*) compared to those dipping in the ascorbic acid solution ($p \leq 0.05$), while no significant difference when compared to the sample dipping in calcium chloride solution. The banana chip samples obtained when treated with cysteine or ascorbic acid solution before vacuum frying showed the highest total phenolic content. However, sensory quality revealed that sample obtained when the cysteine solution was used as antibrowning agent exhibited the off odor and taste. Thus, ascorbic acid solution was suitable antibrowning agent for the pre-treatment of the banana slices before vacuum frying.

Moreover, coating of the banana slices before vacuum frying by dipping in the solution of CMC, guar gum or pectin to reduce the oil absorption showed that coating of banana slices by guar gum and CMC could reduce the oil content by 9.45 and 5.89 %, respectively, compared to the control sample. On the other hand, coating with pectin had no effect in the reduction of oil absorption of banana chips. Coating of banana slices by CMC and guar gum showed no difference in the sensory quality; therefore, the guar gum was selected as the suitable agent to reduce oil absorption of banana chips. In addition, freezing of banana slices before vacuum frying resulted in banana chips with 1.45 times lower in hardness compared to the control samples. The result from sensory evaluation also confirmed that, banana chips prepared from the frozen banana slices had better texture quality compared to the control sample.