**Euphorbia hirta** (Asthma Plant) Gummies as Alternative Supplements: An Experimental Research

Dwyane Emanuel U. Romano¹; Francez Louise E. Putot²; Shane Lynster M. Pael³; Jiel Nicol A. Cordova⁴; Princess Shaina B. Bucog⁵; Kent Lloyd M. Destajo⁶

Basic Education, Saint Paul University Surigao, Philippines

¹ dwyanemanuel.romano@spus.edu.ph; ² francezlouise.putot@spus.edu.ph; ³ shanelynster.pael@spus.edu.ph; ⁴ jielnicol.cordova@spus.edu.ph; ⁵ princessshaina.bucog@spus.edu.ph; ⁶ kentlloyd.destajo@spus.edu.ph

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**Abstract**—This study aimed to produce the **Euphorbia hirta** (Asthma Plant) Gummies as an Alternative supplement. Specifically, this study sought to answer the following: (1) What is the procedure in producing the **Euphorbia hirta** gummies? (2) What is the acceptability of **Euphorbia hirta** (Asthma Plant) gummies as alternative supplements through Hedonic Rating Scale in terms of appearance, aroma, taste, and texture? (3) Is the **Euphorbia hirta** (Asthma Plant) gummies as alternative supplements recommendable through Descriptive Rating Test in terms of appearance, aroma, taste, and texture? To evaluate the product the researchers used sensory evaluation, wherein 10 selected individuals from the St. Paul University Surigao community participated, including canteen staff, TLE teachers, and fetchers. To carry out the data collection, this study used a research-made questionnaire for gathering data, which consists of two parts. Descriptive Rating Test and Hedonic Rating Scale were utilized for assessing the product’s characteristics. The result of the study explained that there is a potential for **Euphorbia hirta** gummies as an alternative supplement.

**Keywords**— **Euphorbia hirta**, asthma plant, gummies, alternative supplement

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**I. INTRODUCTION**

**Euphorbia hirta**, commonly known as "tawa-tawa" in the Philippines, is a traditional herb abundant in grasslands, often harvested at its flowering stage to prepare a decoction used as tea (Perera et al., 2018). This plant exhibits a rich phytochemistry, offering a variety of pharmacological benefits, including dietary antioxidants, anti-inflammatory properties, and phytoneutrients that support immune function (Khursheed & Jain, 2021). (Vaidya, 2017) reported that the leaves of **Euphorbia hirta** have anti-inflammatory and wound-healing properties, whereas its juice has been used to treat colds and diarrhea. In a study by Nyeem et al. (2017) investigating the medicinal properties of **Euphorbia hirta**. **Euphorbia hirta**, a plant from the Euphorbiaceae family, is nutritionally significant, with its leaves containing flavonoids, polyphenols, tannins, sterols, alkaloids, glycosides, and triterpenoids (Nyeem et al., 2017). In this regard, plants have been utilized from early human advancement onwards as a medication and supplement for a wide range of diseases and are cost-effective (Dash et al., 2018).
Herbal plants are increasingly being recognized as a valuable source of alternative supplementation due to their potential to prevent and treat various diseases (Soundararajan et al., 2018). As people become increasingly interested in natural supplements and alternative ways, more and more individuals are turning to herbal extracts to address their health concerns. One creative way to consume these extracts is by incorporating them into gummies, a tasty and convenient form that is particularly appealing to everyone. Making gummies from herbal extracts allows for a fun way to incorporate the benefits of natural supplements into one's daily routine. In this context, this research explores the process of making gummies out of herbal extracts, focusing on the use of *Euphorbia hirta* extract as an alternative supplement.

Plant-based gummies offer a range of benefits as they can be used as edible coatings to extend the shelf-life of fresh fruits, vegetables, and even herbal plants (Saha et al., 2017). These gummies have high stabilization, viscosity, and adhesive properties, making them suitable for various applications, including pharmaceutical formulations (Babbar et al., 2015). Additionally, plant gummies have been used in food industries, and their extraction, composition, and properties have been extensively studied (Nascimento et al., 2023). The medicinal and nutritional importance of plants lies in different phytochemical components that have a particular physiological action on the human body (Ghosh et al., 2019).

