

The Sensory Evaluation on Pumpkin Ice Cream that Formulated by Red Dragon FruitSutrisno Adi Prayitno^{1*}, Amalia Rahma²¹Food Technology Department, Agriculture Faculty of Gresik Muhammadiyah University No. 101 Gresik, East Java Indonesia 61121²Nutrition Department, Health Faculty of Gresik Muhammadiyah University No. 101 Gresik, East Java Indonesia 61121*Email: sutrisnoadi2007@gmail.com**ABSTRACT**

The types of fruit that are often used in functional foods are pumpkin and red dragon fruit. Pumpkin contains high levels of beta-carotene and proved to be useful in mobilizing iron reserves in the body in haemoglobin synthesis. On the other hand, the ingredients in dragon fruit was almost the same as pumpkin, which contains iron elements that play a role in the formation of blood, namely in the synthesis of haemoglobin. The existence of pumpkin and red dragon fruit can be processed into functional food. One of the functional food products was ice cream. The purpose of the study was to find out the organoleptic quality of pumpkin ice cream that formulated with red dragon fruit. The sensory evaluation on ice cream was carried out by hedonic test. The proportion of comparisons between pumpkin and dragon fruit used was four treatments. Treatment A is 100% : 0%, treatment B is 80% : 20%, treatment C is 50% : 50% and treatment D is 60% : 40%. In sensory evaluation using untrained panellists. The determination of the best formulation on the product is obtained from the average value of the highest overall acceptability. The hedonic results show that the pumpkin ice cream and dragon fruit formulations are generally accepted (colour, smell, taste and texture) with the category is likes. In terms of colour, texture and smell the most preferred by untrained panellists is in the C formulation (50% : 50%). In terms of taste, the panellists preferred in D formulation (60%, 40%). By this, it can be concluded that the best formulation that can be recommended is in the C treatment by the proportion of 50% : 50% pumpkin and red dragon fruit.

Keywords: *Pumpkin; red dragon fruit; ice cream; functional food*

INTRODUCTION

Fruit plants in Indonesia have many variations. Though some of them are not native to Indonesian plants and spread by people at a certain time. Any kind of fruit crops in Indonesia essentially can be processed to be used as food ingredients. For example, pumpkin and red dragon, which recently becomes popular due to its inexpensive price and easy to obtain. It can be used in various forms of food processed such as cakes, bread, jams, yoghurts, et cetera.

Pumpkin is a plant type of fruit that is rich in nutrients. Despite it is being relatively inexpensive, their utilization is still insignificant. Pumpkin is rich in vitamin C, B1, B6, and K and in mineral substances (Khongjeamsiri, Wangcharoen, Pimpilai, & Daengprok, 2011). Pumpkin is also a fruit that has the potential for high nutrition food. Nutrient contents include beta-carotene, fat, carbohydrates, fibre, and minerals such as calcium, phosphorus, iron, vitamins A, B and C (Suwanto, Suranto, & Purwanto, 2015). The compound of beta-carotene or pro-vitamin A itself has a role in the synthetic blood haemoglobin (Siallagan, Swamilaksita, & Angkasa, 2016). Actually, the pumpkin has various colours such as orange, yellow, green, grey, and green with several white spots. The variety also goes the same with the skin, some are smooth and some are coarser. Pumpkin is easily cultivated in Indonesia and have a diversity based on the shape of its base such as round, oval, and cylindrical (Blessing, Ifeanyi, & Chijioke, 2011; Jun, Lee, Song, & Kim, 2006).

Besides pumpkin, another potential fruit as a food ingredient is red dragon fruit. The red dragon fruit has a lot of nutrient contents like the pumpkin fruit. The fruit contains phosphorus and high fibre. Red dragon fruit also contains pectin which acts as an antioxidant and it is a macromolecule (O'Neill, Ishii, Albersheim, & Darvill, 2004; Tang, Wong, & Woo, 2011). It also has the function as the iron supplement and blood booster from the vitamin B1, B2 and B3, which help to decrease the cholesterol level in the body. It also contains vitamin C which helps to maintain the skin and prevent the occurrence of acne. It is also supported by elements of the protein and fat as well as iron (Mufas & Perera, 2013; Warisno & Dahana, 2009).

