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Enhancement of Sensory Qualities of Papaya Leaf Extract (PLE) Gummy Candy

Bernel Hussein D. Acob, Ziah Jarmaine L. Hizon, Aiden Kristoff R. Limbungan, Rya Edryn Louise L. Watiwat, Anamarie G. Valdez*

Sultan Kudarat State University, ACCESS, EJC Montailla, Tacurong City, Sultan Kudarat, Philippines
Correspondence: E-mail: ziahjarmainehizon@sksu.edu.ph

ABSTRACT

This study aimed to improve the sweetened candy papaya leaf extract by enhancing sensory qualities using six treatments. We used the Evaluation Rating Sheets to evaluate the five sensory qualities, namely: color, odor, taste, texture, and overall appearance. There were twenty respondents evaluated the sweetened candy and were given a chance to rate it with the five ranges and parameters along with its interpretation. We used the one-way analysis of variance (ANOVA) to determine the difference between the sensory qualities of the treatments regarding sugar and honey. As the findings were concluded, it was found that each sweetener used in each replication contains the lowest mean, highest mean, and grand mean with the interpretation of Not acceptable, Slightly acceptable, Acceptable, Highly acceptable, and Very highly acceptable. In conclusion, we concluded that there is a statistically significant difference between Replication 1 and Replication 2 in terms of the five sensory qualities of sugar and honey as sweeteners. Thus, this study is beneficial to all youngsters, parents, candy manufacturers, and future researchers.

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1. INTRODUCTION

Carica papaya Linn, often known as Papaya, is a member of the Caricaceae family and was well-recognized around the world for its medicinal and nutritional characteristics (Bhadane *et al*., 2014; Alam *et al*., 2011). Since ancient times, several elements of the papaya plant have been employed for medicinal purposes (Singh *et al*., 2020). It was found that papaya leaves contain active components responsible for therapeutic efficacy and applications (Saeed *et al*., 2014), such as alkaloids, glycosides, tannins, saponins, and flavonoids (Nagarathna *et al*., 2021; Palanisamy & Basalingappa, 2020). It was also shown that its leaf extract possesses medicinal properties such as antibacterial, antiviral, anti-tumor, hypoglycemic, and anti-inflammatory activity (Singth *et al*., 2020; Khan *et al*., 2022; Hariono *et al*., 2021).

Moreover, papaya juice or papaya leaf extract increases the platelet counts in people suffering from dengue fever (Sathyapalan *et al*., 2020; Yuson-Sunga *et al*., 2021). Eventually, the papaya leaf extract converted into gummy papaya candy has a bitter taste, and the look appears to prevent individuals from eating because most children and adolescents prefer to eat aesthetically pleasing foods. Although papaya leaf extract candy is helpful and reliable in avoiding dengue or malaria disease, parents have difficulties convincing their children to intake it.

As a result, we induced to improve the sweetened candy papaya leaf extract by enhancing the sensory qualities using six treatments. This research will assist in addressing and expounding on the issue to be helpful to the benefactors. Conceptual Framework is shown in **Figure 1**.

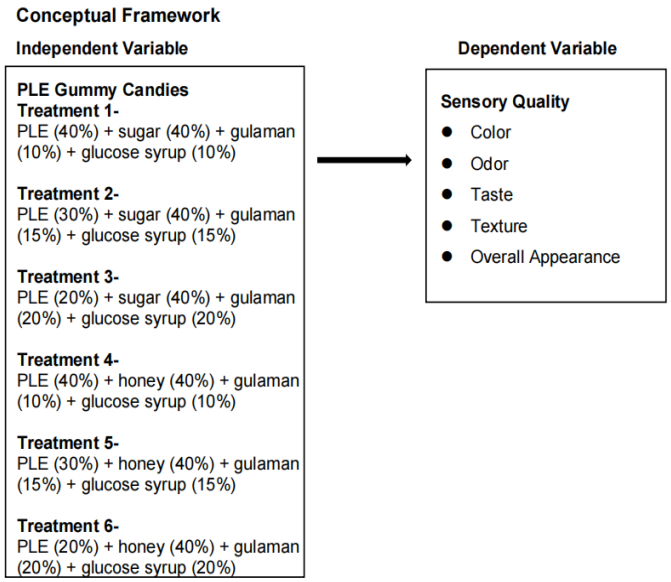

Figure 1. The conceptual framework of the study.

