Sensory Evaluation of Appearance and Texture of Carrot Lip Balms Containing Virgin Coconut Oil

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Sensory Evaluation of Appearance and Texture of Carrot Lip Balms Containing Virgin Coconut Oil

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Abstract. Virgin coconut oil, VCO is rich with lauric acid, which acts as antimicrobial and antioxidant properties towards the skin. Meanwhile, a carrot is rich with vitamin A, C and E that help in nourishing and healing the skin. Studies on the combination of these two ingredients in lip balm formulation are minimal even though the beneficial effects of the VCO and carrot are well known. Thus, the main objective of this study is to use the sensory analysis as a tool to evaluate the attributes in term of appearance and texture of the developed lip balm product. The lip balm was formulated using natural ingredients such as beeswax, VCO, natural preservative and essential oils. One hundred volunteers evaluated the samples for smoothness, colour, odour, spreadability and overall acceptance. The stick formulation showed organoleptic properties with light orange colour, rose odour and uniform appearance. This sensory evaluation test used a hedonic scale from rank 1 to 5 (1-extremely dislike, 2-moderately dislike, 3-neither like or dislike, 4-moderately like, 5-extremely like). In this study, panellists tended to vote more on formulation with a high concentration of carrot. The formulated lip balm has acceptable characteristics in term of texture, especially in smoothness, colour, odour and spreadability. Overall, the panellists were satisfied with the product and agreed that the product has the potential to be marketed.

1. Introduction

The Virgin Coconut Oil (VCO) is extracted from fresh coconut oil which undergoes medium heat at a temperature of 60°C without any chemical addition. The VCO is enriched with lauric acid and monolaurin, as well as high of antioxidant activity and phenolic content than the usual coconut oil [1]. In a study conducted by Lieberman et al. [2], the monolaurin is proven to be effective in against the Staphylococcus aureus when combining with Origanum essential oil. In this study, the VCO is used to extract the beta-carotene that is affective in against oxygen, slow down the process of oxidation, and also implemented widely in food application [3].

In carrot, vitamin A was found contain 8353 international units in a small cut of raw carrot [4]. Carrot oil is the oil that has been extracted from the carrot using any oil as a solvent medium. In the conventional extraction method, the solvent that usually being used to extract carrot oil is vegetable oils. The carrot oil usually yellow or pale orange-brown in appearance. The benefits of carrot oil are it rich with lutein zeaxanthin riboflavin, niacin, pathetic acid, foliate, and vitamins of B6, K, C, A, and E that will be nourishing and healing our skin [5]. Moreover, it also contains many active constituents

such as α-tocopherol, polyacetylenes, phenolics and carotenoids that act as antioxidants and give benefits to the body [6]. On the other hand, the oils are beneficial in against the microbial and fungus, for instance, gram-positive bacteria strains such a Bacillus subtilis, and Staphylococcus aureus [7].

It is promising that the synergy of benefits in carrot and VCO will improve the quality of lip balm, especially as layer protection when applying to lips. The quality of the developed lip balm can be measured by conducting a sensory evaluation. Therefore, this study aims to carry out the sensory analysis entails the understanding of the acceptability of a combination of carrot and VCO lip balm product based on texture and appearance. This sensory evaluation data is crucial and may be used as the basis for the decision-making of lip balm product development.

2. Materials and Methods

2.1 Plant Material.

Carrot sample was purchased from a local market located at Kota Bharu, Kelantan Malaysia, in May 2019. Carrot sample was washed under running tap water to remove all residues and impurities. The clean sample was dried using cloth paper for further use.

2.2 Infused oil preparation.

The carrot skin was peeled off using potato peeler before it was grated into small pieces for extraction purpose. The extraction of carrot was carried out by using a hot maceration process using a conventional heating method. The carrot was mixed with the VCO and heated for 2 minutes at a temperature of 40°C until the VCO liquid became light orange. The mixture of VCO and grated carrot was strained by using a muslin cloth to separate the grated of carrot from the infused oil. Then, the carrot infused oil (as shown in Figure 1) was ready to be used in the lip balm formulation.

2.3 Lip balm formulation.

In this study, the infused oils of carrot were prepared in three different ratios which are 35:65, 38:62 and 43:57 (ratio of VCO to carrot). The ratio of beeswax to infused oil was constant at 1:2 of beeswax to infused oil. The beeswax was heated using the double boiling method on a hotplate until the beeswax was completely melted. After the beeswax melted, the infused oil was added into the beeswax and heated at 60°C. This mixture was continuously stirred to ensure there was no solid form in the mix. Two drops of essential oil were added to each formulation to give a delightful odour to the lip balm. Then, the heat was removed before the mixture was poured into a lip balm container. In this study, 20 g of lip balm formulations were prepared for each ratio of VCO to the carrot. The mixture was left about 15 minutes to cool and harden at room temperature for further evaluation. The formulated lip balms in this study were labelled as X, Y, Z according to the ratios, as stated in Table 1.

