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Research Article

Consumer sensoryresponse towards perceivedhealthbenefits of antioxidants from dragon fruit

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Abstract

Functional food isgaining popularity due to consumer preference for a healthier lifestyle. Dragon fruit, or also known as pitaya, had been known to have a lot of health benefits because of its anti-oxidative properties, which makes it a good candidate for a functional food. A survey of 100 randomly selected consumers of dragon fruit wasmade to evaluate the acceptability of dragon fruit as a functional food, as well as the assessment of its price and perceived health benefits to consumers. The survey revealed that the consumer age, gender and location did not play a significant role in their preference of dragon fruit variants. It showed that female consumers were more knowledgeable on the anti-oxidative properties of dragon fruit than male consumers. The survey also showed that around 60% of the consumers would still buy dragon fruit despite of its relatively high cost.

Keywords:functional food, pitaya, *Hylocereus*, betacyanin, Philippines.

Introduction

Consumers nowadays not only want food that can satisfy their hunger, but can also be beneficial to their health and overall body functions. This leads to the development of food and food ingredients alike which contribute to the physiological functions of the body and limit the risk of developing certain diseases and these are typically called “functional food” [1].

According to concept of the European Commission’s Concerted Action on Functional Food Science in Europe (FuFoSE), coordinated by the International Life Science Institute (ILSI) Europe,

functional food is defined as follows: ‘‘a food product can only be considered functional if, together with its basic nutritional impact, it has beneficial effects on one or more functions of the human organism, either improving the general and physical conditions and/or decreasing the risk of the evolution of diseases. The amount of intake and form of the functional food should be as it is normally expected for dietary purposes. Therefore, it could not be in the form of pills or capsules but only as a normal food form’’ [1, 2].

Changing preference of consumers toward healthier lifestyle is observed nowadays, giving more consideration to healthier food consumption [1]. That is why varieties of food made available to consumers are getting broader and the majority of which contain valuable health functions and potential disease risk reduction properties. These certain types of food items are labelled as functional food [3]. According to Angelov*et. al*. [4],“it is the response of science and industry to the increased consumer awareness regarding health and the role of food for improving quality of life”.The acceptance of functional food is an important factor to all food manufacturing industry today as well as in research [5, 6].

Dragon fruit as it is known in Asia or pitaya as it is called in North, Central and South American countries [7], is an oblong shaped fruit with red skin and green or red scales. The colour of the flesh ranges from purple, red to white [8] and has numerous small soft black seeds [9]. It belongs to the *Hylocereus*species under the *Cactaceae* family. Three varieties are commercially grown; *Hylocereusundatus*, which has red-skinned fruit with white flesh, *Hylocereuspolyrhizus*, which has red-skinned fruit with red flesh and *Hylocereusmegalanthus* which has yellow-skinned fruit with white flesh[10, 11].

Amongst the three varieties, the red flesh pitaya has recently drawn much attention from growers worldwide, not only because of its red-purple colour and economic value as a food product, but also for its anti-oxidative activity from the betacyanin content [12]. Moreover, red pitayas may offer health care benefits, for example by acting as cancer chemo-preventives, anti-inflammatory agents and anti-diabetics and by reducing cardiovascular mortality risk [13].

The aim of this study is to investigate the significant correlations between consumer sensory response on colour preference, of perceived health benefit of dragonfruit on consumer attitudes and the willingness of the consumer to pay for a functional food.

Materials and Methods

All consumer data were collected through a survey of 100 randomly selected consumers. Selection of respondentswas done through an interview to determine those who were familiar with dragonfruit. The respondents were chosen based on age (preferably aged 18-60 years old), gender and location (urban or rural area). Socio-demographic characteristics of the respondents are summarized in Table 1.

Interviews were undertaken personally and respondents were requested to answer a self-administered questionnaire. Acceptability of the fruit and specific variant, assessment of price, as well as perceived health benefits were included in the questionnaire.

Following data gathering, all forms collected were subjected to statistical analysis to determine the significance of the respondents' answers. Analysis was based on the methods of Minoza-Gatchalian and Divino-Brannan [14] regarding non-parametric measurement of relationship and Windows software PHStat2 was used.

Table 1. Socio-demographic characteristics of respondents (% of respondents, n=100).