This study aimed to improve the sensory qualities of sweetened candies made from papaya leaf extract (PLE) along with the different compositions.

Specifically, it sought to answer the following questions:

(i) What is the sensory evaluation of the different developed treatments of PLE candies in terms of as perceived by young children for sugar as a sweetener: color, odor, taste, texture, and overall appearance?

(ii) What is the sensory evaluation of the different developed treatments of PLE candies in terms of as perceived by young children honey as a sweetener: color, odor, taste, texture, and overall appearance

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(iii) Is there a significant difference between the developed treatments in terms of color, odor, taste, texture, and overall appearance of sugar as a sweetener?
(iv) Is there a significant difference between the developed treatments in terms of color, odor, taste, texture, and overall appearance of honey as a sweetener?

2. METHODS

The study employed quantitative experimental research to improve the sensory qualities of papaya leaf extract (PLE) gummy candy in terms of color, odor, taste, texture, and overall appearance with the help of six treatments. We used Evaluation Rating Sheets based on a 5-point hedonic scale to evaluate the five parameters.

2.1. Materials and Equipment

The study used the following materials as such papaya leaves, honey, sugar, food coloring, glucose syrup, vanilla extract, food processor, strainer, gulaman powder, measuring cups, beakers, pot, containers, camera for documentation, and molder.

2.2. Preparation and Extraction of Papaya Juice

The papaya leaves collected were then chopped and cut off into small pieces, and placed in a container to wash and cleanse the dirt or dust encircling the leaves. After that, the leaves were put into the food processor with a small amount of water to easily extract the juice. Then, the juice extracted was separated from the shredded leaves through the use of a strainer. Lastly, the papaya leaf extract was measured into different measurements, following the percentage of each treatment, and was placed in a clean container to avoid intrusion of dirt and impure contaminants.

2.3 Experiment Design and Treatment

The study conducted utilized the Complete Randomized Design (CRD) with two-factor experiments, which are the sweeteners as Factor A and different Papaya Leaf Extract amounts as Factor B. Each replication was repeated twice.

2.4 Statistical Treatment

To assess the sensory qualities of the candy made with papaya leaf extract, the mean and standard deviation of the responses were computed across the five (5) parameters. We used the one-way analysis of variance (ANOVA) to determine the difference between the sensory qualities of the treatments in terms of sugar and honey.

3. RESULTS AND DISCUSSION

3.1. Sensory Evaluation of the different Developed Treatments of PLE Candies in Terms of Color, Odor, Texture, Taste, and Overall Appearance of Sugar as a Sweetener

Table 1 reveals that the highest mean scores were obtained by T3 (mean 3.85; sd 1.06184), and T6 (mean 3.85, sd 1.10703), all of which were rated as highly acceptable. This suggests that younger kids thought these two treatments looked more appealing in terms of color for sugar as a sweetener. T1, on the other hand, achieved the lowest mean with an interpretation of acceptable (mean = 3.05; sd = 1.24399). This indicates that, in terms of color, T1 is the least appealing of the six treatments to young children. **Table 1** also presents the obtained Grand Mean with a (mean of 3.40; sd = 1. 23746) along with its interpretation as acceptable. Young children are more attracted to colorful candies, so they developed papaya leaf extract candy

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with a result of a sum of (100.1728) in Single Factor in terms of color and Sugar as for sweetener.

Table 1. Analysis on the sensory evaluation of PLE candies with sugar as sweetener as perceived by the young children in terms of color.

Replication 1	Mean	SD	Interpretation
T1	3.05	1.24399	Acceptable
T2	3.60	0.86023	Highly acceptable
T3	3.85	1.06184	Highly acceptable
T4	2.30	1.12250	Slightly acceptable
T5	3.25	1.47902	Acceptable
T6	3.85	1.10703	Highly acceptable
Grand Mean	**3.40**	**1.23746**	**Acceptable**

Table 2 reveals that the highest mean scores were obtained by T3 (mean 4.10; sd .99499), and T6 (mean 4.10, sd 1.09087), all of which were rated as highly acceptable. This suggests that younger kids thought these two treatments felt smooth in terms of texture and very much not too porous to eat for sugar as a sweetener. T1, on the other hand, achieved the lowest mean with an interpretation of highly acceptable (mean = 3.80; sd = 1.20830). This indicates that, in terms of texture, T1 is the least smooth of the six treatments for young children. It also presents the table's Grand Mean which is 3.96; sd = 1.12839 with an interpretation of highly acceptable.