The dragon fruit also reported containing many elements of nutrition such as beta-carotene, lycopene, and vitamin E, which have the potential to be used medically in preventing cancer (Mufas & Perera, 2013). Lycopene is the natural pigment of bioactive compounds on the existence and natural materials capable of being used as a natural food colouring for industry (Kong *et al.*, 2010). The dragon fruit can also be processed in a variety of processed forms such as juice, syrup, ice cream, yoghurt, jelly, and candy (Tang *et al.*, 2011). In addition, it can be developed in the manufacture of ice cream. The ice cream products usually contain high sugar levels and, therefore, there is a contradiction against the healthy diet (Pon, Lee, & Chong, 2015). Ice cream is a dessert that is often favoured by many people that generally consisted of milk, sweeteners, stabilisers, emulsions, and flavouring. But it can be promoted as health products to overcome the deficiency or a disease (Khongjeamsiri *et al.*, 2011; Kulkarni, Joshi, Tagalpallewar, & Gawai, 2017).

Based on the benefits and the nutrient contents, pumpkin and red dragon fruit are expected to be able to be used as a functional food. Therefore, this research development would like to make an ice cream that formulated with pumpkin and red dragon fruit as a functional food.

METHODS

Materials and Tools

The materials used in the study are divided into two groups; the main ingredients and additives. The major materials used are pumpkin and red dragon fruit. While the additional ingredients used are skim milk, granulated sugar, salt and whipping cream. For the equipment used in the ice-cream making are digital scales (Scout Ohaus), blender (Phillips), mixer (Phillips), a basin, a spoon, knife, and keeps.

Method

In this study using the proportion of pumpkin and the red dragon fruit. The treatment on the research is formulated in four treatment as follows:

| No | Code | Formulation |
|----|------|---|
| 1 | A | 100 g pumpkin + 100 g whipped cream + 20 g skim milk + 78 g sugar + 2 g salt |
| 2 | B | 80 g pumpkin + 20 g red dragon fruit + whipped cream 100 g + 20 g skim milk + 78 g sugar + 2 g salt |
| 3 | C | 50 g pumpkin + 50 g red dragon fruit + whipped cream 100 g + 20 g skim milk + 78 g sugar + 2 g salt |
| 4 | D | 60 g pumpkin + 40 g red dragon fruit + whipped cream 100 g + 20 g skim milk + 78 g sugar + 2 g salt |

Making pumpkin porridge

The pumpkin is peeled and diced, then cleaned by being washed by running water. Then it was steamed for 20 minutes and then wait for the pumpkin until it is cooled. Afterwards, the pumpkin was mashed with a blender without the addition of water until mashed up and become a homogeneous slurry substance.

Making red dragon fruit pulp

The red dragon fruit is peeled to clean the skin and made into cubes, then blended with a medium to strong power blender without adding water until the dragon fruit become homogeneous and become a fine slurry or pulpy substance.

Making ice cream formulation of the pumpkin and the red dragon fruit

The ingredients already prepared, weighed-in with digital scales and grouped to the proportion of each treatment. The ingredients are already weighed then placed into a container and homogenised with basin and mixer. The homogenisation process is done by the medium strength mixer and then accelerated with higher strength so that the ingredients become perfectly homogenised. The ingredients then placed into a cup of ice cream and frozen into the freezer for 2 to 3 hours.

Sensory Evaluation of Ice Cream

Quality test of ice cream based on the fondness of each panellist. This test is referred to as a hedonic test. Several panellists have ice cream cup with different labels. Panellists were asked to provide an assessment of the quality of the ice cream in the organoleptic test. These include organoleptic flavour, smell, texture and colour. Assessment scales used are in numbers. Assessment levels range from numbers 1 -5 with the number 5 being classified as highly fond of the product, number 4 as fond of the product, number 3 as quite fond of the product, number 2 as less fond of the product, and number 1 as not fond of the product.

