



Sensory Evaluation of Dried Fettuccine Pasta Enriched with Gotu Kola *Centella asiatica*

CHARLENE EVE L. SALIGUMBA*

Bohol Island State University Main Campus, Tagbilaran City, Bohol, Philippines
 Email: charleneeve.saligumba@bisu.edu.ph

JEAN F. NEBREA

Bohol Island State University Main Campus, Tagbilaran City, Bohol, Philippines

Received 28 February 2022 Accepted 13 June 2022 (*Corresponding Author)

Abstract The use of gotu kola in food and beverages has increased over the years due to its beneficial and nutritional properties. The intent of this study is for the public utilization of the gotu kola and its improvement. It further investigates the sensory evaluation of dried fettuccine pasta enriched with gotu kola *Centella asiatica* among the three treatments in terms of aroma, color, taste and texture and to determine if there was a significant difference among the three treatments. This study used the experimental-descriptive research design employing a self-made modified questionnaire as a main tool in gathering the data through 4-point modified Hedonic scale for the level of liking. The data gathered were tabulated using the weighted mean and ANOVA to determine the significant difference in the respondent's liking among the three treatments. There was a total of 85 respondents composed of 55 selected food technology experts (25 instructors handling food technology and food related subjects and 30 students taking Master of Arts in Teaching Vocational Education major in Food Technology) and 30 consumers. The findings revealed that treatment 3 was "like very much" while, treatments 1 and 2 were "like moderately". The result showed there was a significant difference in the level of liking of the dried fettuccine pasta in three treatments. Thus, the researcher recommended to utilize gotu kola as a potential ingredient to enrich the pasta for possible income generating project for extension activities.

Keywords gotu kola, sensory evaluation, fettuccine pasta

INTRODUCTION

Filipinos are known to be passionate food lovers; they always search for those good snacks where it is delicious and healthy. Herbs hit it perfectly! These luscious leaves-parsley, mint, oregano, gotu kola and the like- not only add enticing aroma, fresh flavor and vivid green color to food but also have remarkable health benefits (Krieger, 2017).

In the Philippines, manufacturers of food use herbs in their production that turns the food more appealing and nutritious. One example of herbs present in this country is the Gotu Kola with a scientific name *Centella asiatica*. Gotu Kola is a small, slender, umbelliferous creeping plant. It acts as an alternative tonic, an agent which produces gradual beneficial change in the body, usually by improving nutrition, without having any marked specific effect and without causing strange clearing. Gotu Kola also prevents anxiety and stress which boost immune system (Stuart Jr., 2017). It has been proven to have many benefits in the body. It helps boost cognitive function, treat Alzheimer's disease, helps reduce anxiety and stress, acts as an antidepressant, improves circulation and reduce swelling, helps ease insomnia, helps reduce appearance of stretch marks, promotes wound healing, and minimize scarring, helps relieve joint pain and have a detox effect (Wilson, 2017).

According to Pharmacological Review on *Centella asiatica*: A Potential Herb Cure-all (2010) proved that gotu kola has been used as medicinal herbs since it does not contain any caffeine and

has not been shown to have stimulant properties. In this view, this study is optimistic to pursue in making something new out of the gotu kola to extend its importance as a medicinal herb and, at the same time, remedial snack food. But, more importantly, the intent of this study is also to catch the attention of the public that is averse to herbs. That is why pasta is to be made mixed with a prime substantial gotu kola.

OBJECTIVE

The study primarily aims to create a new variety of dried fettuccine pasta enriched with gotu kola which is abundant in the locality and this will be assessed to determine its sensory evaluation in terms of aroma, color, taste and texture.

METHODOLOGY

The study was an experimental and descriptive research using *Single-group* design in which it involves a single treatment with two or more levels. The experimental design was used in determining the different formulations in order to come up with a quality result of the study as to the sensory attributes of dried fettuccine pasta enriched with gotu kola. While the descriptive design with the aid of questionnaire using the modified 4-point Hedonic scale to investigate the sensory attributes and level of liking in terms of aroma, color, taste and texture and the shelf life of the three treatments which vary in the measurement of blended gotu kola. In harvesting the gotu kola, the researcher is careful enough to select the finest leaves both young and mature leaves together with its stem since they contain vital nutrients. The researcher got the gotu kola source at Loon, Bohol in which it is where the gotu kola herbs can be found in a domesticated area where it is a moist place and safe environment. After gathering the herbs, the researcher bought the other ingredients in the local market. And prepare the needed ingredients, tools, materials, and equipment in making the dried fettuccine pasta. The ingredients were separated and measured accurately with the proper use of tools and equipment. All the tools and equipment used were cleaned, sanitized and in good condition. The researcher formulated the recipes in three treatments; Treatment 1 is the pasta with 25 grams of fresh gotu kola, Treatment 2 is the pasta with 50 grams of fresh Gotu Kola, Treatment 3 is the pasta with 75 grams of fresh Gotu Kola.

