



Phyto-Chocolate: A Novel Herbal Formulation for Regulating Menstrual Cycle and Alleviating Menstrual Cramps.

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Abstract:

Evaluation of menstrual disorders such as dysmenorrhea, irregular cycles, and premenstrual syndrome (PMS) has prompted increasing interest in natural remedies that offer both therapeutic benefits and improved patient compliance. This research focuses on the development and formulation of a medicated phyto-chocolate designed to help regulate and manage menstrual discomfort using natural ingredients. The formulation includes dark chocolate as the base, known for its mood-enhancing and antioxidant properties, combined with a synergistic blend of medicinal herbs—ginger, turmeric, cinnamon, ashwagandha, fennel, clove, and honey. Each component was selected based on its individual pharmacological activity related to pain relief, hormonal balance, anti-inflammatory effects, and digestive support.

The study involved standardization of ingredient quantities, formulation trials, and organoleptic evaluation. The final herbal chocolate formulation was found to be palatable, stable, and effective in preliminary subjective assessments. This novel approach aims to integrate the benefits of nutraceuticals with traditional herbal medicine, offering a convenient and enjoyable option for menstrual health.

Menstrual cramps and irregular cycles affect millions of women worldwide, impacting their quality of life. The current treatment options often have side effects, leading to a growing interest in natural and holistic approaches. Phyto-Chocolate is a novel herbal chocolate formulation that combines the benefits of dark chocolate with the therapeutic properties of ginger, turmeric, cinnamon, ashwagandha, fennel, clove, and honey. This unique blend of herbal ingredients has been traditionally used to alleviate menstrual cramps, regulate menstrual cycles, and reduce symptoms of anxiety, depression, and fatigue associated with menstrual cramps. The anti-inflammatory and antioxidant properties of these ingredients work synergistically to provide relief from menstrual discomfort.

Phyto-Chocolate offers a natural, non-pharmacological, and delicious solution for women seeking relief from menstrual cramps and irregular cycles. Unlike conventional treatments, Phyto-Chocolate is free from synthetic hormones, artificial flavorings, and other harsh chemicals. This innovative formulation has the potential to revolutionize the way women

Manage their menstrual health, providing a safe, effective, and enjoyable alternative to traditional treatments.

Keywords: herbal chocolate, menstrual cycle regulation, menstrual cramp relief, phytotherapy, women's health, phyto-chocolate.

1. Introduction

Menstruation is a natural biological process in a woman's reproductive life, yet for many, it is accompanied by a range of discomforts such as cramps (dysmenorrhea), bloating, mood swings, and irregular cycle patterns. These symptoms can significantly impact quality of life, productivity, and emotional well-being. Although pharmaceutical solutions like NSAIDs and hormonal therapies are widely used, they often come with side effects, prompting a growing interest in alternative and natural remedies.[B.1]

Herbal medicine, with its roots in traditional systems like Ayurveda and Traditional Chinese Medicine, offers a safer, holistic approach to managing menstrual disorders. Ingredients like ginger, turmeric, and fennel are time-tested for their anti-inflammatory, analgesic, and hormonebalancing properties.[B.2] When these are combined with dark chocolate—a source of magnesium, iron, and natural mood enhancers—the result is a formulation that is not only therapeutic but also appealing to consume.[B.21]

Chocolate, particularly dark chocolate, contains flavonoids, polyphenols, and theobromine, all of which have positive effects on mood and oxidative stress.[A.3] By infusing it with carefully selected herbs such as ashwagandha (an adaptogen that reduces stress), clove (a natural analgesic), and honey (a soothing and antimicrobial agent), we aim to create a product that supports menstrual health in a multifaceted manner.

This project explores the development and formulation of a medicated herbal chocolate designed to be a nutraceutical alternative for women seeking natural relief from menstrual discomfort. It combines modern food technology with traditional herbal wisdom, making the remedy not only effective but also enjoyable.[B.16]

Menstrual cramps and irregular menstrual cycles are common issues affecting millions of women worldwide, impacting their quality of life and overall well-being. Menstrual cramps, also known as dysmenorrhea, are characterized by painful uterine contractions that occur during menstruation. These contractions can be severe enough to interfere with daily activities, causing significant distress and discomfort.

