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RESEARCH ARTICLE

INFLUENCE OF COLOUR ON THE SENSORY PERCEPTION OF READY-TO-DRINK SOY MILK

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ABSTRACT

Food companies rely on sensory evaluation to determine the acceptability of their product. This study provided a data on the sensory perception of ready-to-drink soy milk using only colour as a ranking characteristic. Specifically, it aimed to answer whether the colour of ready-to-drink soy milk can influence sensory parameters like sweetness, aftertaste, naturalness and artificiality, liking and consumption. The study made use of five different coloured ready-to-drink soy milk and results showed that colour do influence perception and manner of consumption.

Key words:

Colour,

Sensory Perception,

Ready-to-Drink Soy Milk

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INTRODUCTION

There are a number of factors that consumers use to base their decision in purchasing a product brand over another based on preferences and opinions on sensory perception. Food companies spend time and money testing and analysing how consumers think and feel every time a new product is launched in the market. Use of human subjects in sensory evaluation tests is done in research and development departments to generate and evaluate products often on an on-going basis. However, food companies determine consumer preferences before launching a product in the market and inputs from these target consumers who are untrained evaluators are perceived to be significant in determining product survival in the market. A well-known adage among chefs that states, "You eat with your eyes first" (Delwiche, 2012) means that when food is unappealing, it is often not eaten (Delwiche, 2004). Our sense of sight is the first interaction with food because it allows people to see the colour, size, shape and other imperfections a food may have. In fact, colour is a major visual factor in the decision process of food consumption (deHamer, 2012). According to Brown (2010), vision is the first step in the process of sensory evaluation to gather perception about any food products without actually tasting the food itself. Previous studies have already been conducted to determine if there is a correlation between colour, flavour and taste perception

(King and Duineveld, 1998; Chan and Kane, 1997; Oram, 1995; Philippsen *et al.*, 1995). According to their studies, colour of the product in itself had an influence on the flavour intensity i.e. a dark coloured drink is perceived to be sweeter as compared to a lighter coloured product. In a separate study, Piqueras-Fiszman (2012) and Guéguen (2003), correlated colour of the serving plate and colour of the drinking glass to determine the taste perception of a food and thirst-quenching quality of a beverage. These two studies proved that even the colour of the serving plate and drinking glass had a significant influence on the sensory perception of a beverage and food, i.e. a beverage served in a blue coloured glass is perceived to have a greater thirst-quenching ability than in an orange coloured glass, while a strawberry mousse served on a white plate is perceived to be sweeter than when served on a coloured plate.

Majority of basic food recognition is completely related to colour. It is for this reason that beverage companies rely on colour for their advertising campaigns. Consumers often can tell the quality, taste and flavour of a beverage simply by its colour. In the Philippines, consumption of soy milk is limited to consumers with lactose intolerance, health-conscious individuals and those who are willing to spend more since soy milk is quite expensive than cow's milk. Despite perceived health benefits of soy milk, it lacks in sensorial qualities similar to cow's milk. Food companies producing soy milk in the Philippines conduct research to improve sensory qualities and acceptability of soy milk.

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However, to the knowledge of the researchers, there is a limited study on sensory evaluation of a food or beverage based on colour characteristic alone. This study was undertaken to investigate the effects of colour on the sensory perception of a beverage like ready-to-drink soy milk.

Specifically, it aimed to answer whether the colour of soy milk can influence sensory parameters like taste (sweetness, aftertaste, naturalness and artificiality), liking and consumption. The data that will be generated from this study can be used as a way to understand what consumers like and how to increase their interest on soy milk.

MATERIALS AND METHODS

Sensory Evaluation

A total of (15) semi-trained panellists composed of food science graduate students presently enrolled in a sensory evaluation class were given a questionnaire (see Appendix A). A 5-point Ranking Test, with colour as the only ranking characteristic, was used to determine how much each sample was perceived based on sweetness, aftertaste, artificiality, naturalness and liking. The panellists were instructed to give a score of "5" for the highest ranked and "1" as the least. The following questions were also asked: "preferred temperature of the drink".