The study was conducted at six BISU Campuses namely: BISU Main Campus, Balilihan Campus, Bilar Campus, Calape Campus, Candijay Campus, and Clarin Campus. The purposive sampling method was used to determine the participants. It involved 85 respondents composed of 55 selected food technology experts (25 instructors handling food technology and food related subjects and 30 students taking Master of Arts in Teaching Vocational Education major in Food Technology) and 30 consumers.

RESULTS AND DISCUSSION

In observing the shelf life of dried fettuccine pasta enriched with gotu kola, the researcher used two ways to identify the shelf life of the dried fettuccine pasta. The researcher put the pasta in sealed food containers and placed it in a refrigerator and a room to test how many days the pasta lasted in refrigerated and room temperature condition.

Table 1 reflects the shelf life of dried fettuccine pasta enriched with gotu kola in three (3) treatments. As illustrated in Table 1 in refrigerated condition, from day 1 to day 2, the three treatments were no changes occurred and were safe for human consumption. However, on day 3 changes occurred as to its aroma, color and texture. Aroma became unpleasant, texture became soft and lighter color. Therefore, on day 3, all three treatments were spoiled and not safe for food consumption.

Table 1 Shelf life of dried fettuccine pasta with enriched gotu kola in refrigerated condition

Treatment	Number of days	
	Day 1-2	Day 3
T1	No changes occurred	Unpleasant aroma, lighter color, and not safe for food consumption
T2	No changes occurred	Unpleasant aroma, lighter color, and not safe for food consumption
T3	No changes occurred	Unpleasant aroma, lighter color, and not safe for food consumption

Table 2 Shelf life of dried fettuccine pasta with enriched gotu kola in room temperature condition

Treatment	Number of weeks			
	Week 1-2	Week 3	Week 4	Week 5
T1	No changes occurred	Lighter color	Lighter color and milder aroma	Molds appeared and no longer safe for consumption
T2	No changes occurred	Lighter color	Lighter color and milder aroma	Molds appeared and no longer safe for consumption
T3	No changes occurred	No changes occurred	Lighter color and milder aroma	Molds appeared and no longer safe for consumption

Another way to get the shelf life of the dried fettuccine pasta enriched with gotu kola is in room temperature condition. As shown in Table 2 in room temperature condition, from day 1-2 week, the three treatments were no changes occurred. However, on week 3, the researcher observed that the color of the treatment 1- 25 grams of gotu kola as well as the treatment 2- 50 grams of gotu kola slightly faded and lighter. But for treatment 3- 75 grams of gotu kola, the color remained and there were no changes occurred. On week 4, the observation of the three treatments was lighter color and milder. Lastly on week 5, the three treatments, has molds appeared and no longer safe for consumption. The measurements of gotu kola added to the pasta, were one of the factors that affected the shelf life of the pasta. In room temperature condition, the three treatments got damaged on week 5. But in refrigerated condition it was easily damaged on the 3rd day. Thus, the lesser the blended fresh gotu kola, the longer its shelf life. The more the blended fresh gotu kola, the earlier to spoil.

Table 3 Nutrition facts analysis of dried fettuccine pasta enriched with gotu kola

Analysis	T1	T2	T3
Crude ash, g/100g	1.22	1.11	1.50
Crude fat, g/100g	3.80	3.82	3.41
Moisture, g/100g	14.9	12.6	14.8
Crude Protein, g/100g	13.6	14.0	13.2
Carbohydrates, g/100g	66.5	68.5	67.1
Calories, cal/100g	355	364	352

Table 3 shows the nutritional facts analysis of the dried fettuccine pasta enriched with gotu kola among the three treatments. In order to get the nutritional value of the three treatments, the researcher submitted the required sample size to First Analytical Services and Technical Cooperatives (F.A.S.T) Laboratories. They identified the basic requirement of the Food and Drugs Administration (FDA) which is moisture, ash, fat, protein, calories, and carbohydrates. The result implies that in every 100 grams of each treatment, it contains adequate energy and nutrients for the maintenance of health and well-being of people (Das, 2011).

