



Evaluation of Color, Hardness, and Tannin Content in Soft Cheese, Suspesi Using Biduri Leaf Juice Level

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ABSTRACT

Suspesi is a soft cheese with the addition of biduri leaf juice and functions as a coagulant. There have been no researches examining the color value, hardness, and content of tannins in soft cheese suspesi. The research purpose was to analyze and evaluate difference the hardness, color value of (L^* , a^* , and b^*) and tannin content of soft cheese suspesi with the addition of biduri leaf juice level 3% and 5%. This research used a completely randomized design with two treatments with six replications. A1= Biduri leaf juice level 3% (v/v), A2= Biduri leaf juice level 5% (v/v). Data on hardness, color value, and tannin content were analyzed by Independent T-Test. The results showed that the use of biduri leaf juice level were significantly different ($P < 0.05$) on the hardness, color value of L^* , and tannin content of the soft cheese suspesi. The color value of a^* and b^* did not show a significant difference ($P > 0.05$) in the soft cheese suspesi. The addition of different levels of biduri leaf juice gave differences in hardness, color value of (L^* , a^* , b^*), and tannin content different of the soft cheese suspesi. The characteristics of the soft cheese suspesi showed an increase in hardness, color value of (L^* , a^* and b^*) and tannin content as with increasing addition of biduri leaf juice.

Keywords: biduri leaf juice, color, hardness, soft cheese suspesi, tannins

INTRODUCTION

Suspesi is a dairy product similar to soft cheese, and is obtained from the coagulation of milk protein with the use of biduri leaf juice. According to [1] Suspesi is a local dairy product from the Soepeople, Timur Tengah Selatan District, East Nusa Tenggara. The product is made from cow milks with the addition of biduri leaf juice and goes through a heating process. Biduri leaf juice contains *alkaloids, tannins, saponin, flavonoids, and glycosides* [2] and where tannins as protein coagulation agents [3].

Currently, no research has been found on soft cheeses using coagulant from the biduri leaf plant (*Calotropis gigantea*) which analyzes the hardness, color, and tannin content of the

final product. Several research have was used latex coagulant from the biduri plant [4]–[6]. In addition, another research was used *Calotropic procera* leaves [7], [8].

Other research have developed the use of coagulant from plants as an alternative material in the manufacture of cheese, such as cheese making using coagulants from spinach leaf extract[9], *Moringa oleifera*[10], also from papaya latex [11], [12], [13], papaya leaf [14]; and passion fruit juice [15]. The use of green vegetables that contains *flavonoids*, *coumarins*, *tannins*, and *phenolic* compounds and plays a role in health[16]. Therefore, the aim of the research was to analyze and evaluate difference the hardness, color value (L^* , a^* and b^*) and the tannin content of soft cheese suspesi with the use of biduri leaf juice at the level of 3% and 5%.

MATERIALS AND METHODS

Soft cheese suspesi, was made at the Laboratory of Animal Products Technology, Universitas Nusa Cendana, Kupang. The hardness test was analyzed at the Agricultural Product Technology Laboratory of the Kupang State of Agricultural Polytechnic. The Color value test (L^* , a^* and b^*) were analyzed at the Laboratory of Animal Products Technology, Faculty of Animal Science, Hasanuddin University, Makassar. The tannin content analysis was carried out at the Laboratory of Feed Chemistry, Faculty of Animal Science, Hasanuddin University, Makassar. The research was designed in a completely randomized design (CRD) with two treatments and six replications. A1=Biduri leaf juice level 3% (v/v), A2= Biduri leaf juice level 5% (v/v).

The tools used in this research were 250 ml beaker glasses, measuring cups, stem thermometers -10-110°C, filters, color meter [Color Meter TES 135A], texture analyzer [Brookfield CT3 4500], oven [memmert], Spectrophotometer [Thermo Scientific Genesys 20]. The materials used in this research were milk from Misi farm, Mandeu Village, Belu Regency, East Nusa Tenggara, and biduri leaf juice.

Biduri Leaf Juice

The biduri leaves were washed. The biduri leaves were withered at 40°C for 5 minutes [Memmert oven] and then were ground with a mortar. The crushed biduri leaves then were squeezed to get the juice from the biduri leaf.

Soft Cheese Suspesi Manufacturing

The manufacture of soft cheese suspesi was carried out by a series processed as follows: pasteurization, temperature reduction, the addition of biduri leaf juice, and separation of curd and whey. The Flow chart for the process of making soft cheese suspesi can be seen in Figure 1.

