IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 5, May 2024

DOI: 10.17148/IARJSET.2024.11534

Formulation, Analysis and Acceptability of Phyto-colored Taro Farfalle

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Abstract: The study formulated the phyto-colored taro farfalle with blue ternate, bougainvillea and squash flower extracts, specifically it aimed to evaluate its sensory qualities and acceptability in terms of appearance, aroma, color, taste and texture. The method used in this study was developmental-experimental method of research. In the developmental research, this method used for formulation of taro farfalle for potential development and commercialization while in the experimental method attempted to investigate the proportion of taro farfalle using three treatments. This used the Completely Randomized Design: one (1) was tested by panel of evaluators and second (2) for final processes for consumer's preference evaluation. Score cards with the Nine (9) Points Hedonic Scale was used to obtain the data. The mean and Analysis of Variance (ANOVA) were used to analyze the data into alpha level set at 0.01 alpha. Findings on the general acceptability showed that taro farfalle with bougainvillea extracts obtained the highest acceptability when the sensory qualities were considered in terms of appearance, aroma, color, taste, and texture. The taro farfalle was safe for human consumption as the results of microbial analysis of the product and based on the BFAD standard for microorganism test for products belonging Pasta Product category.

Keywords: Taro, Farfalle, Blue ternate, Bougainvillea, Squash Flower

I. INTRODUCTION

Background of the Study

Taro (*Colocasia esculenta L.*) belongs to aroid family (Aracaceae) and it is in the genus Colocasia. It is widely produced throughout the world for its underground corms. Besides basic nutrients a nutritional profile that includes carbohydrates, dietary fiber, magnesium, potassium, vitamin E, vitamin B6, and vitamin C (Temesgen et al., 2015).

Edible flowers, specifically blue ternate, bougainvillea, and squash blossom, are used to enhance the visual appeal of dishes by contributing flavor, color, and other sensory elements. They also include bioactive chemicals, like polyphenols, which may have positive health effects.

The researcher thought of utilizing flowers such as blue ternate, bougainvillea and squash flower as a colorant for taro farfalle that can be used as an alternative in food production. Therefore, this study was developed and aimed to investigate the acceptability of phyto-colored taro farfalle among consumers.

Objectives of the Study

1. the sensory qualities of phyto-colored taro farfalle in terms of appearance, aroma, color, taste, and crispiness;
2. determine the general acceptability of the product among three treatments

Significance of the Study

The study of phyto-colored taro farfalle sees it utmost significance to various stakeholders across different sectors and the key beneficiaries include consumers, health and wellness sector, food industry, entrepreneurs, agriculture sector, public health organization.

Scope and Limitation of the Study

This study was limited only on making taro farfalle with colorants from blue ternate, bougainvillea and squash flower extracts. Experimented with different ingredient ratios and cooking methods to achieve the desired flavor, texture, and nutritional profile, explored various options for sourcing high-quality taro and fresh flowers to ensure the farfalle were made with wholesome and natural ingredients.

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II. METHODOLOGY

This chapter presents the research tools, equipment, ingredients, procedures, experimental design, treatment proportions and statistical analysis of the study.

The method used in this study was the developmental-experimental method of research. The developmental research was the methodical investigation of design, development and evaluation of instructional program products and processes that must meet informal consistency and efficacy criteria (Richey and Klein 2014).

In the developmental research the product developed was taro pasta with flower colorant for potential product development and commercialization. The researcher used this research method in order to get the best product out of several trial and errors being conducted. Experimental method focuses the study in the future (what will be) when the variables or the study are carefully controlled or manipulated (Coleman & Steele, 2018).

The researcher designs an experiment to manipulate factors such as ingredient composition, cooking methods, or presentation to determine their impact on the acceptability of Phyto-colored Taro Farfalle. This approach allows for controlled comparisons and insights into the relative importance of different variables.

The sensory qualities were evaluated by panel of trained tasters to assess the flavor, texture, aroma, and overall acceptability of taro farfalle. Consider employing trained sensory panels or consumer taste tests to assess preferences and acceptance of different taro farfalle formulations.

The researcher uses descriptive analysis methods to evaluate the appearance, aroma, color, taste, and texture of the farfalle. The researcher design and administer evaluation sheet to gather data on consumer preferences in the appearance, aroma, color, taste, and crispiness of the product. The statistical tools utilized was analysis of variance (ANOVA) to identify the significant difference in three (3) experimental trials.