Table 4 Sensory attributes of dried fettuccine pasta enriched with gotu kola in terms of aroma, color, taste and texture

Sensory attributes	Treatment 1		Treatment 2		Treatment 3	
	Mode	Description	Mode	Description	Mode	Description
Aroma	2	Slightly Pleasant	3	Pleasant	3	Pleasant
Color	2	Light Green	3	Green	4	Dark Green
Taste	3	Distinctive	3	Distinctive	3	Distinctive
Texture	2	Slightly Firm	3	Firm	4	Very Firm

Table 4 displays the result of the sensory attributes of the study in terms of aroma, color, taste and texture. In terms of aroma, it depicts the lesser gotu kola is mixed to the product, the less it perceives the odor of the gotu kola added to the pasta. In terms of color, it shows that the more amount of gotu kola added to the pasta, the nicer its color and appearance would be. On the other hand, in terms of taste, the more gotu kola added to the pasta, the more unique its taste would be. Lastly, in terms of texture, the more gotu kola added to the pasta, the more tender and “al dente” the pasta would be, if cooked.

Table 5 Level of liking of dried fettuccine pasta enriched with gotu kola

Sensory attributes	Treatment 1		Treatment 2		Treatment 3	
	WM	Description	WM	Description	WM	Description
Aroma	3.12	Like Moderately	3.15	Like Moderately	3.07	Like Moderately
Color	2.98	Like Moderately	3.20	Like Moderately	3.33	Like Very Much
Taste	2.86	Like Moderately	3.11	Like Moderately	3.39	Like Very Much
Texture	2.87	Like Moderately	3.25	Like Very Much	3.40	Like Very Much
AWM	2.96	Like Moderately	3.18	Like Moderately	3.30	Like Very Much

Table 5 reveals that treatment 3 got the highest average weighted mean of 3.30 which described as “like very much” in terms of aroma, color, taste and texture because of its gotu kola content (75g) compared to treatments 1 (25g) and 2 (50g).

Table 6 reveals the difference on the level of liking of the dried fettuccine pasta in three treatments. It shows that it had a significant difference since the computed f-value is greater than the tabular f-value. Therefore, it implies that the three treatments had different odor, shade, flavor and consistency because the three treatments have different measurement of gotu kola added to the ingredients of pasta. Thus, the null hypothesis is rejected.

Table 6 Difference on level of liking of dried fettuccine pasta in three treatments

Difference on the level of liking of the dried fettuccine pasta in three treatments	Computed f-value	Tabular f-value	Interpretation	Decision
	At 5% level of significance			
	41.16	3.03	Significant	Reject null hypothesis

Table 7 Post hoc analysis in difference on level of liking of the dried fettuccine pasta in three treatments

Post-Hoc Tukey HSD test			
Treatments pair	Tukey HSD Q statistic	Tukey HSD p-value	Tukey HSD inference
TR 1 v TR 2	6.7442	0.0010053	** p<0.01
TR 1 v TR 3	12.8251	0.0010053	** p<0.01
TR 2 v TR 3	6.0809	0.0010053	** p<0.01

Table 7 denotes that the pairs of treatments were significantly different from each other in the level of liking of the dried fettucine pasta in three treatments. Therefore, it implies that treatments 1, 2 and 3 have big difference in the respondents' level of liking since treatment 1 had 25 grams gotu kola, treatment 2 had 50 grams of gotu kola and treatment 3 had 75 grams of gotu kola.

CONCLUSION

Based on the result of the study, the nutritive value of the three treatments of Dried Fettucine Pasta Enriched with Gotu Kola: T1- 25 grams of fresh gotu kola, T2- 50 grams of fresh gotu kola, and T3- 75 grams of fresh gotu kola was evaluated by F.A.S.T Laboratories and found out that in every 100 grams of it is rich with nutrients and no preservatives added.

The dried fettucine pasta has a longer shelf life if kept in a room temperature than kept in a refrigerated temperature. The pasta should be completely dried to have a longer shelf life since the moisture content of the pasta can cause the product to spoil easily.