RESULT AND DISCUSSIONS

The ice cream product formulations of pumpkin and the red dragon fruit have different formulations analysis of the quality of organoleptic by using untrained panellists. Panellists were asked to independently test the remote against the power of product receipt that is presented. Panellists were asked only to give judgment in hedonic level of fondness that product. According to Kusuma, Kurniawati, Rahmi, Rusdan, and Widyanto (2017), a hedonic test is something to do with fondness and aims to measure the level of fondness and acceptance of a product to a consumer. The parameters that were analysed are the colour, flavour, smell, and texture of the ice cream product.

Color on ice cream

Food colour is one of the parameters that give the first visual impression of a product. Usually, a bright and striking colour gives a good impression (Saniyah *et al.*, 2018). The colour of ice cream in this research produces various impressions. It is caused by different proportions so that the pigment in the treatment gives the strength of a different colour. The level of colour preference can be seen in Figure 1.

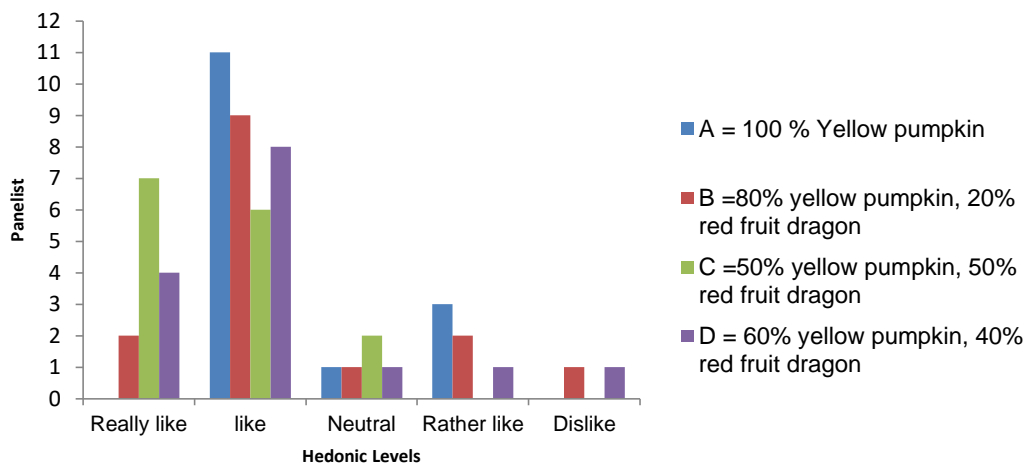


Figure 1. Level of colour preference

Based on the histogram, it shows that the reception quality of the colours in each treatment is different. This shows the average level of preference for ice cream colours in each treatment is different. At the C treatment, with the proportion of pumpkin and the red dragon fruit of 50%: 50%, the panellists tend to like brighter colours. The C treatment delivers the quality of the dominant colour preferred by the panellists. The colours on A treatment raises the yellow colour, supported by the presence of carotenoid pigment group of the pumpkin. It is supported by the research of Kin *et al.*, (2010), which states that the pigment is a natural compound that can be used as a food colouring that is safe for the human body.

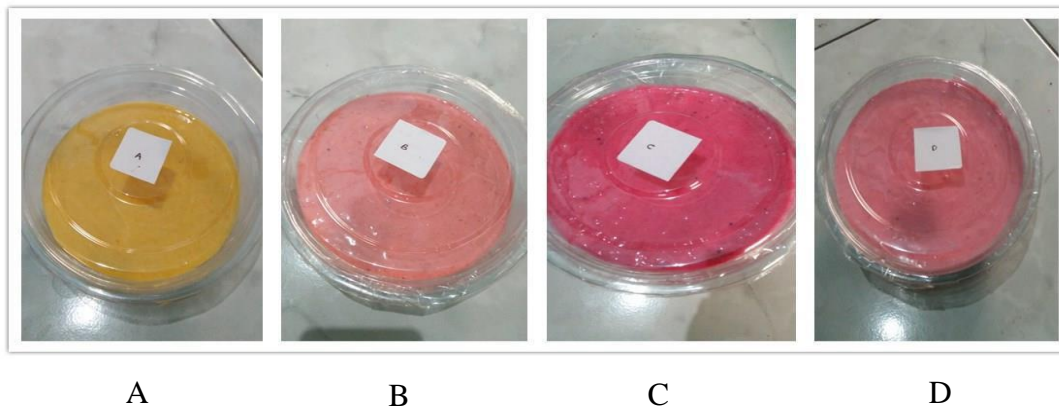


Figure 2: Description: the proportion of pumpkin and fruit of the red dragon fruit.
 A: proportion of 100% pumpkin, B 80%: 20%, C 50%:50%, and D 60%: 40%.