III. RESULTS AND DISCUSSION

Sensory Qualities of Phyto-colored Taro Farfalle

The sensory qualities of the taro farfalle as evaluated by the panel of experts with 30ml, 45ml and 60ml of blue ternate, bougainvillea and squash flower as colorant in terms of appearance, aroma, color, taste, and texture was presented in Table 1.

Evaluation for taro farfalle with 60 ml of blue ternate, bougainvillea and squash flower, following results were found: in terms of appearance, blue ternate, bougainvillea and squash flower were rated “extremely appealing” as shown by the means of 8.30. For aroma, taro farfalle with bougainvillea was “extremely appealing” having a mean 8.20, while blue ternate and squash flower was “very much appealing” having mean scores of 7.80 and 8.10 respectively.

For the color, all of the products were also found to be “extremely authentic” with means of 8.30 for bougainvillea and squash flower and 8.20 for blue ternate. The same results were obtained in terms of the taste of the taro farfalle. Blue ternate, bougainvillea and squash flower were evaluated as “very much delicious” with the means of 7.60, 8.00 and 8.10. Finally in terms of texture, similar results were rated as “very much firm and chewy” shown by the mean of 7.80 for blue ternate and bougainvillea and 7.90 for the squash flower.

In general, the sensory evaluation results suggest that variations on the amount of flower extract infused in taro farfalle offers appealing sensory attributes, preferences may vary based on individual taste preferences and the specific flower extract added. Furthermore, all variations of the taro farfalle , irrespective of the flowers and amount of flowers extracts, were found to be very appealing, colors are very authentic and indicating a desirable textural characteristic that adds to the overall sensory experience.

The aforementioned findings corroborate the research conducted by Das and Maulik (2024), which examined the use of microbial dyes to attain distinct functional qualities, bright colors, and high production yields when dying a variety of items. The study focused on natural colorants primarily derived from plants and animals. Natural dyes give goods like food, drinks, medications, and other items a more appealing and practical appearance, which increases consumer acceptance.

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Table 1. Sensory qualities of phyto-colored taro farfalle

TREATMENTS		30 ml		45 ml		60 ml	
Product	**Quality Attributes**	**Mean**	**AD**	**Mean**	**AD**	**Mean**	**AD**
Treatment A (Blue Ternate)	Appearance	7.10	MA	7.70	VMA	8.30	EA
	Aroma	7.20	MP	7.50	VMP	7.80	VMP
	Color	7.10	MA	7.70	MVA	8.20	EA
	Taste	7.20	MD	7.80	VMD	7.60	VMD
	Texture	7.00	MF	7.47	VMF	7.80	VMF
Treatment B (Bougainvillea)	Appearance	7.10	MA	7.90	VMA	8.30	EA
	Aroma	7.30	VMP	7.60	VMP	8.20	EP
	Color	7.20	MA	7.70	MVA	8.30	EA
	Taste	7.30	VMD	7.80	VMD	8.00	VMD
	Texture	7.30	VMF	7.93	VMF	7.80	VMF
Treatment C (Squash Flower)	Appearance	7.30	VMA	7.70	VMA	8.30	EA
	Aroma	7.50	VMP	7.80	VMP	8.10	VMP
	Color	7.20	MA	7.50	MVA	8.30	EA
	Taste	7.30	VMD	7.80	VMD	8.10	VMD
	Texture	7.10	MF	7.80	VMF	7.90	VMF

Legend: ***Adjectival Description (AD)***

Score	***Appearance***	***Aroma***	***Color***
8.12 – 9.00	*Extremely Appealing (EA)*	*Extremely Pleasant (EP)*	*Extremely Authentic (EA)*
7.23 – 8.11	*Very Much Appealing (VMA)*	*Very Much Pleasant (VMP)*	*Very Much Authentic (VMA)*
6.34 – 7.22	*Moderately Appealing (MA)*	*Moderately Pleasant (MP)*	*Moderately Authentic (MA)*
5.45 – 6.33	*Slightly Appealing (SA)*	*Slightly Pleasant (SP)*	*Slightly Authentic (SA)*

