Organoleptic and Hedonic Tests On *Soft Candy Formulations* From Essential Oil Active Ingredients Fennel Seeds (*Foeniculum Vulgare*)

Ag. Kirwanto[1*] , Susilo Y [2] , Ronal T [3]
[1,2,3] Department of Herbal Medicine, Ministry of Health Polytechnic of Surakarta, Indonesia
E-mail: aguskirjamu@gmail.com

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Abstract: *One of the plants in Indonesia that is beneficial for health is fennel (Foeniculum vulgare). Fennel has long been known as a component of traditional medicine. The plant has been commercially cultivated for its oil. Fennel oil is known to have a strong effect on the digestive system as an appetite stimulant, increasing gastric secretion and bile content, having a carminative effect, and as an expectorant. All levels of society of all ages are very fond of candy. One type of candy that is widely circulated today is soft candy . Making soft candy from the active ingredient of fennel seed essential oil can be useful for overcoming health problems in a more practical and economical way. The purpose of this study was to determine the results of organoleptic and hedonic tests on the formulation of soft candy from the active ingredient of fennel seed essential oil (Foeniculum vulgare). The research method used was observational with a descriptive research design. The population used were students living in the Midwifery Department Dormitory of the Ministry of Health Polytechnic of Surakarta. The sampling technique was simple random sampling with a sample of 55 students. The research instrument used was a questionnaire. The ready-to-eat soft candy formula has a chewy texture, pale orange color, orange aroma, and sweet taste with a distinctive fennel seed flavor. Most respondents disliked it.*

INTRODUCTION

One of the plants in Indonesia that is beneficial for health is fennel (*Foeniculum vulgare*). Fennel or spicy fennel (*Foeniculum vulgare* Miller, fennel family or *Apiaceae*) has long been known as one of the components of traditional medicine (http://id.wikipedia.org/wiki/Adas , accessed on March 13, 2014 at 1:40:07 PM WIB). Fennel grows in highland areas with an altitude of 1,800 m above sea level with a cool climate. This plant has been cultivated commercially for its oil. Fennel oil is known to have a strong effect on the digestive system as an appetite stimulant. In addition, it can increase gastric secretions, bile content, and has a carminative effect. In addition, fennel oil is known to contain 1,8 cineole which is also effective as an expectorant. The main content of the oil is anethole with a

concentration of 60-70%. Fennel oil is known as *fennel oil* . Other compounds contained in fennel oil are fenchon, pinen, felandren kamfreza, and fatty oil (Yuliani and Satuhu, 2012).

Candy (*boiled sweet*) is a popular food product. Candy can be made from a mixture of sucrose and glucose syrup in a specific ratio and cooked at high temperatures. One type of candy widely available today is *soft candy* . *Soft candy* is a soft-textured confectionery processed with the addition of hydrocolloid components such as agar, gum, pectin, starch, carrageenan, gelatin, and others (Lukas, 2011).

THEORETICAL BASIS

Fennel has a fragrant aroma, green leaves, and yellow flowers. Fennel grows well at an altitude of 1,800 meters above sea level and with 2,500 mm of annual rainfall, in cool, sunny conditions. This plant contains 0.3–6 % essential oil.

Fennel essential oil can be isolated by water distillation, steam distillation, or steam and water distillation. The essential oil obtained from fennel plants can be used to make *soft candy* .

Soft candy is a soft-textured confectionery processed by adding hydrocolloid components such as agar, gum, pectin, starch, carrageenan, gelatin, and others. This type of candy is popular among the public because it has several benefits, namely relieving coughs, stimulating appetite, increasing gastric secretions, bile content, and has a carminative effect. It can also be consumed practically. One of the distinctive organoleptic properties of this candy is its fresh aroma due to its main ingredient being essential oils. *Soft candy* must first be tested for quality standards before consumption. The quality standard that will be tested is its water content. After that, *soft candy* , one of the properties of which is an expectorant, can be consumed well because it is prepared orally, so it can work directly in the body through the digestive organs.

RESEARCH METHODS

This type of research is quantitative research because it presents the results of research data that has been obtained in the form of data analysis figures (Sugiyono, 2012).

In terms of the research objectives to be achieved, this study uses an observational research method. Observational research methods are research conducted using planned procedures, including observing, listening, and recording a certain number and level of activities related to the problem being studied (Notoatmodjo, 2012).

