SUMMARY

Tea is globally one of the most popular and lowest cost beverages, next only to water. Nowadays, tea powder is being developed because it has many advantages such as more practical, simple transport economics, and simply to prolong product’s shelf-life. There are several method to produce tea powder, one of them is spray drying method. The objectives of this research are to investigate the effect of solid concentration in feeds and inlet air temperatures of spray dryer on physical and chemical properties of green tea powder.

In the preliminary research, chemical composition of raw materials involved moisture content, total polyphenols, antioxidant activity, caffeine, and catechin content were determined. In experiment I, production of concentrated green tea was made from extract green tea and increase its concentration with ice cream maker. In experiment II, production of green tea powder with JMC-minilab spray dryer. The resulted green tea powder were then analyzed for its physical properties (such as bulk density, color, solubility, and hygroscopicity) and chemical properties (such as moisture content, total polyphenol content, antioxidant activity catechins, and caffeine contain).

Results showed that dried green tea (Camellia sinensis var. Oolong No 12) contains moisture content 6.05 ± 0.06% w/w wb, total polyphenol 14.98 ± 0.42% db, antioxidant activity 141.5 ± 6.88 mmol Trolox/100 g db, caffeine 2.77 ± 0.23 g/100 g db, and catechin 12.04 ± 1.20 g/100 g db. There is a linear relationship between °brix from refractometer and total solid of oven method with regression $y = 0.842x + 0.142$, $R^2 = 0.997$. Limited concentration of concentrated tea with ice cream maker machine until 11% total solid. Concentrated tea more than 11% total solid, it will deposit at the wall machine and decreased percentage of freeze concentration recovery. Therefore, parameter solid concentration in feed that used were 3, 6, and 9%.

The quality of product especially chemical quality is greatly influenced by production method. The effect of green tea powder production method such as extraction, freeze concentration, and spray drying on its chemical properties such as total polyphenols content, catechins, caffeine, and antioxidant activity have been studied. Amount of total polyphenols, catechins, caffeine, and antioxidant activity of sample decreases significantly (p<0.05) after it was treated by different process such as extraction, concentration, and spray drying. Base on the results, the powder with treatment solid concentration 3% in feed and inlet temperature 220°C has the highest chemical yield and powder with treatment total solid concentration 9% in feed and 180°C has the lowest one.

The different solid concentration 3, 6, 9% in feed and inlet air temperatures of 180, 200, and 220°C affected physical and chemical properties of green tea powder. An increase inlet air temperature, resulted in a significant decrease (p<0.05) in bulk density, hygroscopicity, total polyphenolns and antioxidant activity. An increase of solid concentration in feed gave an increase in tea powder solubility, L, a, b value, and antioxidant activity. However, the total polyphenols contents were not affected by the increase of solid concentration.

The physical results of green tea powder are bulk density of the powder varied between 0.3933-0.5014 g/mL, L value varied between 68.07-74.41, a value varied between 3.50-5.79, b value varied between 30.08-37.37, solubility varied between 75.56-91.17%db, hygroscopicity 8.84-17.84%. The chemical results of green tea powder are moisture content varied between 2.33-