	Respondents	Population (%)
Age		
16-26 y/o	62	62
26-33 y/o	17	17
34-41 y/o	5	5
42-49 y/o	11	11
50-60 y/o	5	5
Gender		
Male	32	32
Female	68	68
Location		
Rural	50	50
Urban	50	50

Results and Discussion

It hasbeen reported that different health awareness and way of living connotes different attitudes toward consumption of functional food. This implied that attitude is a determining factor [15]. Nevertheless, consumers are positively accepting the concept of functional food [16]. The main factor that determined this acceptance was nutrition and the belief in the health benefits of functional food [5, 6]. However, socio-demographic characteristics of consumerswere not the best indicator of their willingness to consume functional food but the need for such food [17]. Other factors being considered by consumers were safety and the confidence in functional food [15].

Reports fromGilbert [18], Beardsworth*et al*. [19], Kubberod*et al*. [20] and VerbekeandVackier [21], find that, in general, women as more philosophical when it comes to matters of food and health than men. That is why the majority of studies regarding acceptance of functional food showed that women are more willing to compromise in their choice. This was substantiated by the fact that females are the ones usually accountable in buying food [18, 22]. This also helps to explain the results in Figure 1, wherein there is a significant difference between the acceptance of males and females regarding the perceived antioxidant benefits of dragon fruit (p-Value = 0.035, $\alpha = 0.05$). Nevertheless, in terms of preference among variants, the table also showed no significant difference in the response of males and females (p-Value = 0.589, $\alpha = 0.05$).

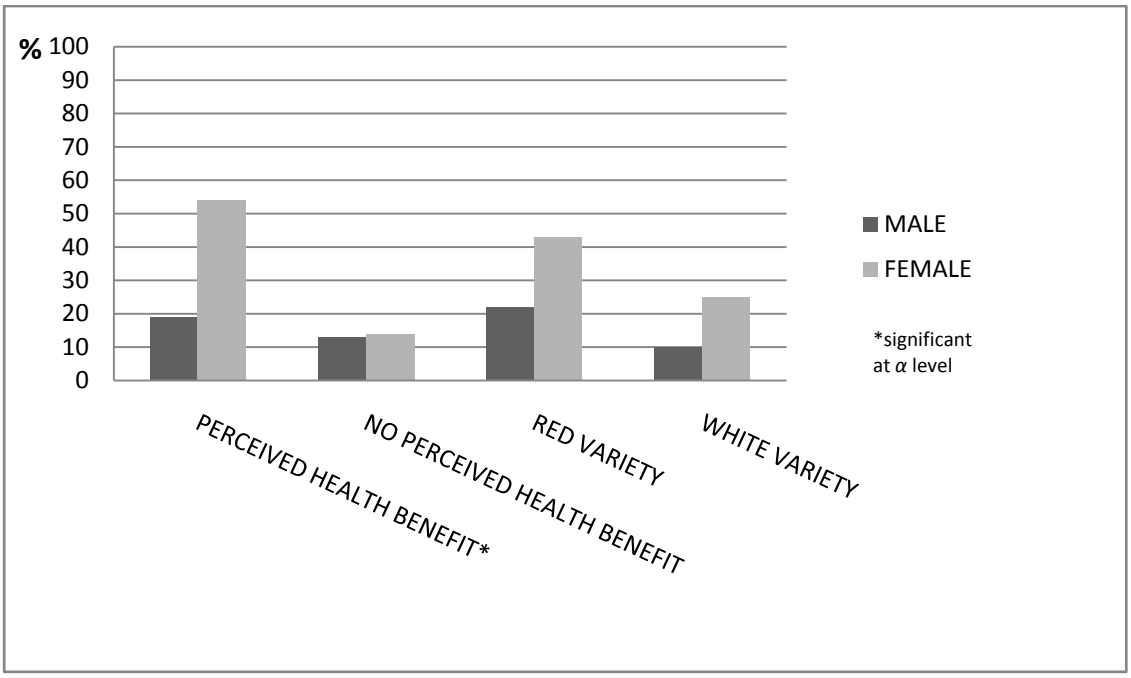

Figure 1.Consumer preference towards antioxidants and variants of dragon fruitby gender (n=100).