Samples

The panellists were presented 5 different coloured soy milks in transparent cups and placed in front of the room for the panellists to see. Colours for the soy milk used were the following: Off-white, Light Orange, Light Green, Light Red and Brown. To avoid bias and distractions, the room was well lit and the chairs were arranged such that the panellists are not close enough to each other. At the end of the evaluation, the panellists were informed of the actual flavours of the soy milks used: Off-white for Plain flavour, Light Orange for *Melon* or Honeydew flavour, Light Red for Strawberry flavour, Light Green for Green Apple flavour and Brown for Chocolate flavour.

Statistical Analysis

Friedman ANOVA was used to analyze significant differences among the five different soy milk samples with varying colours.

RESULTS

This study was conducted to correlate colour with sensory perception. Panellists gave a ranking for each sensory parameter: sweetness, aftertaste, artificiality, naturalness, like and dislike. The panellists also answered the questions on preferred temperature for each coloured drink and also if they will buy the drink. Results of the study showed colour to be an important factor in the acceptability of the soy milk.

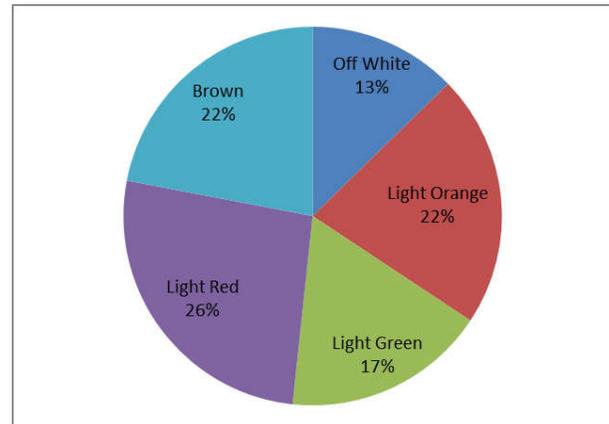


Figure 1. Sweetness

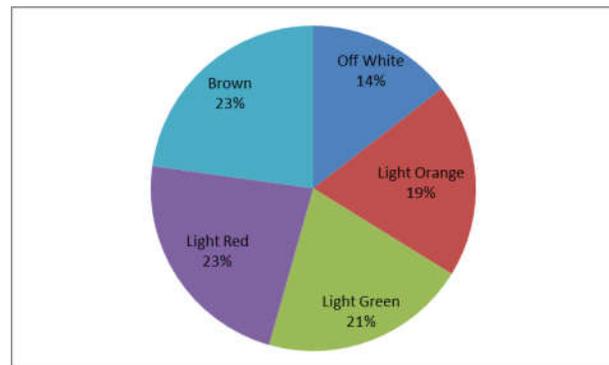


Figure 2. Aftertaste

DISCUSSION

Sweetness, Aftertaste, Artificiality, Naturalness and Like/Dislike (sig. at $p < 0.05$)

Fifteen (15) panellists who evaluated the 5 different coloured soy milks showed results that are significant in terms of sweetness between light red (26%) and off white (13%) soy milk. Significant results were obtained in terms of aftertaste between light red (23%) and off white (14%) soy milk. There is also a significant result in terms of naturalness with off white perceived as the most natural and light red as the least natural and most artificial. A significant difference also in liking was seen with the brown coloured soy milk as the most liked (Figures 1-3). However, no significant difference in terms of dislike was seen among coloured soy milk samples. Although, the light red coloured soy milk obtained the highest percentage of "most dislike" (Figure 4).

Table 1. Preferred Temperature (N= 15)

	Off-white	Light Orange	Light Green	Light Red	Brown
Cold	80.0%	93.3%	93.3%	100.0%*	66.7%
Hot	13.3%	6.7%	-	-	-
Warm	6.7%	-	-	-	-
Ambient	-	-	6.7%	-	-

* Significant at $p < 0.05$

Preferred Temperature

Approximately 100% of the panellists preferred drinking the soy milk at a cold temperature (Table 1) with a majority preferring the light red coloured soy milk to be consumed cold followed by the light orange and light green coloured soy milk. Off-white coloured soy milk was preferred to be consumed either hot or warm at 13.3% and 6.7%, respectively while light orange (93.3%) coloured soy milks was preferred to be consumed hot.

For the light green coloured soymilk, around 6.7% of the panellists preferred to consume the beverage at ambient temperature.

Drink Soymilk? Yes or No

Approximately 100% of the panellists answered “Yes” they will drink the soy milk particularly the brown coloured soy milk (Figure 5). There is no significant difference observed among other coloured soy milks when it came to choices of preference.