The colour differences on ice cream are caused by the addition of the red dragon fruit more compared to other treatments. The higher percentage of the addition of the red dragon fruit increases the fulfilment of the criteria of good colour. On C treatment, the resulting colour is due to Betalain pigments found in red coloured fruits. In red dragon fruit, it contains a compound that is a Betalain pigments/dyes that is safe and natural agent colouring and can be used in food products. In addition to Betalain compound, there is also the pigment that creates the impression of a reddish colour in the form of Anthocyanin, the Cyanidin-3-sophoroside, and Cyanidin-3-glucoside.

Taste on ice cream

The sensed parameter is an important component of the assessment of food products. The main role in providing an assessment of the product taste is the tongue. In the research of Saniyah *et al.*, (2018), the product could be detected in tongues because the tongue is able to respond the presence of flavour in food in the form of sour, salty, sweet, and bitter.

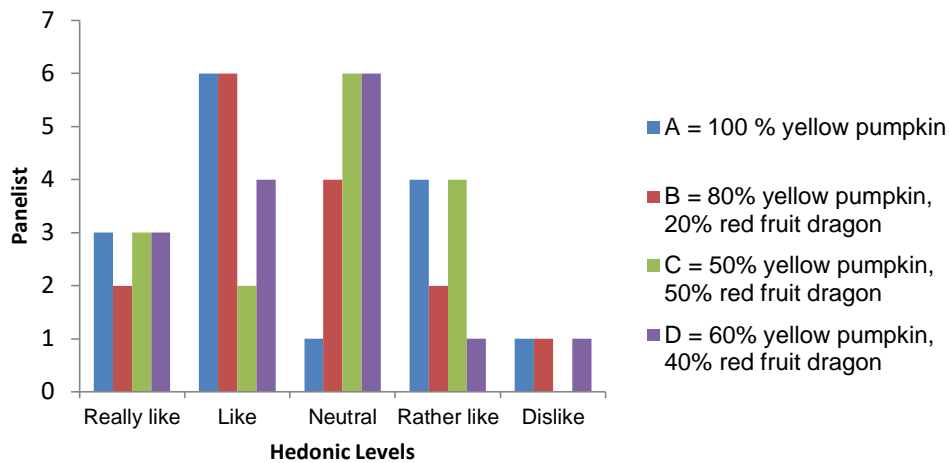
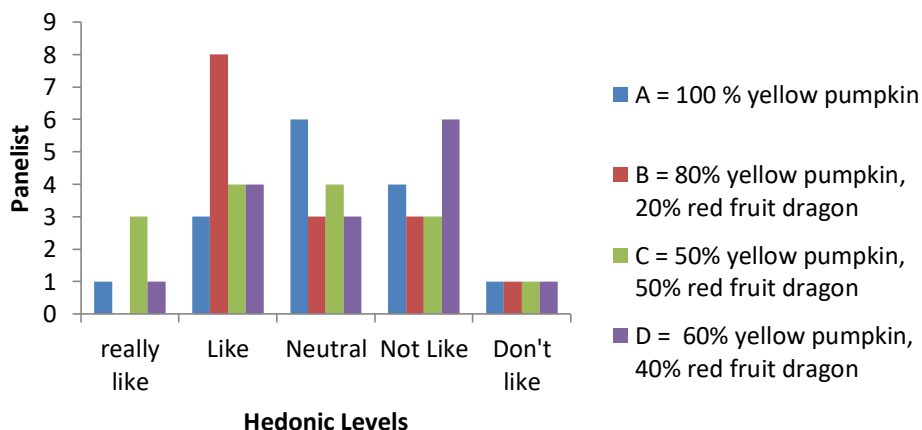