Menstrual irregularities, on the other hand, can manifest in various ways, including irregular cycle length, heavy or light bleeding, and skipped periods. These irregularities can be caused by hormonal imbalances, polycystic ovary syndrome (PCOS), thyroid disorders, and other underlying medical conditions.[B.1]

Current treatments for menstrual cramps and irregularities often have limitations and side effects. Nonsteroidal anti-inflammatory drugs (NSAIDs) and hormonal contraceptives are commonly prescribed to alleviate menstrual cramps, but these medications can have gastrointestinal side effects, interact with other medications, and increase the risk of blood clots and stroke. [B.13]

Alternative therapies, such as acupuncture, herbal supplements, and dietary changes, have gained popularity in recent years.[B.24] However, the efficacy and safety of these therapies are not always well-established, and more research is needed to fully understand their benefits and limitations.

In recent years, there has been a growing interest in the potential health benefits of chocolate, particularly dark chocolate. Cocoa, the main ingredient in chocolate, contains flavonoids, which have anti-inflammatory and antioxidant properties.[B.11] These properties may help to alleviate menstrual cramps and improve menstrual cycle regularity.

Herbal chocolate, a unique blend of cocoa and medicinal herbs, offers a promising approach to managing menstrual cramps and regulating menstrual cycles. The combination of antiinflammatory and antioxidant properties of cocoa with the therapeutic properties of medicinal herbs may have synergistic effects, enhancing the efficacy of each ingredient. [B.19]

Background and Rationale:

Menstrual cramps and irregularities are complex issues that require a multifaceted approach. The current treatment options have limitations and side effects, highlighting the need for alternative therapies. Herbal chocolate offers a promising approach to managing menstrual cramps and regulating menstrual cycles. The rationale for this study is based on the following:

- The anti-inflammatory and antioxidant properties of cocoa may help to alleviate menstrual cramps and improve menstrual cycle regularity.
- The therapeutic properties of medicinal herbs, such as ginger, shatavari, cinnamon, and turmeric, may have synergistic effects with cocoa, enhancing the efficacy of each ingredient.
- Herbal chocolate is a novel and innovative approach to managing menstrual cramps and regulating menstrual cycles, offering a potential alternative to current treatment options.

2. Significance of the Study:

This study is significant because it:

- Investigates the efficacy of herbal chocolate in managing menstrual cramps and regulating menstrual cycles, providing valuable insights into the therapeutic potential of this novel approach.
- Contributes to the growing body of research on the health benefits of chocolate and medicinal herbs, highlighting their potential as alternative therapies for menstrual disorders.
- Offers a potential alternative to current treatment options for menstrual cramps and irregularities, which may have limitations and side effects.

Advantages:

- Natural and holistic approach: Phyto-Chocolate offers a natural alternative to conventional treatments, reducing the risk of side effects.
- Multi-symptom relief: The formulation targets multiple symptoms, including menstrual cramps, irregular cycles, anxiety, depression, and fatigue.
- Delicious and enjoyable: Phyto-Chocolate is a tasty and pleasant way to manage menstrual health.
- No synthetic hormones or harsh chemicals: The formulation is free from artificial ingredients, making it a safer option.
- Potential for long-term benefits: Regular consumption may lead to sustained improvements in menstrual health.

Disadvantages:

- Variable efficacy: Individual results may vary, and some women may not experience significant relief.
- Limited research: More studies are needed to fully understand the effects and potential interactions of Phyto-Chocolate.
- Quality control: The quality of the ingredients and manufacturing process may impact the effectiveness and safety of the product.
- Potential allergens or sensitivities: Some women may be allergic or sensitive to certain ingredients, such as honey or ginger.
- Not a replacement for medical treatment: Phyto-Chocolate should not replace medical treatment for underlying conditions or severe menstrual symptoms.