This study aimed at *Euphorbia hirta* gummy supplements aims to assess their efficacy, safety, and potential health benefits for consumers. Researchers investigate the specific ingredients and provide the intended health outcomes, such as improved immune function. Additionally, studies often explore the consumer acceptability and adherence to herbal gummy supplements compared to other forms of supplementation. This supplement is connected to the field of food science and potentially will be adored by many consumers by its taste and use of these gummies in one's daily routine. The research involved thoughtful planning and idea generation to ensure safe and proper experimental procedures. The primary aim was to enhance the product's convenience, making it a viable alternative supplement for everyone.

II. STATEMENT OF THE PROBLEM

This study aimed to determine the potential of *Euphorbia hirta* gummies as Alternative Supplements. Specifically, it sought to answer the following questions:

1. What is the procedure for producing the *Euphorbia hirta* gummies:
   1.1. Preparation of ingredients;
   1.2. Decoction of the *Euphorbia hirta* (Asthma Plant); and
   1.3. Production of *Euphorbia hirta* (Asthma Plant) gummies?

2. What is the acceptability of *Euphorbia hirta* (Asthma Plant) gummies as alternative supplements through the Hedonic Rating Scale in terms of:
   2.1. Appearance;
   2.2. Aroma;
   2.3. Taste; and
   2.4. Texture

3. Is the *Euphorbia hirta* (Asthma Plant) gummies as alternative supplements recommendable through the Descriptive Rating Test in terms of:
   3.1. Appearance;
   3.2. Aroma;
   3.3. Taste; and
   3.4. Texture

4. What is the Basic Nutritional Facts Analysis of *Euphorbia hirta* (Asthma Plant) Gummies as an Alternative Supplement?

III. ASSUMPTION

It is assumed that *Euphorbia hirta* (Asthma Plant) is accepted and recommended as an Alternative Supplement and will receive favorable sensory evaluation and exhibit beneficial nutritional properties as an Alternative Gummies Supplement.
IV. METHODOLOGY

This study assessed a developmental study to develop an alternative gummy supplement manufactured from *Euphorbia hirta* (Asthma plant). The study was conducted in six phases: (1) Preparation of ingredients, (2) Decoction of *Euphorbia hirta*, (3) Production of *Euphorbia hirta* gummies, (4) Nutrition fact test, (5) Sensory Evaluation, and (6) Data Analysis. This study aimed to determine the potential of *Euphorbia hirta* as a Gummy Supplement and evaluate it in terms of taste, aroma, texture, and appearance. Data were collected through the following process: Different Sample Preparation and Distribution. The materials of this study are evaluated using sensory evaluation. Texture profile analysis was used to determine the mechanical properties of functional gummies. The assessors are instructed to provide a glass of water to rinse their mouths out before tasting the sample to remove all traces of previous taste from other foods to further elaborate the taste of the gummies. The participants were given a product sample and evaluation sheet to answer. From the evaluation given, the data was collected, interpreted, and analyzed to determine the development needed for the product.

V. RESULTS AND DISCUSSION

This chapter presents the results and discussion of the data obtained from the respondents of ten (10) respondents selected Canteen Staff, Teachers, and Consumers from St. Paul University Surigao. Those data were carefully analyzed, presented, discussed, and interpreted according to the perimeter of this research to answer the sensory evaluation of Asthma Plant Gummies Using a Hedonic Rating Scale.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>M</th>
<th>DV</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>8.1</td>
<td>8.00</td>
<td>LM</td>
</tr>
<tr>
<td>Aroma</td>
<td>8.1</td>
<td>7.50</td>
<td>LM</td>
</tr>
<tr>
<td>Taste</td>
<td>8.3</td>
<td>8.50</td>
<td>LVM</td>
</tr>
<tr>
<td>Texture</td>
<td>8.5</td>
<td>9.00</td>
<td>LE</td>
</tr>
</tbody>
</table>