Table 2. Analysis on the sensory evaluation of PLE candies with sugar as sweetener as perceived by the young children in terms of texture.

Replication 1	Mean	SD	Interpretation
T1	3.80	1.20830	Highly acceptable
T2	3.85	1.23592	Highly acceptable
T3	4.10	0.99499	Highly acceptable
T4	3.85	1.15217	Highly acceptable
T5	4.05	1.02347	Highly acceptable
T6	4.10	1.09087	Highly acceptable
Grand Mean	**3.96**	**1.12839**	**Highly acceptable**

Table 3 reveals that the highest mean scores were obtained by T2 (mean 3.20; sd 1.24900), and T6 (mean 3.35, sd 1.32277), all of which were rated as acceptable. This suggests that younger kids thought these two treatments smelled good and satisfying for sugar as a sweetener. T4, on the other hand, achieved the lowest mean with an interpretation of slightly acceptable (mean = 1.90; sd = 0.83066). This indicates that, in terms of odor, T4 has the most putrid smell out of the six treatments for young children. It also shows the table's Grand Mean which is 2.68; sd = 1.32277 with an interpretation of acceptable.

Table 4 reveals that the highest mean scores were obtained by T2 (mean 3.75; sd 1.54515), and T3 (mean 3.75, sd 1.33647), all of which were rated as highly acceptable. This suggests that younger kids thought these two treatments tasted delicious and they like them for sugar as a sweetener. T4, on the other hand, achieved the lowest mean with an interpretation of not acceptable (mean = 1.70; sd = 0.78102). This indicates that, in terms of taste, T4 is the least delicious of the six treatments for young children. **Table 4** also presents the obtained Grand Mean which is 2.96; sd = 1.47984 with an interpretation of acceptable.

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Table 3. Analysis on the sensory evaluation of PLE candies with sugar as sweetener as perceived by the young children in terms of odor.

Replication 1	Mean	SD	Interpretation
T1	2.35	1.23592	Slightly acceptable
T2	3.20	1.24900	Acceptable
T3	2.55	1.32193	Slightly acceptable
T4	1.90	0.83066	Slightly acceptable
T5	2.75	1.33697	Acceptable
T6	3.35	1.31434	Acceptable
Grand Mean	**2.68**	**1.32277**	**Acceptable**

Table 4. Analysis on the sensory evaluation of PLE candies with sugar as sweetener as perceived by the young children in terms of taste.

Replication 1	Mean	SD	Interpretation
T1	2.75	1.29904	Acceptable
T2	3.75	1.33647	Highly acceptable
T3	3.75	1.54515	Highly acceptable
T4	1.70	0.78102	Not Acceptable
T5	2.60	1.35647	Slightly acceptable
T6	3.20	1.32668	Acceptable
Grand Mean	**2.96**	**1.47984**	**Acceptable**

Table 5 reveals that the highest mean scores were obtained by T2 (mean 3.65; sd 1.10793), which are rated as highly acceptable. This suggests that younger kids thought T2 is the most appealing and most acceptable in terms of the overall appearance of sugar as a sweetener. T4, on the other hand, achieved the lowest mean with an interpretation of slightly acceptable (mean = 2.30; sd = 1.05257). This indicates that, in terms of overall appearance, T4 is the least appealing of the six treatments to young children. It also shows the table's Grand Mean which is 3.07; sd = 1.23648 with an interpretation of acceptable.

Table 5. Analysis on the sensory evaluation of PLE candies with sugar as sweetener as perceived by the young children in terms of appearance.