Score	***Taste***	***Texture***
8.12 – 9.00	*Extremely Delicious (ED)*	*Extremely Firm and Chewy (EF)*
7.23 – 8.11	*Very Much Delicious(VMD)*	*Very Much Firm and Chewy (VMF)*
6.34 – 7.22	*Moderately Delicious (MD)*	*Moderately Firm and Chewy (MF)*
5.45 – 6.33	*Slightly Delicious (SD)*	*Slightly Firm and Chewy (SF)*

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General Acceptability of Phyto-colored Taro Farfalle

Table 2 reveals the result in the general acceptability of the Phyto-colored Taro Farfalle in three treatments in terms of appearance, aroma, color, taste and texture as evaluated by a group of consumers using the best product formulation proportion which is 60ml flower extract. Based on the data results, Treatment B the taro farfalle with bougainvillea got the highest results in terms of appearance, aroma, color, taste and texture which the mean scores that range from 8. 43 to 8.57, thus, Treatment B was evaluated as "liked extremely" for appearance, aroma, color, taste and texture and general acceptability.

About the Treatment A (taro farfalle with blue ternate) was described as "liked very much" in terms of appearance, aroma, color, taste and texture and general acceptability with the mean scores of 8.01, 7.90, 8.07, 8.09, 8.06 and 8.03 respectively. Similar results were obtained in the evaluation of Treatment C (taro farfalle with squash flower) as "liked very much" with means scores of 8.11 for appearance, 8.00 for aroma, 8.05 for color, 8.17 for taste, 7.97 for texture and 8.06 for the general acceptability.

This only shows that the above-mentioned treatment was generally acceptable to the consumers in terms of appearance, aroma, color, taste and texture which indicates that the possibility for consumption when introduced to the market is highly likely.

Table 2. General acceptability of phyto-colored taro farfalle

TREATMENTS	**A** (Blue Ternate)		**B** (Bougainvillea)		**C** (Squash Flower)	
Quality Attributes	*Mean*	*AD*	*Mean*	*AD*	*Mean*	*AD*
Appearance	8.01	LVM	8.55	LE	8.11	LVM
Aroma	7.90	LVM	8.43	LE	8.00	LVM
Color	8.07	LVM	8.57	LE	8.05	LVM
Taste	8.09	LVM	8.52	LE	8.17	LVM
Texture	8.06	LVM	8.44	LE	7.97	LVM
Acceptability	8.03	LVM	8.50	LE	8.06	LVM

Legend: ***Adjectival Description (AD)***

Score	***General Acceptability***
8.12 – 9.00	*Liked Extremely (LE)*
7.23 – 8.11	*Liked Very Much (LVM)*
6.34 – 7.22	*Liked Moderately (LM)*
5.45 – 6.33	*Liked Slightly (LS)*

Findings of the study validates to the experiment conducted by Compos et al. (2021), in which they created taro flour-based gluten-free pasta. Taro flour and egg white powder were combined to create the flour that is used in the pasta-making process. This result demonstrated that pasta have good color, cooking qualities, and texture due to lower levels of egg white and transglutaminase (5% flour replacement in flour and 0.005% flour base, respectively), which shows good performance from a technological point of view.

Furthermore, the study of Shivani et al. (2020), bougainvillea extract was used as colorant during jelly preparation. the organoleptic analysis of the jelly with natural dye showed high acceptance compared to jelly with synthetic dye by the consumers. Thus, the study presents a viable approach of utilizing natural dyes in the food industries.

The food industry is becoming more dependent on natural dyes and pigments due to their non-toxic and environmentally beneficial qualities (Kumar et al., 2013). Thus, the awareness of the existence of safe coloring compounds in some edible flowers fit for consumption is a new development in the creation of functional meals and creative recipes for nutritionists.

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IV. CONCLUSION

Taro flour can be utilized as the main ingredients in making farfalle with colorant from flower extracts. Based on the sensory evaluation and general acceptability, taro farfalle with bougainvillea extracts was liked extremely as evaluated by consumers across different sectors. The results also ensure that the chosen product represents the highest quality and safety standards.

V. RECOMMENDATION

It is suggested that refinement of the formulation and concentrations of flower extracts to optimize flavor balance while maintaining product integrity it is also recommended to further use natural pigments for farfalle to offer a wider variety of flavor options and cater to diverse consumer preferences then explore alternative cooking methods or ingredient combinations to enhance the overall sensory experience of the pasta.

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