3. Literature Review

R. et al. 2023.

Around 55% of women experience dysmenorrhea. Dark chocolate is one food known to alleviate menstrual pain. Research suggests that various herbal substances, including red ginger, turmeric, moringa, sambiloto, and honey, may also help reduce discomfort. However, there has been no investigation into the effects of combining dark chocolate with herbal ingredients. Therefore, the aim of this research is to determine if blending dark chocolate with herbs can reduce menstrual pain. A total of thirty participants were involved in this study, divided into three groups: dark chocolate, positive control group, and dark chocolate along with herbs. A beverage of 250 mL was prepared by mixing dark chocolate with herbal components such as red ginger, turmeric, moringa, sambiloto extract, and honey. This is a quantitative research study.[B.10]

Verma A. et al. 2019.

Menstrual pain (PMS), dysmenorrhea, or painful menstruation is characterized by severe cramping in the lower abdomen, often accompanied by additional symptoms like sweating, nausea, and migraines that occur right before or during menstruation. Numerous medications, particularly non-steroidal anti-inflammatory drugs (NSAIDs), are commonly used to alleviate this pain. This study aims to evaluate the assertions regarding dark chocolate as an alternative to NSAIDs. Ninety-nine selected students were divided into three groups and given either 120 grams of dark, milk, or no chocolate daily, depending on their assigned group. Pain was assessed using the Numeric Rate Scale (NRS) both prior to and following the intervention. After the intervention, there was a significant reduction in both premenstrual and menstrual pain.[B.11]

Maharani S. et al. 2017.

The objective of the study was to examine the effects of dark chocolate on menstrual pain in late adolescents. This was a true experimental study with a randomized pretest-posttest design including a control group. It was conducted from September to November 2016 at the Bhakti Husada Boarding School of Poltekkes Kemenkes Semarang. Pain levels were measured using the numeric rate scale (NRS), and data were analyzed employing independent t-tests and Mann-Whitney U tests. The intervention's impact was assessed through the Mann-Whitney and Independent T-test. There was a significant difference ($p < 0.001$) in menstrual discomfort before and after treatment. The mean menstrual pain in the treatment group was significantly lower than that in the control group with a p-value of less than 0.001. Dark chocolate has been shown to significantly diminish menstrual discomfort in late adolescents.[B.25]

Satriawati A. et al. 2020.

Adolescent reproductive health remains an area that needs attention. Dysmenorrhea is one common issue faced by many women at the onset of their menstrual cycle. This study seeks to evaluate the effectiveness of a combination of warm compresses and chocolate to alleviate menstrual pain (dysmenorrhea) among female students at SMP Negeri 1 Bangkalan. The population for this research consisted of female students at SMP Negeri 1 Bangkalan who experienced dysmenorrhea. A simple random sampling technique was employed for the study, resulting in a sample of 54 respondents divided into two groups of 27 each. Data analysis was conducted using the chi-square test and logistic regression. The combination of warm and chocolate compresses was found to have an effect on reducing menstrual pain ($p\text{-value} = 0.050$). Additionally, other factors were found to influence the decrease in menstrual discomfort ($p\text{-value} 0.032$). It is recommended that teenage girls who continue to experience pain during their periods seek a check-up of their reproductive health.[B.11]

Sa'idah S. et al. 2023.

Dark chocolate can serve as a substitute for managing pain during the menstrual cycle due to its various health advantages. This study aimed to determine if offering dark chocolate to female employees at Cabangbungin General Hospital in Bekasi Regency in 2023 would reduce their menstrual pain related to dysmenorrhea. A total of 32 participants took part in this experimental study. Data analysis was conducted using SPSS version 25 for both univariate and bivariate analysis. The results of the paired sample t-test revealed a p-value of 0.000 and an alpha level of 0.05 ($p < \alpha$), indicating that the consumption of dark chocolate is effective in alleviating menstrual discomfort associated with dysmenorrhea. Thus, administering dark chocolate to female staff at Cabangbungin General Hospital in Bekasi Regency in 2023 resulted in reduced monthly dysmenorrhea discomfort.[B.23]

Nuha K. et al. 2023.