Replication 1	Mean	SD	Interpretation
T1	2.75	1.29904	Acceptable
T2	3.75	1.33647	Highly acceptable
T3	3.75	1.54515	Highly acceptable
T4	1.70	0.78102	Not Acceptable
T5	2.60	1.35647	Slightly acceptable
T6	3.20	1.32668	Acceptable
Grand Mean	**2.96**	**1.47984**	**Acceptable**

3.2. Sensory Evaluation of the different Developed Treatments of PLE Candies in Terms of Color, Odor, Texture, Taste, and Overall Appearance for Honey as Sweetener

Table 6 reveals that the highest mean scores were obtained by T6 (mean 3.85; sd 1.10793), which were rated as highly acceptable. This suggests that younger kids thought T6 looked more appealing in terms of color for honey as a sweetener. T1, on the other hand, achieved the lowest mean with an interpretation of acceptable (mean = 3.05; sd = 1.24339). This indicates that, in terms of color, T1 is the least appealing of the six treatments for young

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children. The table also consists of the Grand Mean which is 3.54; sd = 1.28951 with an interpretation of highly acceptable.

Table 7 reveals that the highest mean scores were obtained by T6 (mean 4.15; sd 1.15217) which were rated as highly acceptable. This suggests that younger kids thought T6 felt smooth in terms of texture for honey as a sweetener. T1 (mean = 3.95; sd = 1.20312), T2 (mean = 3.95; sd = 1.16082), and T4 (mean = 3.95; sd = 1.32193) on the other hand, achieved the lowest means with an interpretation of highly acceptable. This indicates that in terms of texture, T1, T2, and T4 are the least smooth out of the six treatments for young children. **Table 7** also presents the obtained Grand Mean which is 4.02; sd = 1.28951 with an interpretation of highly acceptable.

Table 6. Analysis on the sensory evaluation of PLE candies with Honey as sweetener as perceived by the young children in terms of color.

Replication 2	Mean	SD	Interpretation
T1	3.05	1.24339	Acceptable
T2	3.70	1.14455	Highly acceptable
T3	3.35	1.04283	Acceptable
T4	3.25	1.37386	Acceptable
T5	3.65	0.96307	Highly acceptable
T6	3.85	1.10793	Highly acceptable
Grand Mean	**3.54**	**1.28951**	**Highly acceptable**

Table 7. Analysis on the sensory evaluation of PLE candies with Honey as sweetener as perceived by the young children in terms of texture.

Replication 2	Mean	SD	Interpretation
T1	3.95	1.20312	Highly acceptable
T2	3.95	1.16082	Highly acceptable
T3	4.00	1.09545	Highly acceptable
T4	3.95	1.32193	Highly acceptable
T5	4.10	0.88882	Highly acceptable
T6	4.15	1.15217	Highly acceptable
Grand Mean	**4.02**	**1.14734**	**Highly acceptable**

Table 8 reveals that the highest mean scores were obtained by T5 (mean 3.40; sd 1.28062 which were rated as acceptable. This suggests that younger kids thought T5 smelled good for honey as a sweetener. T1, on the other hand, achieved the lowest mean with an interpretation of not acceptable (mean = 1.30; sd = 1.10000). This indicates that, in terms of odor, T1 has the most putrid smell out of the six treatments for young children. **Table 8** also presents the obtained Grand Mean which is 2.81; sd = 1.31210 with an interpretation of acceptable.

Table 9 reveals that the highest mean scores were obtained by T6 (mean 3.20; sd 1.40000), which were rated as acceptable. This suggests that younger kids thought T6 is the most delicious of the six treatments for honey as a sweetener. T4, on the other hand, achieved the lowest mean with an interpretation of slightly acceptable (mean = 2.35; sd = 1.21963). This indicates that, in terms of taste, T4 is the least delicious of the six treatments for young children. **Table 9** also presents the obtained Grand Mean which is 2.81; sd = 1.39222 with an interpretation of acceptable.

Table 10 reveals that the highest mean scores were obtained by T5 (mean 3.55; sd .86458), which were rated as highly acceptable. This suggests that younger kids thought T5 was the

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most appealing in terms of the overall appearance of honey as a sweetener. T4, on the other hand, achieved the lowest mean with an interpretation of acceptable (mean = 2.75; sd = 1.21963). This indicates that, in terms of overall appearance, T4 is the least appealing in terms of the overall appearance of the six treatments for young children. **Table 10** also presents the obtained Grand Mean which is 3.30; sd = 1.22202 with an interpretation of acceptable.

Table 8. Analysis on the sensory evaluation of PLE candies with Honey as sweetener as perceived by the young children in terms of odor.