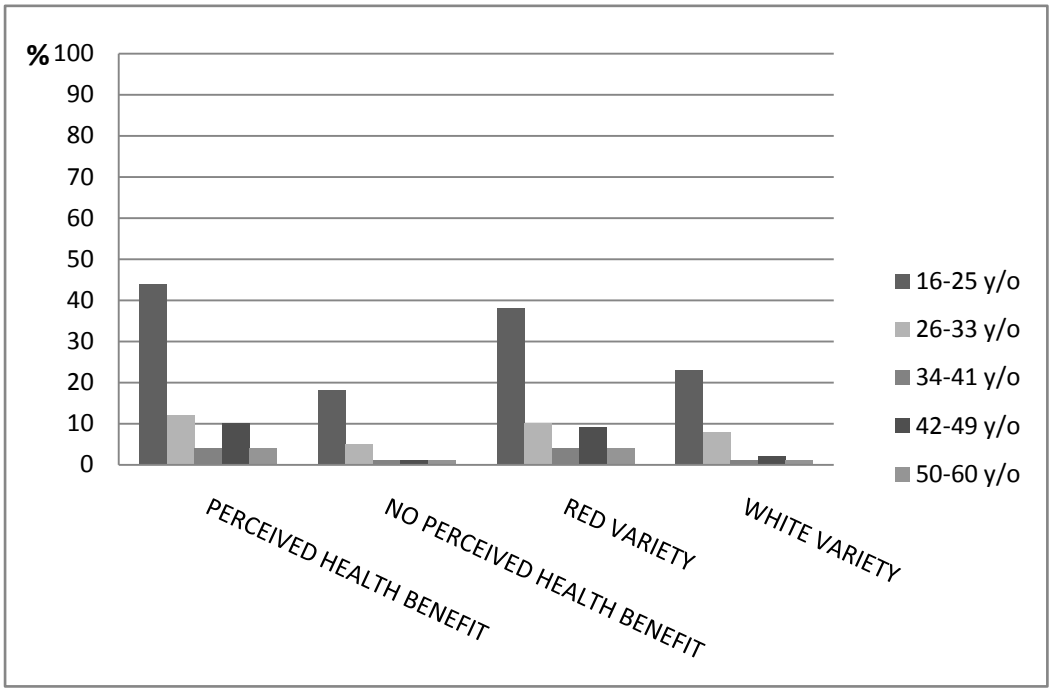

Figure 2. Consumer preference towards anti-oxidants and variant of dragon fruit by age (n=100).

Contrary to the conclusion of Poulsen[23], wherein elderly subjects have more significant response toward functional food because of the perceived health benefits in comparison to younger respondents, the result of this study showed that the consumer's perception of health benefits from antioxidants from dragon fruit between younger subjects and older respondents was not significant as shown in Figure 2 (p-Value = 0.695, $\alpha = 0.05$). The same results were also observed in terms of age groups which showed no significant difference in their response towards their preference between the two dragon fruit varieties (p-Value = 0.515, $\alpha = 0.05$).

Factors such as price/value, taste, convenience, quality and health benefits are the main considerations in purchasing functional food according to the findings of Bhaskaran and Hardley [24]. Most of the previous studies have found that functional food is perceived to be too expensive, which affects the acceptance and intentions of patronizing functional food [5]. However, based on the results shown in Figure 3, there was no significant difference in terms of the acceptance of the consumers towards the price of dragon fruit with respect to location (p-Value = 0.680, $\alpha = 0.05$). This proved that currently, price does not limit the changing preference of consumers when it comes to healthier options. The same results were also observed in consumer preference in terms of variety in two locations as shown in the same figure (p-Value = 0.060, $\alpha = 0.05$).

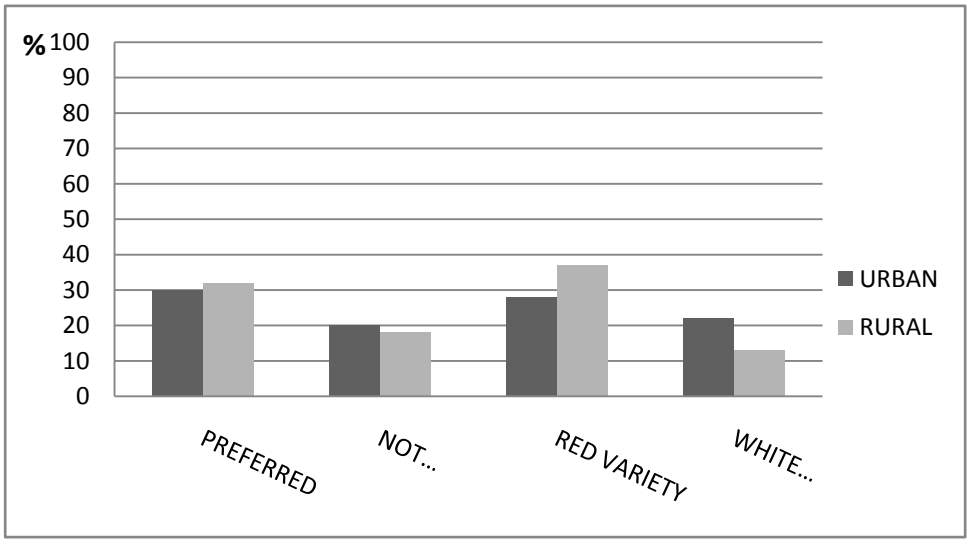

Figure 3. Consumer perception towardsdragon fruit in variant and price in relation to location (n=100).