Figure 3: Hedonic level of the ice cream based on flavour

The research results above show the difference in the level of fondness toward the flavours of the formulated ice cream products. The treatment proportion of pumpkin and red dragon fruit 60%: 40% is the most favoured, which is in the group D. The pumpkin ice cream and fruit can be consumed by various age groups. Seen from its flavours, the mix of pumpkin and the fruit is resulting in a quite good response. So that the ice cream is suitable and possible for a larger-scale consumption. In addition, the ice cream of pumpkin and red dragon fruit has benefits for children, teenagers, and adults. For children, it is beneficial for improving appetite due to the beta-carotene substance on a pumpkin. As for teenage and adult, ice cream can improve the haemoglobin, because inside both fruits contains the compound or substance of iron and beta-carotene. Both of these compounds are potential as substances for the synthesis of haemoglobin.

Flavor (Smell) on ice cream

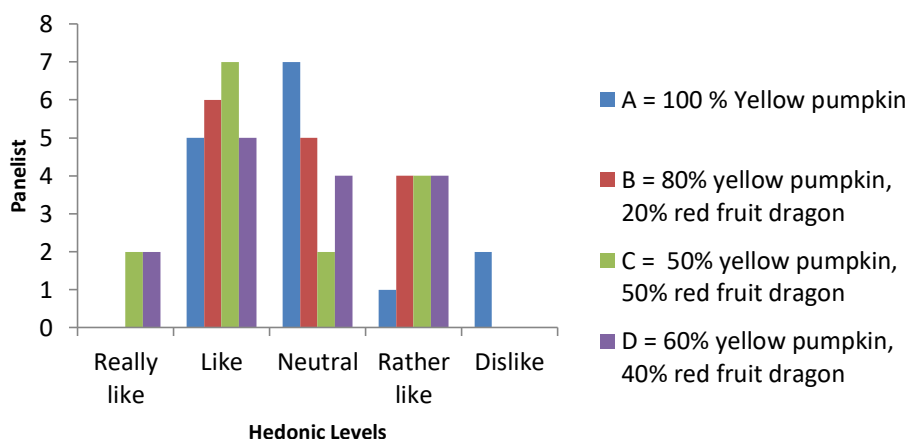
The purpose of the assessment test is to recognise the level of product's scent on the formulated ice cream based on scoring from the panellists and the fondness level of



panellists' response of a product (Saniyah *et al.*, 2018). Based on the assessment on the organoleptic of ice cream smell done by the panellists, it shows an average level difference of panellists against the scent of ice creams that being tested. Based on the histogram of the organoleptic against ice cream smell, treatment C, which consisted of the same proportion of pumpkin and dragon fruit is the most preferred by the panellists due to its fresher feeling and balanced of both fruits. On ice cream products, also there was no smell of pumpkin or fruit in excess. So that it produces a higher score. On the treatment A, B and D, the emergence of the smell of pumpkin and red dragon fruit is likely due to the aromatic element compounds in the fruits are still on the substance and it is evaporated little by little because the compound is generally easy to evaporate, but in a slow pace.

Texture on Ice Cream

The texture is a condition of a foodstuff, ranging from tender, hard, smooth or rough, or easily broken. From the graph above, it indicates the category of really like and like are more dominant.



Thus it can be concluded that the differences of each group have an influence on the ice cream texture. It can be seen from the results obtained from panellists that gives judgment against four groups of treatment. While the group shows that there is a dominant value in treatment C and D. But the highest value obtained in treatment C in categories of "like". While the lowest value obtained by treatment C and D in the categories of "really like".

CONCLUSION

The formulations of formulated ice cream by pumpkin and red dragon fruit is generally acceptable in terms of colour, smell, taste, and texture that has fondness category. The pumpkin and red dragon fruit ice cream are best in terms of colour, smell and texture is the treatment C, i.e. proportion of pumpkin and red dragon fruits are 50%: 50%. Whereas in terms of flavours is the treatment D, i.e. proportion of pumpkin and the red dragon fruit is 60%: 40%. The recommendation for the best formula is the treatment C formulation, with the proportion of the pumpkin and red dragon fruits of 50%: 50%.

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