A significant proportion of women globally experience dysmenorrhea, which is the pain associated with menstrual cycles, often leading to decreased productivity. Although there are various pharmaceutical and non-pharmacological options available for pain management, there remains a lack of understanding regarding their effectiveness, particularly concerning green coconut water, dark chocolate, and Ibuprofen.

This study aimed to compare the effectiveness of Ibuprofen, dark chocolate bars, and green coconut water in reducing the severity of primary dysmenorrhea. Forty-five participants were randomly divided to receive either 400 mg of Ibuprofen, 35 g of 70% dark chocolate, or 330 mL of green coconut water in a randomized controlled trial with a quantitative design. The participants were given their designated treatments on the first day of

menstruation, when dysmenorrhea symptoms typically arise. The immediate effects of each treatment were assessed using a single-dose methodology. Participants were instructed to consume the provided substance within fifteen minutes. The pain level was measured using a Numeric Rating Scale before the intervention and again two hours after consuming the treatment. The multivariate Kruskal-Wallis test indicated a significant difference ($p < 0.05$) in the effectiveness of the three treatments. According to the study, Ibuprofen was the most effective approach when compared to the others. These findings emphasize the efficacy of Ibuprofen and enhance our understanding of treatment options for primary dysmenorrhea.[B. 23]

Singh K. et al. 2022.

Given that chocolate is a beloved food while medication is often viewed negatively, this study aimed to create medicated chocolate that contains medicinal properties to prevent various health issues. *Withania somnifera*, known as ashwagandha, possesses numerous beneficial properties, including anti-stress, anti-inflammatory, and effects on the nervous system. Similarly, *Asparagus racemosus*, or shatavari, has various medicinal properties such as preventing miscarriage, promoting lactation, treating infertility, and regulating menstrual cycles. Consequently, powdered ashwagandha and shatavari must be incorporated into chocolate to achieve the desired pharmacological effects. Ultimately, the developed medicated chocolate is evaluated for general use.[B.15]

4. Need of Study:

Menstrual disorders are a common concern among women of reproductive age, with symptoms ranging from mild discomfort to severe pain and disruption of daily activities. The most prevalent issues include dysmenorrhea (painful periods), premenstrual syndrome (PMS), and irregular menstrual cycles. These conditions are often managed with conventional medications such as analgesics, hormonal pills, and antispasmodics. However, prolonged use of such treatments may lead to adverse effects, including hormonal imbalances, gastrointestinal disturbances, and dependency.

There is a growing demand for safe, effective, and natural alternatives that can support menstrual health without unwanted side effects. Herbal medicine offers a vast repertoire of plant-based remedies traditionally used to alleviate menstrual problems. When properly formulated, these herbs can provide anti-inflammatory, analgesic, antispasmodic, and adaptogenic effects that address the root causes of menstrual discomfort.

Despite their therapeutic potential, herbal remedies are often underutilized due to issues like bitter taste, complex preparation, and lack of standardized dosage forms. By incorporating these herbs into a chocolate-based formulation, this study seeks to overcome such barriers and enhance patient compliance. Chocolate not only masks the unpleasant taste of certain herbs but also provides nutritional benefits such as antioxidants, magnesium, and iron—nutrients that are especially beneficial during menstruation.

This study is needed to bridge the gap between traditional herbal medicine and modern nutraceutical delivery systems, offering a scientifically backed, pleasant-tasting, and convenient solution for menstrual regulation and symptom relief.

5. Aim:

To develop and formulate a medicated herbal chocolate using selected natural ingredients for the effective management and regulation of the menstrual cycle and associated cramps.

6. Objectives:

1. To identify and select herbal ingredients with scientifically supported benefits for menstrual health.
2. To formulate a palatable and stable chocolate-based dosage form incorporating the selected herbs.
3. To evaluate the organoleptic properties (taste, texture, aroma, appearance) of the medicated herbal chocolate.
4. To assess the stability and compatibility of herbal ingredients within the chocolate matrix. To explore the synergistic effects of combined herbs in managing menstrual symptoms like cramps, mood swings, and irregular cycles.
5. To offer a nutraceutical alternative that enhances patient compliance through ease of administration and taste.