Table 1. Sensory Evaluation of *Euphorbia hirta* through Hedonic Rating Scale

Legend:

<table>
<thead>
<tr>
<th>Range</th>
<th>Descriptive</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.75 - 9.00</td>
<td>Like Extremely</td>
<td>LE</td>
</tr>
<tr>
<td>8.00 – 8.50</td>
<td>Like Very Much</td>
<td>LVM</td>
</tr>
<tr>
<td>7.00 – 7.50</td>
<td>Like Moderately</td>
<td>LM</td>
</tr>
<tr>
<td>6.00 – 6.50</td>
<td>Like Slightly</td>
<td>LS</td>
</tr>
<tr>
<td>5.00 – 5.50</td>
<td>Neither like or Dislike</td>
<td>NLOD</td>
</tr>
<tr>
<td>4.00 – 4.50</td>
<td>Dislike Slightly</td>
<td>DS</td>
</tr>
<tr>
<td>3.00 – 3.50</td>
<td>Dislike Moderately</td>
<td>DM</td>
</tr>
<tr>
<td>2.00 - 2.50</td>
<td>Dislike Very Much</td>
<td>DVM</td>
</tr>
<tr>
<td>1.00 - 1.50</td>
<td>Dislike Extremely</td>
<td>DE</td>
</tr>
</tbody>
</table>

Table 1 The Sensory Evaluation of *Euphorbia hirta* gummies, based on feedback from 10 respondents, highlights a well-rounded product. The nine-point hedonic scale is commonly used in food science for product acceptance evaluation (Pimentel et al., 2015). The scale ranges from 'extremely like' to 'extremely dislike' (Xia et al., 2020), and Rolim et al. (2019) utilize a 9-point hedonic scale to study consumers' acceptability towards healthier results. Texture obtained the highest score (9.00), noted for its enjoyable chewiness, contributing significantly to the overall satisfaction of the product. It was classified as Like significantly (LE), indicating a highly positive reaction to the appearance. Taste rated positively (8.50). It demonstrates a commendable balance, with a pleasing fusion of sweetness and herbal undertones that resonated positively with the respondents and was classified as Like Very Much. Aroma and appearance both rated positively (7.50 and 8.00, respectively); the two subtle yet pleasing and complementing the herbal nature of *Euphorbia hirta* were classified as Like Moderately (LM). This indicated that the participants, on average, are fond of the Aroma and Taste. This comprehensive sensory assessment indicates a thoughtfully crafted gummy, impressing across taste, appearance, texture, and aroma, promising a delightful experience for consumers. Mahat et al. (2020) suggested that the sensory scores for flexibility, hardness, and chewiness can predict hedonic ratings, suggesting that these attributes are important in gummy evaluation.
Table 2. Sensory Evaluation of Euphorbia hirta through Descriptive Rating Test

<table>
<thead>
<tr>
<th>Attributes</th>
<th>M</th>
<th>DV</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>3.5</td>
<td>3.00</td>
<td>R</td>
</tr>
<tr>
<td>Aroma</td>
<td>3.5</td>
<td>3.00</td>
<td>R</td>
</tr>
<tr>
<td>Taste</td>
<td>3.3</td>
<td>3.50</td>
<td>HR</td>
</tr>
<tr>
<td>Texture</td>
<td>3.6</td>
<td>4.00</td>
<td>HR</td>
</tr>
</tbody>
</table>

Legend:

- **Range**: 3.25 - 4.00
- **Comprehensive Descriptive Code**: Highly Recommendable (HR)
- **Recommendable**: Range: 2.50 - 3.24
- **Not Recommendable**: Range: 1.75 - 2.49
- **Highly Not Recommendable**: Range: 1.00 - 1.74