Replication 2	Mean	SD	Interpretation
T1	2.30	1.10000	Sightly acceptable
T2	2.65	1.27574	Acceptable
T3	3.10	1.41067	Acceptable
T4	2.35	1.06184	Slightly acceptable
T5	2.40	1.28362	Acceptable
T6	3.05	1.32193	Acceptable
Grand Mean	**2.81**	**1.31210**	**Acceptable**

Table 9. Analysis on the sensory evaluation of PLE candies with Honey as sweetener as perceived by the young children in terms of taste.

Replication 2	Mean	SD	Interpretation
T1	2.60	1.36382	Slightly acceptable
T2	2.80	1.36382	Acceptable
T3	2.95	1.46544	Acceptable
T4	2.35	1.21963	Slightly acceptable
T5	2.95	1.49917	Acceptable
T6	3.20	1.40000	Acceptable
Grand Mean	**2.81**	**1.39222**	Acceptable

Table 10. Analysis on the sensory evaluation of PLE candies with Honey as sweetener as perceived by the young children in terms of overall apprearance.

Replication 2	Mean	SD	Interpretation
T1	3.20	1.36382	Acceptable
T2	3.45	1.28355	Highly acceptable
T3	3.40	1.20000	Acceptable
T4	2.75	1.21963	Acceptable
T5	3.55	0.86458	Highly acceptable
T6	3.45	1.16082	Highly acceptable
Grand Mean	**3.30**	**1.22202**	Acceptable

3.3. Significant Differences Between the Developed Treatments in Terms of Color, Texture, Odor, Taste, and Overall Appearance of Sugar as a Sweetener.

Table 11 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance value of 0.030 (*F* = 0.3.837) and 0.021 (F = 4.306), are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T3 and T3 vs. T6. This is great to know that only in these two groups revealed significant differences between treatments conducted.

Table 12 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance values of 0.027 (F = 0.3.712), 0.001 (F =8.767), 0.042 (F =3.244), 0.027 (F =3.728) .025 (F =3.792) and

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0.025 (F =5.773), are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T5, T2 vs. T3, T2 vs. T4, T2 vs. T6, T4 vs. T5 and T4 vs. T6. This is great to know that only these six groups revealed significant differences between treatments conducted.

Table 11. Analysis on the significant differences between the developed treatments in terms of color with sugar as sweetener.

Replication 1 (Color)	F	Sig.	Interpretation
T1 vs. T2	0.483	0.699	Not Significant
T1 vs. T3	3.837	0.030**	Significant
T1 vs. T4	2.413	0.095	Not Significant
T1 vs. T5	0.330	0.854	Not Significant
T1 vs. T6	0.788	0.518	Not Significant
T2 vs. T3	1.213	0.337	Not Significant
T2 vs. T4	2.379	0.098	Not Significant
T2 vs. T5	0.158	0.956	Not Significant
T2 vs. T6	1.154	0.358	Not Significant
T3 vs. T4	0.397	0.807	Not Significant
T3 vs. T5	0.892	0.493	Not Significant
T3 vs. T6	4.306	0.021**	Significant
T4 vs. T5	0.639	0.643	Not Significant
T4 vs. T6	1.159	0.356	Not Significant
T5 vs. T6	2.236	0.123	Not Significant

**Signifacant at 0.05 level.

Table 12. Analysis on the significant differences between the developed treatments in terms of texture with sugar as sweetener.

Replication 1 (Texture)	F	Sig.	Interpretation
T1 vs. T2	1.179	0.359	Not Significant
T1 vs. T3	2.102	0.589	Not Significant
T1 vs. T4	2.064	0.137	Not Significant
T1 vs. T5	3.712	0.027**	Significant
T1 vs. T6	1.475	0.259	Not Significant
T2 vs. T3	8.767	0.001**	Significant
T2 vs. T4	3.244	0.042**	Significant
T2 vs. T5	0.500	0.737	Not Significant
T2 vs. T6	3.728	0.27**	Significant
T3 vs. T4	0.759	0.533	Not Significant
T3 vs. T5	1.554	0.239	Not Significant
T3 vs. T6	2.098	0.141	Not Significant
T4 vs. T5	3.792	0.025**	Significant
T4 vs. T6	5.773	0.025**	Significant
T5 vs. T6	1.449	0.266	Not Significant

**Signifacant at 0.05 level.

Table 13 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance value of 0.040 (F = 0.3.907) and 0.034 (F = 3.471), are below 0.05. , therefore, there is a statistically significant difference in the means of T2 vs. T4 and T3 vs. T5. This is good to know that only in these two groups revealed significant differences between treatments conducted.