7. Phytochemistry of herbs used in formulation

The use of medicinal plants for managing menstrual disorders dates back centuries and has been supported by various traditional systems of medicine such as Ayurveda, Unani, and Traditional Chinese Medicine. Several herbs have been extensively studied for their effectiveness in alleviating menstrual symptoms. Below is a review of key ingredients used in the present formulation:

1. Dark Chocolate



Fig no. 1 *Dark Chocolate*

Dark chocolate is rich in magnesium, flavonoids, and polyphenols. Magnesium helps reduce menstrual cramps by relaxing the muscles of the uterus, while flavonoids have antioxidant properties that combat inflammation and oxidative stress. Studies have also indicated that consumption of dark chocolate improves mood by boosting serotonin levels. [A.3]

2. Ginger (*Zingiber officinale*)



Fig no. 2 *Ginger*

Ginger is widely recognized for its anti-inflammatory and analgesic properties. Clinical trials have shown that ginger is as effective as nonsteroidal anti-inflammatory drugs (NSAIDs) in reducing the severity of dysmenorrhea. It works by inhibiting prostaglandin synthesis, which is responsible for pain and uterine contractions. [A.1,B.2]

3. Turmeric (*Curcuma longa*)



Fig no. 3 *Turmeric*

Curcumin, the active compound in turmeric, exhibits strong anti-inflammatory, antioxidant, and antispasmodic effects. It has been shown to help regulate hormones and relieve PMS symptoms. Turmeric also supports liver function, which plays a role in hormone metabolism. [A.2,B.3]

4. Cinnamon (*Cinnamomum verum*)



Fig no. 4*Cinnamon*

Cinnamon helps in regulating insulin levels and improving blood circulation. Research has shown that it can significantly reduce menstrual pain and bleeding. It also has warming and anti-clotting properties that are beneficial during menstruation. [A.6,B.6]

5. Ashwagandha (*Withania somnifera*)



Fig no. 5*Ashwagandha*

Ashwagandha is an adaptogen known for reducing stress, balancing hormones, and improving overall reproductive health. Studies have shown it helps regulate the menstrual cycle and relieve fatigue and mood swings associated with PMS. [A.4,B.15]

6. Fennel (*Foeniculum vulgare*)



Fig no. 6*Fennel*

Fennel is traditionally used to relieve bloating, cramps, and irregular menstruation. Its phytoestrogens help balance female hormones, and its antispasmodic effect helps ease uterine contractions.[A.5,B.18]

7. Clove (*Syzygium aromaticum*)



Fig no. 7Clove

Clove possesses strong analgesic and anti-inflammatory properties. It contains eugenol, which acts as a natural painkiller and can help reduce the severity of menstrual cramps. [B.14]

8. Honey



Fig no. 8Honey

Honey is used as a natural sweetener and a carrier in this formulation. It has antimicrobial, soothing, and antioxidant properties. Additionally, honey enhances the taste, masking the bitterness of some herbs while offering mild uterine tonic effects. [B.20]

8. Ingredients Used

The formulation of the medicated herbal chocolate involves a strategic combination of medicinal herbs and a palatable base—dark chocolate. Each ingredient is selected based on its pharmacological relevance to menstrual health and its compatibility with chocolate-based delivery systems.

Sr. No.	Ingredient	Botanical Name	Quantity (% w/w)	Role in Formulation
1	Dark Chocolate	—	70%	Base and mood enhancer; source of antioxidants and magnesium
2	Ginger Powder	Zingiber officinale	5%	Anti-inflammatory, relieves cramps
3	Turmeric Powder	Curcuma longa	3%	Anti-inflammatory, balances hormones
4	Cinnamon Powder	Cinnamomum verum	2%	Improves circulation, reduces menstrual pain
5	Ashwagandha Powder	Withania somnifera	5%	Adaptogen; reduces stress and balances menstrual cycle
6	Fennel Powder	Foeniculum vulgare	3%	Relieves cramps, acts as a phytoestrogen
7	Clove Powder	Syzygium aromaticum	1%	Analgesic, anti-inflammatory
8	Honey	—	11%	Natural sweetener, enhances palatability, mild uterine tonic

Table no. 1Ingredients and their role in the formulation

This synergistic blend of herbs is incorporated into melted dark chocolate and molded into small portions for oral administration. The ingredients are selected to work both independently and synergistically in alleviating menstrual discomforts, improving compliance through an enjoyable dosage form

9. Formulation and Development

The medicated herbal chocolate was developed by integrating selected powdered herbs into a melted dark chocolate base, ensuring uniform dispersion, taste masking, and preservation of therapeutic efficacy. The formulation process was carried out using simple food-grade techniques suitable for small-scale nutraceutical production.