Based on statistical result in the level of likeness of Dried Fettucine Pasta Enriched with Gotu Kola shows that Treatment 3- Pasta with 75 grams of fresh Gotu Kola as rated "like very much" in terms of color, taste and texture. The result reveals that there was a significant difference in the level of liking of the dried fettucine pasta in three treatments, therefore it implies that all treatments had different odor, shade, flavor and consistency because the three treatments have different measurement of gotu kola added to the ingredients of pasta.

ACKNOWLEDGEMENTS

As the researcher journeyed throughout this study, many people helped and supported her along the way. It is only right to thank and give these people appreciation and recognition.

The researcher would like to express her heartfelt gratitude to the Almighty God for the blessings, guidance and grace; To Dr. Jean F. Nebrea, the co-author, for rendering her time, effort, and encouragement to continue undertaking the study, for sharing her knowledge and expertise for going over the paper; To Dr. Mary Grace C. Ramada, the editor, for her assistance and effort in correcting the grammar of this paper; To Prof. Edelmarie A. Cellan, the statistician, for her pieces of advice in the computation of statistical treatment and providing the correct formula; To 13th ICERD Organizing Committee, for granting my request to be one of the presenters for the 13th International Conference on Environmental and Rural Development; To Research Development and Extension Committee of BISU, for the assistance, giving support especially in processing my prepayment, and for providing funds; To Bohol Island State University, for the opportunity you had given me to be one of the presenters for the 13th International Conference on Environmental and Rural Development; To College of Technology and Allied Sciences- Research Development Office, for the trust you had given me to be selected as one of the faculty researchers; and To the Respondents, Food Technology Experts and Consumers, for the time in answering the questionnaires as and who helped the researcher in the collection of the data.

REFERENCES

- Alfaro, D. 2022. What is fettuccine? A guide to buying, cooking and storing fettuccine. The Spruce Eats, Retrieved from <https://www.thespruceeats.com/what-is-fettuccine-995667>
- American Botanical Council. 2008. Gotu kola, Medical and spiritual uses. American Botanical Council, Retrieved from <http://herbalgram.org/resources/herbclip/herbclip-news/2008/gotu-kola-medical-and-spiritual-uses/>
- Christensen, E. 2019. Dry pasta vs. fresh pasta, What's the difference? Kitchn is, Retrieved from <https://www.thekitchn.com/dry-pasta-vs-fresh-pasta-whats-47888>
- Congress of the Philippines Republic of the Philippines. 2009. Food and drug administration act of 2009. Republic Act No. 9711, Philippines, Retrieved from <https://www.officialgazette.gov.ph/2009/08/18/republic-act-no-9711/>

- Das, A.J. 2011. Review on nutritional medicinal and pharmacological properties of *Centella asiatica* (Indian pennywort). *Journal of Biologically Active Products from Nature*, 1 (4), 216-228, Retrieved from https://www.researchgate.net/publication/260041417_Review_on_Nutritional_Medicinal_and_Pharmacological_Properties_of_Centella_asiatica_Indian_pennywort
- Forever Healthy and Young. 1990. Gotu Kola, Two leaves a day keep old age away, Retrieved from <http://foreverhealthy.blogspot.com/2012/04/gotu-kola-two-leaves-day-keep-old-age.html>
- Harris, S. 2018. Is pasta good or bad for you? *Medical News Today*, Retrieved from <https://www.medicalnewstoday.com/articles/322564#whole-grain-vs-white>
- Icahn School of Medicine at Mount Sinai. 2018. Gotu kola. Mount Sinai, Retrieved from <https://www.mountsinai.org/health-library/herb/gotu-kola>
- Krieger, E. 2017. Herbal health benefits. *Herb Essentials*, Retrieved from <https://www.hiclassblends.com/2017/01/herbal-health-benefits/>
- Light, P.D. 2011. What is herbalism? *Appalachian Center for Natural Health*, Retrieved from <https://www.phyllisdlight.com>
- Stuart, G.U. Jr. 2018. Takip-kohol, *Centella asiatica* (L.) Urb. *Philippine Medicinal Plants*, Retrieved from <http://www.stuartxchange.org/TakipKohol.html>
- Wikimedia. 2022. Department of science and technology (Philippines). *Wikimedia Foundation*, Retrieved from [https://en.wikipedia.org/wiki/Department_of_Science_and_Technology_\(Philippines\)](https://en.wikipedia.org/wiki/Department_of_Science_and_Technology_(Philippines))