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Table 13. Analysis on the significant differences between the developed treatments in terms of odor with sugar as sweetener.

Replication 1 (Odor)	F	Sig.	Interpretation
T1 vs. T2	1.227	0.341	Not Significant
T1 vs. T3	0.510	0.729	Not Significant
T1 vs. T4	0.898	0.489	Not Significant
T1 vs. T5	0.775	0.559	Not Significant
T1 vs. T6	0.775	0.559	Not Significant
T2 vs. T3	0.877	0.501	Not Significant
T2 vs. T4	3.907	0.040**	Significant
T2 vs. T5	3.471	0.034**	Significant
T2 vs. T6	2.253	0.112	Not Significant
T3 vs. T4	0.452	0.769	Not Significant
T3 vs. T5	2.544	0.083	Not Significant
T3 vs. T6	1.531	0.244	Not Significant
T4 vs. T5	1.025	0.380	Not Significant
T4 vs. T6	3.339	0.060	Not Significant
T5 vs. T6	1.282	0.321	Not Significant

**Signifacant at 0.05 level.

Table 14 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance value of 0.031 (F = 3.827), 0.017 (F =5.270), 0.016 (F =4.316), 0.021 (F =4.288), 0.012 (F =4.640), 0.021 (F =4.857), 0.001(F =9.126), 0.021 (F =4.857), 0.001(F = 10.193), are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T3, T1 vs. T4, T1 vs. T5, T3 vs. T3, T2 vs. T6, T3 vs. T4, T3 vs. T6, T4 vs. T5, and T4 vs. T6. This is great to know that these nine groups revealed significant differences between treatments conducted.

Table 14. Analysis on the significant differences between the developed treatments in terms of taste with sugar as sweetener.

Replication 1 (Taste)	F	Sig.	Interpretation
T1 vs. T2	1.567	0.169	Not Significant
T1 vs. T3	3.827	0.031**	Significant
T1 vs. T4	5.270	0.017**	Significant
T1 vs. T5	4.316	0.016**	Significant
T1 vs. T6	1.072	0.405	Not Significant
T2 vs. T3	4.288	0.021**	Significant
T2 vs. T4	1.565	0.235	Not Significant
T2 vs. T5	0.422	0.791	Not Significant
T2 vs. T6	4.640	0.012**	Significant
T3 vs. T4	4.288	0.021**	Significant
T3 vs. T5	2.683	0.082	Not Significant
T3 vs. T6	9.126	0.001**	Significant
T4 vs. T5	4.857	0.021**	Significant
T4 vs. T6	10.193	0.001**	Significant
T5 vs. T6	2.031	0.141	Not Significant

**Signifacant at 0.05 level.

Table 15 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance values of 0.042 (F = 3.241), 0.024 (F = 3.837), 0.020 (F = 4.062), and 0.043 (F = 3.213) are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T2, T1 vs.

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T4, T2 vs. T3, and T4 vs. T5. This is great to know that only these four groups revealed significant differences between treatments conducted.

Table 15. Analysis on the significant differences between the developed treatments in terms of overall apprearance with sugar as sweetener.

Replication 1 (Overall Apprearance)	F	Sig.	Interpretation
T1 vs. T2	3.241	0.042**	Significant
T1 vs. T3	1.828	0.176	Not Significant
T1 vs. T4	3.837	0.024**	Significant
T1 vs. T5	1.512	0.249	Not Significant
T1 vs. T6	1.343	0.300	Not Significant
T2 vs. T3	4.062	0.020**	Significant
T2 vs. T4	1.753	0.191	Not Significant
T2 vs. T5	0.271	0.892	Not Significant
T2 vs. T6	0.536	0.712	Not Significant
T3 vs. T4	0.951	0.462	Not Significant
T3 vs. T5	1.830	0.176	Not Significant
T3 vs. T6	0.907	0.462	Not Significant
T4 vs. T5	3.213	0.043**	Significant
T4 vs. T6	0.426	0.801	Not Significant
T5 vs. T6	0.446	0.773	Not Significant

**Signifacant at 0.05 level.

3.4. Significant Differences Between the Developed Treatments in Terms of Color, Texture, Odor, Taste, and Overall Appearance of Honey as a Sweetener.