10. Plan of Work:

1.Collection and Authentication of Herbs

Herbal ingredients were sourced from certified Ayurvedic suppliers and authenticated based on morphological and organoleptic properties.

2.Drying and Powdering

Herbs like ginger, turmeric, cinnamon, fennel, and ashwagandha were dried (if necessary) and finely powdered using a grinder to ensure uniform particle size.

3. Sifting and Weighing

Powders were passed through mesh #60 to remove any coarse particles. Ingredients were then weighed accurately according to the formulation.

4.Melting of Dark Chocolate

Dark chocolate was melted using a double boiler method to avoid direct heat, preserving its antioxidants and preventing burning.

5.Incorporation of Herbal Powders

While the chocolate was still in a semi-liquid state (~40–45°C), herbal powders and clove were added gradually with continuous stirring to ensure even distribution.

6.Addition of Honey Honey was added at the end to enhance sweetness, binding, and therapeutic value.

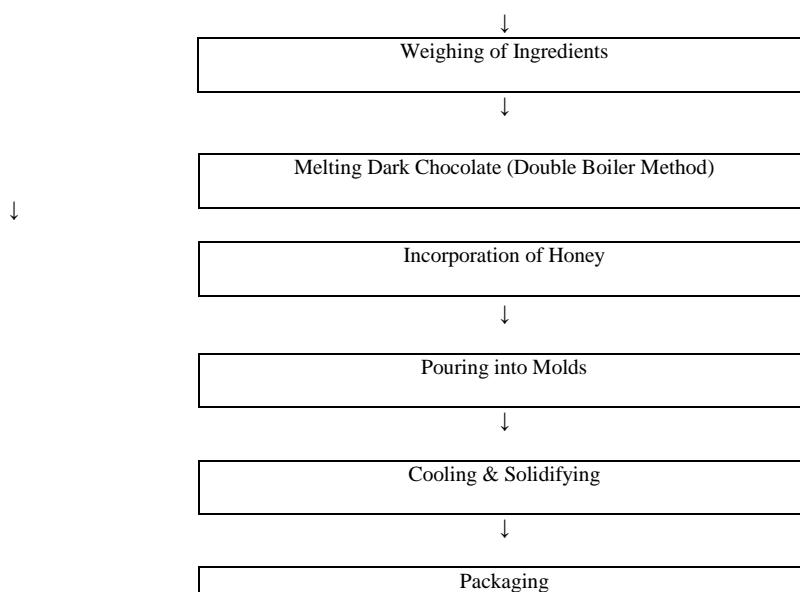
7.Molding and Cooling

The final mixture was poured into silicone molds and allowed to set at room temperature (or refrigerated at 4–8°C for faster solidification).

8.Demolding and Packaging

Once hardened, chocolates were removed from the molds and stored in airtight containers away from light and heat .

Flowchart of Formulation Process:



This method ensures stability of the active compounds and provides a dosage form that is both effective and consumer-friendly.

11. Evaluation of Herbal Chocolate

To ensure the effectiveness, safety, and palatability of the formulated medicated herbal chocolate, various evaluation parameters were assessed. These included physical characteristics, organoleptic properties, pH, weight variation, and stability studies.

1. Physical and Organoleptic Evaluation

Parameter	Observation
Appearance	Smooth, glossy, uniformly molded
Colour	Deep brown with visible herbal specks
Odour	Mild chocolate with herbal undertones
Taste	Pleasant, slightly spicy-sweet
Texture	Smooth, melt-in-mouth consistency
Shape and Size	Uniform small bite-size pieces

Table no. 2.Physical and Organoleptic Evaluation

2. Weight Variation Test

Ten randomly selected chocolate pieces were weighed individually. The standard deviation was within acceptable limits, confirming uniformity in dosage.