In addition, sensory attributes of dragon fruit also contributed to the significant response of subjects towards their preference between the two variants. Out of the 100 subjects interviewed, 65% of them preferred the red variety because of its distinct, savoury and sweet taste and attractive colour. On the other hand, 35% of the subjects described their sensory perception on the white variety as being juicier, looking similar to cookies and cream, having better texture than red and having just the right sweetness and likeable sourness.For the texture of red dragon fruit variants, about 40% of the respondents noted that the red variety of dragon fruit was juicy and only 10% noted that it was firm. For the taste, 70% of the respondents noted that it was sweet. For the texture of the white dragon fruit variant, 25% of respondents noted that it was juicy and another 25% stated that it was firm. For the taste, 25% of the respondents noted that it was sweet and only 5% of the respondents noted that it was sour.

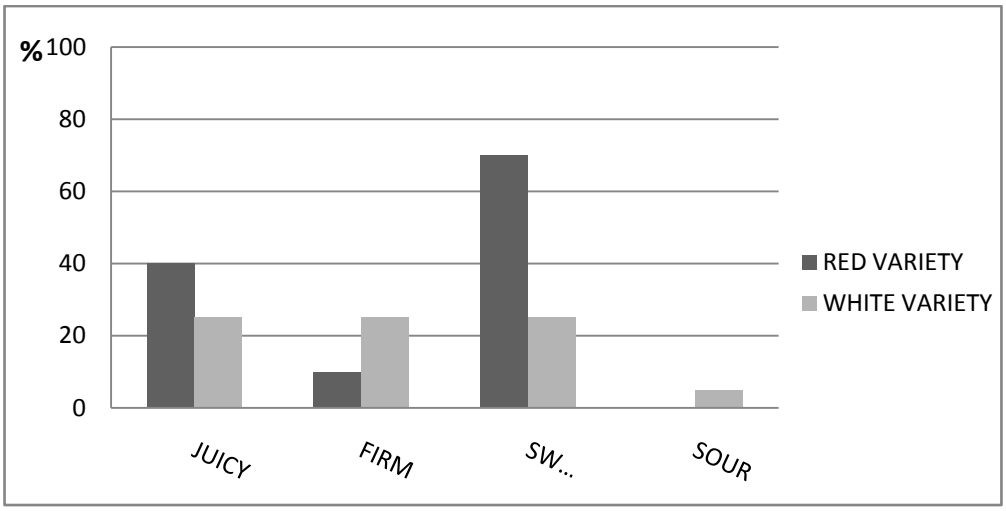

Figure 4. Consumer sensory response to dragon fruit (n=100).

Finally, around 60% of the 100 respondents still considered buying dragon fruit despite of its relatively high cost. With regard to considering dragon fruit as a snack rather than apple, almost 65% of the respondents do not consider it to be comparable. However, around 86% of the respondents stated that they would recommend dragon fruit to their parents/relatives.

Conclusion

The acceptance of consumers towards the presence of antioxidants in dragon fruitwas not significantly different by age, as well as their preference on its variety. However, female respondents demonstrated greater knowledge on the presence of antioxidants in dragon fruit than the male respondents, but their preference between the two variantsdid not differ significantly to each other. In terms of location, there is no significant difference regarding the variant preference, as well as price perception, in both rural and urban areas. Furthermore, results also showed that around 60% of the respondents still consider buying dragon fruit despite of its relatively high cost. Almost 65% of the respondents do not consider eating dragon fruit as a snack rather than apple, however, around 86% of them would recommend dragon fruit to their parents/relatives.

It is recommended that a bigger population size with equal distribution among age groups be evaluated for consumer preference on dragon fruit as a functional food. Evaluation of additional attributes of dragon fruit, such as texture and aroma, is also recommended. Also, other socio-demographic characteristics of subjects must be considered such as education and income.

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