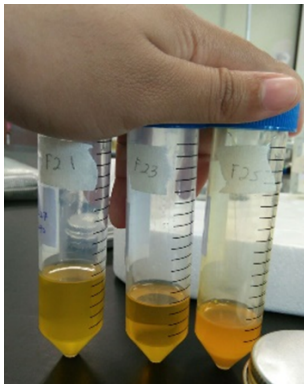

Figure 1. Infused oil from carro

Table 1. Formulation of lip balm

Formulated lip balm	Ratio of VCO: Carrot	Ratio of beeswax: Infused oil
X	35: 65	
Y	38: 62	1:2
Z	43:57	

2.4 Sensory Evaluation.

The sensory evaluation test was done to one hundred respondents to evaluate their acceptance about the formulated lip balm. Three formulated lip balms containing a different composition of carrot, VCO and beeswax were used in the test. Those 100 untrained panels ranked those three lip balm samples using 5-hedonic scales which 5 indicated as like extremely while 1 mentioned as dislike extremely as stated by Yusof et al. [8]. The respondents were asked based on smoothness, colour, odour, spreadability and overall acceptance for each lip balm sample. The sensory evaluation session was done in Food Laboratory located at Universiti Malaysia Kelantan Jeli Campus. The results were then interpreted using IBM SPSS software Version 21.

3. Result and Discussion

The sensory evaluation of the formulated carrot lip balm was assessed using the One Way ANOVA Test. The result from this statistical analysis showed that the X formulation obtained the highest mean (4.14) compared to the Y and Z formulations. The lowest mean in this analysis is Z which the less favourable by the respondent. The significant value in this data is 0.915, which is high than the P-value (>0.05). This result shows weak evidence against the null hypothesis. The results from Table 2 show that the X, Y and Z formulations exhibit no significance different since the three formulations are in the same subset. This result strongly displays that the three formulations of lip balm are averagely like by the respondents.

Table 2. Results of means between X, Y and Z in homogenous subsets

Formulation of lip balm	N	Subset for alpha = 0.01
		1
X	100	4.10
Y	100	4.12
Z	100	4.14
Significance different		0.915

Means for groups in homogeneous subsets are displayed.
Uses Harmonic Mean Sample Size = 100.000.

Table 3. Analysis of Post-Hoc Test on Formulation of Lip Balm

(I) formulation of lip balm	(J) formulation of lip balm	Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
X	Y	0.02	0.1	0.978	-0.27	0.31
	Z	-0.02	0.1	0.978	-0.31	0.27
Y	X	-0.02	0.1	0.978	-0.31	0.27
	Z	-0.04	0.1	0.915	-0.33	0.25
Z	X	0.02	0.1	0.978	-0.27	0.31
	Y	0.04	0.1	0.915	-0.25	0.33

However, the X formulation was more favourite by the respondent with the mean value of 4.14, while the least favourable was Z formulation as presented in Figure 2. X formulation contained the lowest amount of VCO, while the Z formulation consisted of the highest amount of VCO. However, X formulation used the highest amount of carrot, which led to a more orange colour to the product compared to Y and Z. The more significant the amount of carrot used in infused oil, the sweeter the odour of the lip balm. Thus, it can be concluded that all respondents were more favourable towards the lip balm that is less greasiness, a bit oily (moisture texture), darker colour (orange) and sweet smell.

From the analysis of Post Hoc Test in Table 3, it illustrates that the X, Y and Z formulations display no significant difference in overall acceptance as the p-value is more than 0.05.

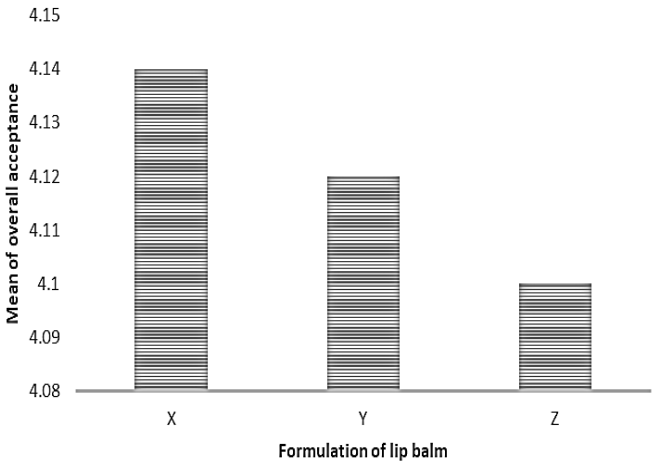

Figure 2. Graph mean of overall acceptance to the formulation of lip balm

4. Conclusion

In this study, the sensory evaluation method was successfully conducted to three carrot lip balms containing VCO. The result of the sensory evaluation showed that the panellist chose the X formulation, which is formulated with the highest concentration of carrot. Carrot composes of several vitamins that help in nourishing and healing skin while VCO acts as an antioxidant and antimicrobial. This study was conducted to combine these two ingredients in the formulation of lip balm. The combination is believed can give beneficial effects to the lips. The formulated lip balm was accepted and satisfied by all the panellist in the sensory evaluation test. Therefore, the lip balm formulated from VCO and carrot has the potential to be marketed.

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