Measurement of Hardness, Color value of (L*, a*, and b*) and Tannin Content

Measurement of hardness in soft cheese suspesi was using texture analyzer [Brookfield CT3 4500]. Color L*, a*, b* using color meter [Color Meter TES 135A], Before use, calibration is carried out on a white standard (calibration color L=94.76, a=-0.795, and b=2.200) [17]. The color indicator value of L* represents black (0)-white (100). The color indicator value of a* represents red (+)-green (-). The color indicator value of b* represents yellow (+)-blue (-) [9]. The content of tannins using the UV Vis Spectrophotometry method [3].

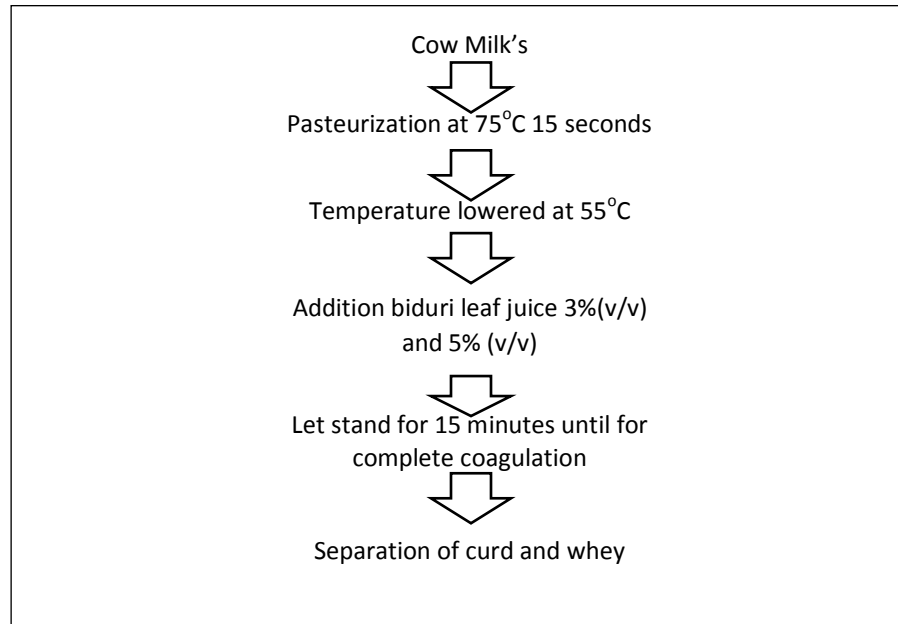


Figure 1. Flowchart of the process of making soft cheese suspesi

Data Analysis

Data on hardness, color L*, a*, b*, and tannin content were analyzed by Independent T-Test. The Statistical analysis was processed by SPSS (Version 16.0) Software.

RESULTS AND DISCUSSIONS

Influence Biduri Leaf Juice on the Hardness

The hardness of the soft cheese suspesi was $16.67g \pm 1.54$ - $33.75g \pm 1.70$ (Table 1). These results indicated that the level of addition of biduri leaf juice at 5% has a higher hardness ($33.75g \pm 1.70$) compared to the level of addition of biduri leaf juice at 3% ($16.67g \pm 1.54$). The results of statistical analysis showed a significant difference ($P < 0.05$) in the hardness of soft cheese suspesi. This shows that the hardness of the soft cheese suspesi was influenced by the level of addition of biduri leaf juice. This was influenced by the higher the level of biduri leaf juice, the more curd that is formed so that it influences the chemical components contained in the soft

cheese suspesi which will have an impact on the hardness of the resulting cheese[18], The level of hardness was strongly influenced by the level of papaya latex given. According to Rashidi and Razapi [19], the hardness is strongly influenced by the fat content in milk, where low-fat cheese has a higher hardness level than full-fat one.

Furthermore, the hardness is strongly influenced by the level of passion fruit used as a coagulant and there is no difference in the hardness of the cheese before ripening and an increase in hardness along with the ripened time[20].The cheese obtained is still lower than the cheese produced by Rashidi and Razapi [19], Cheese containing Low-Fat (LF) has a hardness value of 1838 g, Optimized Low-Fat cheese (OLF) 944 g, and Full-Fat cheese (FF) 973 g. It can be concluded that the level of cheese hardness increases in line with the level of addition of biduri leaf juice.

Influence BiduriLeaf Juice on Color Value of(L*,a* and b*)

The color of the soft cheese suspesi Color value of L* were 76.607 ± 2.58 - 82.952 ± 1.76 . The color value of a* were 15.310 ± 2.77 - 18.716 ± 3.64 and the color value of b* were 28.365 ± 8.53 - 29.944 ± 2.14 (Table 1). The results of statistical analysis was showed a significant difference ($P < 0.05$) to color value of L* in the resulting soft cheese suspesi but did not show a significant difference ($P > 0.05$) to Color value of a* and color value of b* of the soft cheese suspesi.