Table 16 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance values of 0.035 (F = 3.438), 0.002 (F = 7.488), 0.046 (F = 3.153), 0.011 (F = 5.171), 0.012 (F = 4.617), 0.001 (F = 9.362), and 0.007 (F = 5.858) are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T6, T2 vs. T3, T2 vs. T4, T2 vs. T6, T3 vs. T6, T4 vs. T5, and T5 vs. T6. This is great to know that only in these seven groups revealed significant differences between treatments conducted.

Table 16. Analysis on the significant differences between the developed treatments in terms of color with honey as sweetener.

Replication 2 (Color)	F	Sig.	Interpretation
T1 vs. T2	1.221	0.343	Not Significant
T1 vs. T3	0.679	0.617	Not Significant
T1 vs. T4	0.510	0.729	Not Significant
T1 vs. T5	1.071	0.405	Not Significant
T1 vs. T6	3.438	0.035**	Significant
T2 vs. T3	7.488	0.002**	Significant
T2 vs. T4	3.153	0.046**	Significant
T2 vs. T5	2.289	0.117	Not Significant
T2 vs. T6	5.171	0.011**	Significant
T3 vs. T4	0.459	0.714	Not Significant
T3 vs. T5	1.834	0.182	Not Significant
T3 vs. T6	4.617	0.012**	Significant
T4 vs. T5	9.362	0.001**	Significant
T4 vs. T6	0.947	0.646	Not Significant
T5 vs. T6	5.858	0.007**	Significant

**Signifacant at 0.05 level.

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Table 17 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means in terms of texture with honey sweetener. It is very interesting to note that among all the treatments formulated, only T1 vs. T2 disclosed Not Significant (F=2.29; Sig = 0.107). This implies that young children are already particular in terms of texture when eating candies. When the texture is not appealing to them, they perceive that the candy is not delicious.

Table 17. Analysis on the significant differences between the developed treatments in terms of texture with honey as sweetener.

Replication 2 (Texture)	F	Sig.	Interpretation
T1 vs. T2	2.294	0.107	Not Significant
T1 vs. T3	3.931	0.028**	Significant
T1 vs. T4	13.538	0.000**	Significant
T1 vs. T5	3.485	0.033***	Significant
T1 vs. T6	3.317	0.039**	Significant
T2 vs. T3	18.101	0.000**	Significant
T2 vs. T4	30.464	0.000**	Significant
T2 vs. T5	10.027	0.001**	Significant
T2 vs. T6	13.321	0.000**	Significant
T3 vs. T4	35.478	0.000**	Significant
T3 vs. T5	37.333	0.000**	Significant
T3 vs. T6	14.813	0.000**	Significant
T4 vs. T5	11.835	0.000*	Significant
T4 vs. T6	10.338	0.000*	Significant
T5 vs. T6	7.618	0.001**	Significant

**Signifacant at 0.05 level.

Table 18 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance values of 0.012 (F = 5.075), 0.037 (F = 3.376), and 0.002 (F = 7.431) are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T4, T2 vs. T3, and T2 vs. T6. This is great to know that only these three groups revealed significant differences between treatments conducted.

Table 19 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance values of 0.000 (F = 11.672), 0.001 (F = 9.013), 0.043 (F = 3.212), 0.004 (F = 6.500), and 0.13 (F = 4.901) are below 0.05. and, therefore, there is a statistically significant difference in the means of T2 vs. T6, T3 vs. T6, T4 vs. T5, T4 vs. T6, and T5 vs. T6. This is great to know that only these five groups revealed significant differences between treatments conducted.

Table 20 shows the output of the ANOVA analysis and whether there is a statistically significant difference between the group means. It reveals that the significance values of 0.002 (F = 7.050), 0.000 (F = 13.307), 0.024 (F = 3.867), 0.002 (F = 7.511), 0.019 (F = 4.450), and 0.042 (F = 3.230) are below 0.05. and, therefore, there is a statistically significant difference in the means of T1 vs. T2, T1 vs. T4, T2 vs. T3, T2 vs. T6, T3 vs. T5, and T3 vs. T6. This is great to know that only these six groups revealed significant differences between treatments conducted.