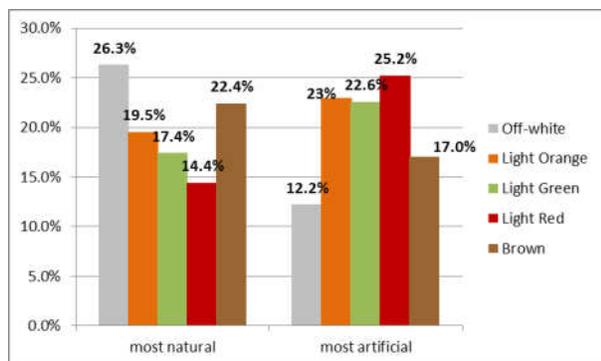


Figure 3. Naturalness and Artificiality

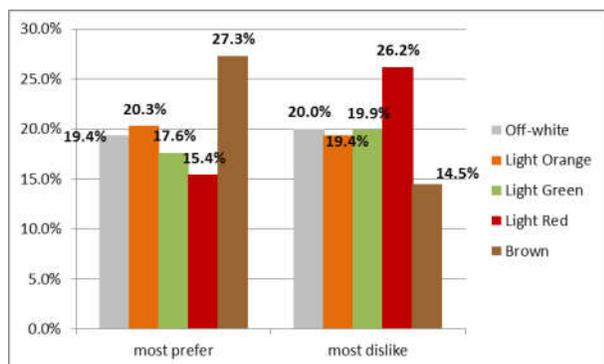


Figure 4. Prefer and Dislike

Conclusion

Despite a limited sensory panellist size (n=15) and the population included only students currently enrolled in a graduate food science class, this study demonstrated that colour does influence sensory perception of the ready-to-drink soymilk. Colour also has affected the serving temperature of the ready-to-drink soy milk which is also similar to previous studies conducted correlating the effect of colour on the serving temperature of the food or drink. Similarly, colour also influenced the response of the panellists particularly when asked if they will purchase the ready-to-drink soymilk as well as the preferred choice of colour. The researchers recommend conducting a more thorough study using the same method. However, it would be better if the study will be conducted on actual selling environment such as inside a supermarket or a mall. It is also recommended to determine if there are gender and age differences when it comes to colour perception of soy milk and to better understand the target market of ready-to-drink soy milk. Moreover, the data generated from this study can be used in the Philippines where colour alone has not been used as a basis to determine acceptability of a specific product.

Ompeting Interests

The author(s) declare that they have no competing interests.

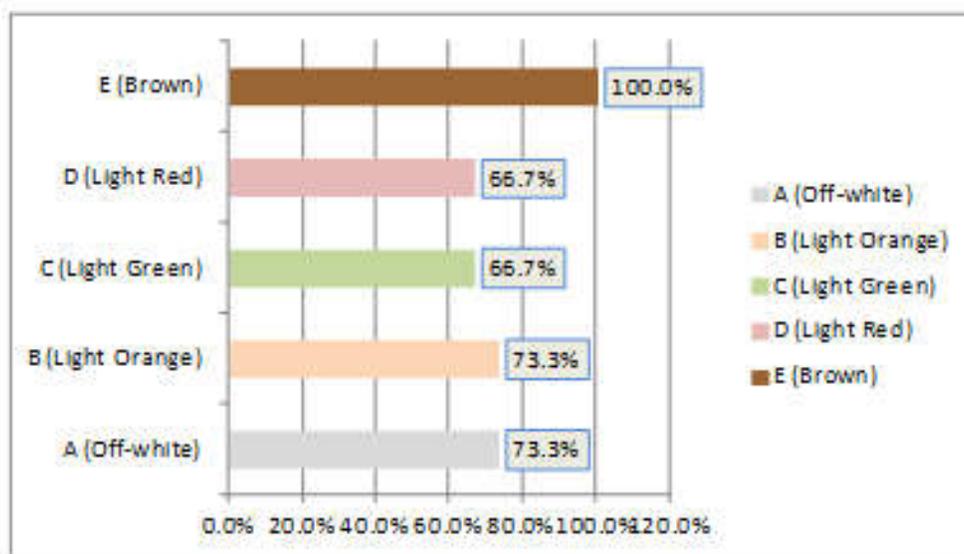


Figure 5. Drink soymilk “Yes” or “No”.

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