The color value of L* showed that the cheese with the addition of 3% biduri leaf juice has a color that was closed to white compared to the cheese with the added biduri leaf juice at the 5% level. The color value of a* was an indicator of green and red color assessment, it can be seen that cheese with 5% biduri leaf juice has a higher color value than the soft cheese suspesi added biduri leaf juice at 3% level. The color value of b* of the soft cheese suspesi was added with biduri leaf juice at a level of 5% had a higher *b color level than the soft cheese suspesi was added with 3% biduri leaf juice. Although visually, the soft cheese suspesi at the level of addition of 3% biduri leaf juice showed a fairly green color, and the soft cheese suspesi with the addition level of 5% biduri leaf juice showed a green color, and it can be seen that the color level of the soft cheese suspesi added with biduri leaf juice at a level of 5% had a higher green color level than the soft cheese suspesi added with biduri leaf juice at the 3% level (Figure 2).This is in line with the opinion[9], which suggested the color of the cheese with the addition of green spinach powder and an increase in green color in line with the level of added spinach powder. Color value of L* cheese with added spinach powder were 51.85-68.33, the color value of a* were value (-1.89) - (-2.68), the color value of b* were 14.09-19.45.

Influence of Biduri Leaf Juice Level on the Tannin Content

The tannin content was $0.25\% \pm 0.04$ - $0.33\% \pm 0.04$ (Table 1).The results of statistical analysis showed a significant difference ($P < 0.05$) in the tannin content contained in the soft cheese suspesi. It can be seen that the increase in the tannin content in the soft cheese suspesiwas in line with the level of added biduri leaf juice.[3], that in biduri leaf juice contains tannins, where at a concentration of 100 ppm there was tannin 1.16 $\mu\text{g}/\text{mL}$, a concentration of 200 has a tannin content of 3.53 $\mu\text{g}/\text{mL}$ and a concentration of 300 ppm has a tannin content of

7.12 µg/mL. This shows that the tannin content at the 5% level is higher than the 3% level biduri leaf juice.

Table 1. Average ± Standard Deviation of Soft Cheese Suspesi with the addition of 3% and 5% Biduri Leaf Juice for hardness, color value of (L*, a* and b*) and tannin content

Parameter	A1	A2	Mean Difference	SE Difference	p-Value
Hardness (g)	16.67±1.54 ^a	33.75±1.70 ^b	-17.08	0.93	0.000
Color					
L*	82.952±1.76 ^a	76.607±2.58 ^b	+6.35	1.27	0.001
a*	15.310±2.77 ^a	18.716±3.64 ^a	-3.41	1.87	0.098
b*	28.365±8.53 ^a	29.944±2.14 ^a	-1.58	3.59	0.669
Tannin (%)	0.25±0.04 ^a	0.33±0.04 ^b	-0.08	0.02	0.007

Information: A1: Addition of 3% biduri leaf juice, A2: Addition of 5% biduri leaf juice, SE= standard error

^{a,b}different superscript values in the same row showed significant differences (P<0.05)

Color Indicator*L black (0) - white (100): *a red (+) - green (-); *b yellow (+) - blue (-)

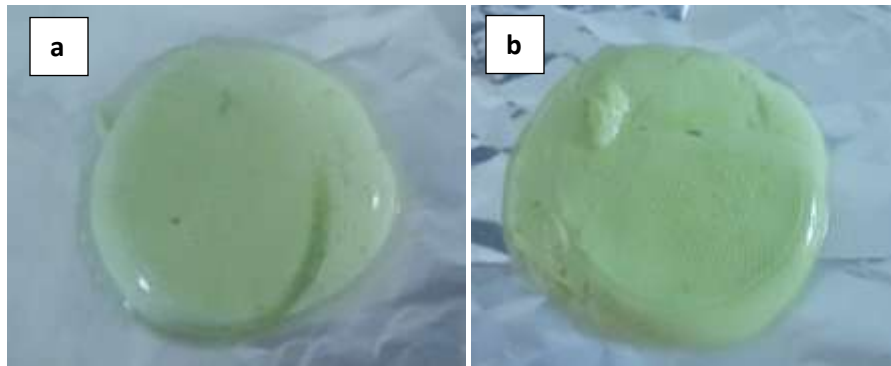


Figure 2. Soft cheese suspesi (a. soft cheese suspesi with the addition of biduri leaf juice level 3%, b. soft cheese suspesi with the addition of biduri leaf juice level 5%)

CONCLUSIONS

The level of added biduri leaf juice gave a difference in the level of hardness, color value of L*, a*, b*, and tannin content in the soft cheese suspesi. The characteristics of the soft cheese suspesi increased in terms of hardness, color value of L*, a*and b*, and tannin content in line with the level of added biduri leaf juice.

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