RESULTS AND DISCUSSION

1. Isolation of Fennel Seed Essential Oil

Isolation of fennel seed essential oil was performed using water distillation. 500 grams of fennel seeds were distilled for approximately 4 hours. The essential oil from the distillation was added with anhydrous Na_2SO_4 at a dose of 2-5% into the Erlenmeyer flask to absorb the distilled water still contained in the essential oil . The yield of fennel seed essential oil obtained was 4.68 ml .

2. Yield of Fennel Seed Essential Oil

The oil yield obtained during the distillation process is expressed as a percentage and is the ratio of the amount of oil produced divided by the initial amount before processing.

Table 1. Results of measuring the yield of fennel seed essential oil

Sample	Measurement		
	Sample Weight (g)	Volume (ml)	Yield (% v/b)
Fennel seed (*Foeniculum vulgare*)	500 g	4.68 ml	0.94% v/b

3. *Soft Candy* Formulation

Determining the amount of ingredients for making *soft candy* was done through *trial and error. Researchers created three soft candy* formulations with different ingredient concentrations to find the right formula.

Table 2. *Soft candy* formula I

Material	Ingredients Composition
Sorbitol	70 grams
Maltodextrin	10 grams
Gelatin	13 grams
Fennel seed essential oil	7 drops
Orange flavor	1 drop
Water	5 ml

The result of the first formula was a texture that dissolved too easily, a taste that was too sweet , and the ingredients did not adhere well to each other.

Table 3. *Soft candy* formula II

Material	Ingredients Composition
Sorbitol	55 grams
Maltodextrin	10 grams
Gelatin	15 grams
GOM ARAB	1 gram
Tapioca flour	14 grams
Fennel seed essential oil	5 drops
Orange flavor	1 drop
Water	7 ml

The result of the second formula is a texture that is too hard and the taste is not sweet enough .

Table 4. *Soft candy* formula III

Material	Ingredients Composition
Sorbitol	62 grams
Maltodextrin	7 grams
Gelatin	15 grams
GOM ARAB	0.4 grams
Tapioca flour	10 grams
Fennel seed essential oil	6 drops
Orange flavor	2 drops
Water	5 ml

The result of the third formula is a chewy texture with just enough sweetness . *soft candy* formulation above, the third formula is the most appropriate result in terms of texture, color, smell, and taste.

4. Test the Water Content of *Soft Candy*

The water content of *soft candy* was tested using the AOAC oven method (1995). A sample of 3 grams is put into a cup of known weight. Then the cup is placed in the oven until a constant weight is obtained. The water content in *soft candy* is 13.3 % .

5. Organoleptic Test of *Soft Candy*

Organoleptic tests include observing the texture, color, smell and taste of *soft candy* using the five senses.

Table 5. Organoleptic test results on *soft candy*

Formula	Organoleptic			
	Texture	Color	Smell	Flavor
Soft Candy	Springy	Pale orange	Orange Aroma	Sweet and has the taste of fennel seeds

6. Hedonic Test of *Soft Candy*

The hedonic test is carried out by analyzing preferences (texture, color, smell, taste parameters) for 5 respondents .

Table 6. Results of the hedonic (preference) test on *soft candy*

Formulation	Parameter	Numerical Scale			
		0 (Like)		1 (Do not like)	
		Amount	Percentage	Amount	Percentage
Soft Candy	Texture	30	55%	25	45%
	Color	22	40%	33	60%
	Smell	34	62%	21	38%
	Flavor	22	40%	33	60%

Based on the table of hedonic test results on *soft candy* , scale 0 is the assessment of respondents who do not like the texture, color, smell, and taste, while scale 1 is the assessment of respondents who like the texture, color, smell, and taste. A total of 30 respondents do not like the texture and 25 respondents like it, 22 respondents do not like the color and 33 respondents like it, 34 respondents do not like the smell of *soft candy* and 21 respondents like it, 22 respondents do not like the taste and 33 respondents like it.

CONCLUSION

soft candy formulation from the active ingredient of fennel seed essential oil is made with a composition of 62 grams of sorbitol, 7 grams of maltodextrin, 15 grams of gellatin, 0.4 grams of GOM, 10 grams of tapioca flour, 6 drops of fennel seed essential oil, 2 drops of orange flavor, and 5 ml of water. The water content of *soft candy* is 13.3%. The results of the organoleptic test on this *soft candy* are its chewy texture, pale orange color, orange aroma, and sweet taste with a distinctive taste of fennel seeds. The hedonic assessment carried out by respondents showed that most did not like the aroma and texture *of the soft candy* , while for the taste and color more people liked it. Respondents who did not like the aroma were 62% and those who did not like the texture of *the soft candy* were 55%, while for the taste and color *of the soft candy* , there were 60% of respondents who liked it.

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