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Table 18. Analysis on the significant differences between the developed treatments in terms of odor with honey as sweetener.

Replication 2 (Odor)	F	Sig.	Interpretation
T1 vs. T2	2.810	0.064	Not Significant
T1 vs. T3	1.436	0.271	Not Significant
T1 vs. T4	5.075	0.012**	Significant
T1 vs. T5	1.857	0.178	Not Significant
T1 vs. T6	1.641	0.216	Not Significant
T2 vs. T3	3.376	0.037**	Significant
T2 vs. T4	0.674	0.581	Not Significant
T2 vs. T5	2.451	0.101	Not Significant
T2 vs. T6	7.431	0.002**	Significant
T3 vs. T4	0.984	0.425	Not Significant
T3 vs. T5	1.521	0.247	Not Significant
T3 vs. T6	2.009	0.145	Not Significant
T4 vs. T5	3.106	0.56	Not Significant
T4 vs. T6	0.342	0.846	Not Significant
T5 vs. T6	1.521	0.246	Not Significant

**Signifacant at 0.05 level.

Table 19. Analysis on the significant differences between the developed treatments in terms of taste with honey as sweetener.

Replication 2 (Taste)	F	Sig.	Interpretation
T1 vs. T2	2.007	0.145	Not Significant
T1 vs. T3	2.820	0.063	Not Significant
T1 vs. T4	0.570	0.643	Not Significant
T1 vs. T5	0.455	0.767	Not Significant
T1 vs. T6	1.430	0.271	Not Significant
T2 vs. T3	2.893	0.059	Not Significant
T2 vs. T4	1.273	0.317	Not Significant
T2 vs. T5	1.657	0.212	Not Significant
T2 vs. T6	11.672	0.000**	Significant
T3 vs. T4	2.695	0.081	Not Significant
T3 vs. T5	1.138	0.376	Not Significant
T3 vs. T6	9.013	0.001**	Significant
T4 vs. T5	3.212	0.043**	Significant
T4 vs. T6	6.500	0.004**	Significant
T5 vs. T6	4.901	0.013**	Significant

**Signifacant at 0.05 level.

Table 20. Analysis on the significant differences between the developed treatments in terms of overall apprearance with honey as sweetener.

Replication 2 (Overall Apprearance)	F	Sig.	Interpretation
T1 vs. T2	7.050	0.002**	Significant
T1 vs. T3	2.345	0.102	Not Significant
T1 vs. T4	13.307	0.000**	Significant
T1 vs. T5	0.287	0.824	Not Significant
T1 vs. T6	2.747	0.068	Not Significant
T2 vs. T3	3.867	0.024**	Significant
T2 vs. T4	2.178	0.121	Not Significant
T2 vs. T5	1.112	0.373	Not Significant

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Table 20 (Continue). Analysis on the significant differences between the developed treatments in terms of overall apprearance with honey as sweetener.

Replication 2 (Overall Apprearance)	F	Sig.	Interpretation
T2 vs. T6	7.511	0.002**	Significant
T3 vs. T4	0.853	0.514	Not Significant
T3 vs. T5	4.450	0.019**	Significant
T3 vs. T6	3.230	0.042**	Significant
T4 vs. T5	0.500	0.688	Not Significant
T4 vs. T6	1.782	0.185	Not Significant
T5 vs. T6	0.900	0.488	Not Significant

**Signifacant at 0.05 level.

4.CONCLUSION

The goal of this study was to enhance the candy constructed with papaya leaf extract's Color, Odor, Taste, Texture, and Overall Appearance to appeal to the youth. Based on the ratings gathered, all replications in which sugar was the sweetener used were involved and were rated and interpreted as Acceptable. Thus, the results that were gathered came out as acceptable to all the youngsters. Also, in terms of honey being the sweetener, it was conceptualized that the sensory evaluation was interpreted as Highly Acceptable. The five sensory qualities namely, Color, Odor, Taste, Texture, and Overall Appearance were given high ratings, which the youngsters rated positively. Overall, we concluded that Replication 1 and Replication 2 in terms of the five sensory qualities of Sugar and Honey as sweeteners revealed statistically significant differences between the treatments.

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6. AUTHORS' NOTE

The authors guarantee that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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