ABSTRACT

YANE REGIYANA. Relationship of Sensory Profile and Physicochemical Properties of Indonesian Sweet Soy Sauces. Under supervision of DEDE ROBIATUL ADAWIYAH and BUDI NURTAMA.

Soy sauce is one of the most popular fermentation products and largely consumed in Asia. Its popularity has reached Europe. Soy sauce in Indonesia can be classified into salt soy sauce and sweet soy sauce. Sweet soy sauce is used daily as a flavor enhancer in Indonesia. The unique flavor and taste of sweet soy sauce makes it widely accepted as one of the seasonings in Indonesian culinary culture.

As a popular and most preferred product in Indonesia most of sauce based on Indonesian consumer’s acceptance. Although many variants of sweet soy sauces are available in the market, there is a limited publication regarding the sensory profile describing the characters of sweet soy sauces. Therefore it is necessary to study the relationship between the sensory profiles and physicochemical properties of commercial soy sauce. The sensory attributes of sweet soy sauce consist of color, flavor, taste, and consistency or viscosity. These attributes are affected by many factors such as the raw material, the production process, and the chemical substance of the sweet soy sauce. Physicochemical properties that influenced by ingredients and process will interact with human sense and form consumer preference or acceptance. Based on that ground, physicochemical properties of soy sauce need to be investigated in accordance to sensory profile and consumer acceptance. The purpose of this study was to study the relationships between consumer preference, sensory profile, and physicochemical properties of Indonesian commercial sweet soy sauce.

The study consists of 4 stages: 1) descriptive analysis of soy sauce, including recruitment and selection of panelists, training attribute development and determination phase; 2) Consumer preferences analysis; 3) Physicochemical analysis including viscosity, pH, a_w, color, moisture content, ash content, salinity, sugar content, nitrogen content, and the levels of MSG (Mono Sodium Glutamate); 4) Correlation of relationship between sensory profiles, preferences, and physicochemical properties of Indonesian commercial soy sauce.

Sweet soy sauces used in this study were 13 brands of Indonesian commercial sweet soy sauce. Descriptive sensory analysis was conducted with Focus Group Discussion and QDA® (Quantitative Descriptive Analysis) of 12 trained assessors. The result were five sensory attributes of soy sauce, sweet, salty, sour, savory, and bitter and also seven flavor attributes, coconut sugar, palm sugar, sour, moromi, caramel, smoky, and pekak flavor (star anise flavor).

Result of PCA (Principal Component analysis) for QDA data of taste attributes showed that 31% of the sample population had unique sweet characteristics, 31% of the sample population had sweet and savory characteristics, 23% of the sample population had salty and sour characteristics, and 16% of the sample population had bitter characteristics. Whereas aroma attributes of sweet soy sauce samples showed that 31% of the sample population had palm and caramel aroma, 15% of the sample
population had aroma pekak, 8% of the sample population had palm sugar aroma, and 31% of the sample population had sour and smoke aroma.

The consumer preference test was conducted with hedonic rating (Balanced Incomplete Block Design) presentation technique was carried out directly to the sauce without other foods. The result showed that there was a statistical significance in the 13 tested samples. The Duncan post-hoc comparison means showed that the M-coded and L-coded samples were the highest preference score group.

Consumer preference mapping for the taste attributes suggested that consumers preferred the sweet and savory tastes but tend to dislike the sour and bitter tastes. Whereas the mapping for aroma attributes showed that consumers preferred the caramel and palm sugar aromas.

The results of physical properties (viscosity, degree of Brix, color, and water activity) and chemical properties (water content, ash content, sugar content, nitrogen content, and MSG content) showed significant differences in the thirteen types of samples sweet soy sauces. In general, physicochemical analysis showed that samples with high moisture content had lower viscosity which, in turn, could affect the consistency of products. The presence of organic acids in sweet soy sauces tends to lower the pH value of the product and might to cause the sour taste. Sweet soy sauces with high salt level tends to have high levels of total nitrogen and affect the salty and savory flavor of the products.

The biplot graphics displayed of Principal Component Analysis for physical properties of the samples showed that 15% of the sample population had specific characters of viscosity, color (lightness) and degrees of Brix; 54% of the sample population had a specific character of the water activity; and 31% of samples population did not show specific physical properties. From the chemical properties 31% of the sample population had a specific character of the ash content and salinity; 8% of the sample population had a specific character to the parameters of moisture and total nitrogen; 8% of the sample population had a specific character of the parameter pH and total sugar; and 38% of the sample population did not indicate any specific attributes of the chemical properties.

In general, sensory attributes highly correlated with physicochemical characteristics. A fairly strong correlation was found between the pH and acid taste; salty taste and salt content; and sweet taste and the total sugar. Savory taste had no correlation with the levels of MSG, but fairly strong positive correlation with total sugar and sufficiently strong negative correlation with salinity.

Keywords: sweet soy sauce, descriptive analysis, preference mapping, physicochemical characteristics, PCA