Table 2 The sensory evaluation of *Euphorbia hirta* gummies, derived from feedback and recommendations gathered from 10 respondents. The use of descriptive rating tests in sensory evaluation is recommended, especially in the food industry where it can provide valuable insights into product attributes and consumer preferences (Sirangelo, 2019). Despite the taste accounting for 3.50%, it is categorized as Highly Recommendable (HR) as it brings a subtle and refined flavor profile, making it suitable for those who appreciate delicately balanced herbal notes. The appearance, calculated at 3.00, ranked as Recommendable (R), may be modest but still carries an understated rate, showcasing the simplicity of the product. Texture, leading with 4.00, is classified as Highly Recommendable (HR) and stands out as a notable feature, delivering a satisfying chewiness that enhances the overall experience. Aroma, scoring 3.50, is designated as Highly Recommendable (HR) and contributes a mild yet pleasant scent, aligning with the subtle nature of *Euphorbia hirta*. This evaluation suggests a product that, while not overwhelming in any single aspect, offers a well-rounded sensory experience for the recommendation of the consumers.

Table 3. Summary of the Used Ingredients

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>g</th>
<th>(P)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma plant extract</td>
<td>70g</td>
<td>70.6%</td>
</tr>
<tr>
<td>Glucose syrup</td>
<td>50g</td>
<td>59.3%</td>
</tr>
<tr>
<td>Unflavored gelatin</td>
<td>42g</td>
<td>54.7%</td>
</tr>
<tr>
<td>Sugar</td>
<td>10g</td>
<td>43.9%</td>
</tr>
<tr>
<td>Total</td>
<td>172g</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3 Shows a comprehensive summary of the ingredients used in the formulation, providing their quantities and respective percentages in relation to the total mixture. The predominant component is Asthma plant extract, followed by a contribution of 70g, with 70.6% offering the flavor of the final product. Latif et al. (2022) found that adding natural plant extracts to gummy candies improved their nutritional value and antioxidant activity. In making the gummies, the researchers measured the Asthma plant extract to dominate the ingredients. Glucose Syrup follows with 50g, with 59.3% offering insights into the flavor and likely playing a critical role in enhancing the overall taste profile. Glucose syrup plays a crucial role in the production of gummy candies, particularly in influencing their texture. It has been found that the addition of glucose syrup can significantly impact the gelling and melting behaviors of gelatin (Wang, 2021). Unflavored gelatin comes after with a percentage of 42g, with 54.7%. It plays a crucial role in the product's consistency. Unflavored gelatin is a crucial ingredient in gummy confections due to its role in forming the gel network that gives gummies their characteristic texture and stability (Hani et al., 2014). Sugar follows with a substantial 10g with 43.9% of the entire mixture, indicating its central role in the formulation. Pattarathitwiwat (2020) explored the physical, chemical, and sensory properties of low-sugar gummies, with the best results found at 25-50% potentially providing gummies with enough nutrition and health benefits.
Table 4 shows the lab result of the gummy supplement. The high moisture content at 49.6 indicates a relatively moist composition. This is proven by the method of gravitation, which is a method in analytical chemistry that determines the quantity of an analyte based on the mass of a solid. The substantial carbohydrate content at 36.2 suggests it contains vitamins and minerals. It was confirmed by Calculating the Kjeldahl, Soxhlet, and Gravimetric. The Crude protein at 12.2 was determined by The Kjeldahl method, which involves a three-step approach to the quantification of protein: digestion, distillation, and titration. The low Crude fat at 1.9 was settled using the method of Soxhlet extraction, an exhaustive extraction technique widely applied to sufficiently thermally stable analytes.

VI. CONCLUSIONS

It is concluded that Euphorbia hirta gummies are accepted and recommended as alternative supplements. Moreover, future researchers should explore different ingredient variations to refine texture and enhance taste.

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REFERENCES