Sample No.	Weight (g)
1	5.03
2	5.05
3	5.00
4	5.02
5	5.01
6	5.04
7	5.06
8	5.02
9	5.03
10	5.01
Average	5.03 g

Table no. 3.Weight Variation Test

3. pH Measurement

The pH of the aqueous dispersion of the chocolate was measured. 1 g of grated chocolate was dissolved in 10 ml of distilled water and stirred for 10 minutes. The pH measured was 6.8 to 7.2, indicating compatibility with oral intake.

4. Stability Studies

Chocolates were stored under different conditions (room temperature, refrigeration, and 40°C with 75% RH) for 30 days.

Condition	Change in Appearance	Odour	Texture	Remarks
Room Temp (25°C)	No change	Stable	No change	Stable
Refrigerator (4°C)	No change	Stable	Slightly firmer	Stable
40°C, 75% RH	Slight softening	Stable	Slight melt	Recommend cool storage

Table no. 4 .Stability Studies

5. Palatability Test (Informal Trial)

Conducted among 10 volunteers (female students age 18–24). 9 out of 10 rated the taste as “pleasant to excellent.” No adverse effects like nausea or irritation were reported.

12. Results and Discussion

The medicated herbal chocolate was successfully formulated using a blend of traditional herbs known for their efficacy in managing menstrual discomfort. The formulation process was smooth, and the ingredients were compatible with the chocolate matrix, producing a stable and palatable final product.



Fig no.9 Herbal chocolate

13. Results Summary:

- Organoleptic Properties: The final product had an appealing appearance, smooth texture, and a taste that balanced the bitterness of herbs with the sweetness of chocolate and honey.
- Weight Variation: All units remained within the acceptable deviation range, ensuring consistent dosing.
- pH: The pH of the formulation (6.8–7.2) was suitable for oral administration, indicating it would be gentle on the gastrointestinal tract.
- Stability: The chocolate remained stable at room temperature and refrigeration for 30 days with no significant changes in odour, appearance, or texture.
- Palatability: Informal evaluation by volunteers confirmed good acceptance with no reports of bitterness or aftertaste.

14. Discussion:

The incorporation of medicinal herbs like ginger, turmeric, and ashwagandha into dark chocolate proved to be a successful strategy in developing a nutraceutical product targeting menstrual health. Ginger and turmeric offered anti-inflammatory benefits, while ashwagandha supported hormonal balance and reduced stress—both key issues during menstruation. The adaptogenic and antispasmodic properties of fennel, cinnamon, and clove contributed to overall menstrual comfort.

Honey not only acted as a natural sweetener but also enhanced the binding and therapeutic properties of the formulation. The use of dark chocolate as a base ensured high compliance, making the supplement both effective and enjoyable.

The preparation did not require complex equipment and can be easily scaled up using food-grade technologies. This study opens avenues for the integration of traditional herbal knowledge with modern nutraceutical formats, especially for conditions where long-term, safe management is desired.

15. Conclusion

This research successfully demonstrates the development and formulation of a medicated herbal chocolate as a novel approach for the management and regulation of the menstrual cycle and cramps. The combination of scientifically validated herbs—such as ginger, turmeric, cinnamon, ashwagandha, fennel, clove, and honey—into a dark chocolate base resulted in a palatable and effective product with multiple therapeutic benefits.

The formulation process was simple, scalable, and used food-grade techniques. Evaluation results confirmed the stability, safety, and acceptability of the final product. The herbal chocolate exhibited excellent organoleptic properties, maintained physical integrity over time, and received positive feedback from initial palatability testing.

By integrating traditional Ayurvedic principles with modern delivery formats, this herbal chocolate provides a nutraceutical solution that improves compliance, reduces side effects, and supports menstrual health naturally. This project contributes to the growing field of functional foods and highlights the potential of herbal chocolates as a complementary remedy for women's health.

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