A SWEET REMEDY FOR PERIOD PAIN: HERBAL CHOCOLATE

Mr. Khajekar Nikhil 1*, Mr.Syed Shahrukh 2*, & Dr. Vitthal Kuchake 3
1: Student, Ojas College of Pharmacy, Jalna – 431203, Maharashtra, Jalna.
2: Guide & Assistant Professor, Department of Pharmaceutics, Ojas College of Pharmacy, Jalna – 431203, Maharashtra, India.
3: Principal, Ojas College of Pharmacy, Jalna – 431203, Maharashtra, India.

Corresponding author: -
Khajekar Nikhil Chandrahari,
Syed Shahrukh
Student, Guide, Ojas College of Pharmacy, Jalna – 431203, Maharashtra, India.
Email: - nikhilkhajekar790@gmail.com
Email: - syedshahrukh2298@gmail.com

ABSTRACT:
Menstrual cramps, medically known as dysmenorrhea, affect a significant portion of the female population worldwide, often leading to discomfort and decreased quality of life during menstruation. In recent years, there has been growing interest in natural remedies to alleviate menstrual pain, with particular attention to the potential benefits of herbal ingredients. This abstract introduces a novel formulation of herbal chocolate designed specifically to address period cramps. The blend incorporates almond, pumpkin seeds, citric acid, dark chocolate, and ginger, each chosen for their potential analgesic and anti-inflammatory properties. Almonds and pumpkin seeds are rich sources of magnesium and essential fatty acids, which have been linked to reducing menstrual pain. Citric acid acts as a natural preservative while providing a tangy flavor profile. Dark chocolate not only serves as a delicious base but also contains flavonoids that may help relax blood vessels and reduce inflammation. Ginger, a well-known traditional remedy for various ailments, possesses anti-inflammatory properties that could offer relief from menstrual cramps. This abstract underscores the potential synergy of these herbal ingredients in providing natural relief for menstrual discomfort while indulging in the pleasurable experience of consuming chocolate. Further research into the efficacy and optimal dosage of this herbal chocolate blend is warranted to establish its role as a complementary approach to managing menstrual cramps.

Objective: Menstrual pain is a periodic pain which happens during the days of menses. The menstrual disturbances as a health problem among young girls affect not only reproductive, but also psychical health and quality of life. This study was done with the goal of comparing the effect of Ginger on the menstrual pain. An effort was undertaken to create a chocolate with a chocolate base with the addition of herbal fruits and spices for an easier and faster commencement of the action.

Keywords words: Herbal Chocolate, ginger, alomand, citric acid, pumpkin seeds, dark chocolate.
INTRODUCTION:
Menstrual cramps happen because of contraction in the uterus or womb, which is a muscle. It can press nearby blood vessels if it contracts too strongly during the menstrual cycle (1). The menstrual cycle briefly cuts off oxygen to the uterus, which causes pain and cramping. This pain is caused by natural chemicals called prostaglandins in the uterus lining. In treatment we have to reduce it as it is high during menstruation.

Pain caused during menstruation cramps is compared with the pain during a heart attack, which women must go through every month (2). The marketed NSAID’s can relieve this pain but have side effects if taken every month. So it can be overcome with the natural substituents. To create medicated chocolate, a chocolate base is used, and after the base has been created, the medication is added. It is referred to as a chocolate medication delivery system since the drug is integrated into the chocolate and released from it. It is the best medicine delivery method available, especially for children and younger generations(3).

Two advantages of the chocolate drug delivery technology include the potential bypass of first-pass effects and the prevention of pre-systemic elimination within the GI tract. Due to its anhydrous nature, chocolate is also resistant to microbial development and the degradation of water-sensitive active ingredients. Chocolate is a great delivery system for active compounds in numerous ways (3).

The herbs and fruits used in this polyherbal medicated chocolate have a vast variety of pharmacological use with context to stomach worms and their related issue (4).

To deliver herbal anthelmintics drugs, the current study's goal is to create a polyherbal chocolate formulation. It also aims to assess the prepared formulations' physiochemical parameters so that they can be further standardized and applied in the commercial sector.

Roundworms, pinworms, etc. Although the intestinal system is typically affected, the worms can occasionally invade other organs (5). It is a major issue that affects not just humans but also livestock, particularly in tropical regions. Around the world, 3.5 billion individuals suffer from intestinal parasite infection, with low socioeconomic groups bearing the brunt of the disease.

Advantages of Herbal Chocolate:

Taste and Enjoyment: Herbal chocolate formulations offer a delicious and enjoyable way to consume medicinal herbs. Unlike pills or teas, which may have bitter or unpleasant tastes, herbal chocolate combines the benefits of herbs with the indulgence of chocolate, making it a more palatable option.

Convenience: Chocolate is a convenient and portable format for consuming herbal remedies. It requires no preparation or brewing time like teas, and it can be easily carried and consumed on the go. This convenience factor makes herbal chocolate a practical choice for managing period cramps, especially for individuals with busy lifestyles.

Faster Absorption: Chocolate is often consumed orally, allowing for relatively fast absorption of its active ingredients compared to topical creams or patches, which need time to penetrate the skin. This can result in quicker relief from period cramps when using herbal chocolate formulations.

Gastrointestinal Friendly: Some pain relief medications, especially NSAIDs (Nonsteroidal Anti-Inflammatory Drugs), can irritate the stomach lining and cause gastrointestinal discomfort. Herbal chocolates, particularly those containing soothing herbs like ginger or peppermint, are generally gentler on the stomach, making them a preferable option for individuals with sensitive digestive systems.

Multi-Benefit Approach: Herbal chocolate formulations can offer multiple benefits beyond just pain relief. For example, they may contain herbs known for their calming effects, which can help alleviate stress and anxiety.
associated with menstrual discomfort. This multi-benefit approach addresses both physical and emotional aspects of period cramps.

Natural Ingredients: Herbal chocolates typically contain natural ingredients, including medicinal herbs and cocoa. This can be appealing to individuals who prefer natural remedies over synthetic drugs or chemicals commonly found in some pharmaceutical formulations.

Customization: Herbal chocolate formulations can be customized to include specific herbs known for their effectiveness in relieving period cramps, allowing for personalized treatment based on individual needs and preferences. This flexibility in formulation can cater to a wide range of users with varying symptoms and severity of cramps.

Non-Invasive: Unlike some topical creams or patches that need to be applied directly to the skin, herbal chocolate formulations offer a non-invasive way to manage period cramps.

Psychological Comfort: Chocolate has long been associated with comfort and pleasure. Consuming herbal chocolate during menstruation may provide psychological comfort in addition to physical relief, helping individuals feel pampered and cared for during a challenging time.

Market Appeal: Herbal chocolate formulations have a unique selling point that may appeal to consumers seeking natural alternatives for managing period cramps. The combination of herbs and chocolate offers a novel and attractive option in a market saturated with traditional pain relief products (6).

Limitations: Allergies: Almonds and ginger, two key ingredients in the herbal chocolate, are common allergens. Individuals with nut or ginger allergies may experience adverse reactions, ranging from mild discomfort to severe allergic reactions (7).

Digestive Sensitivity: Some individuals may experience digestive discomfort from consuming almonds, pumpkin seeds, or ginger, particularly if they have pre-existing digestive issues such as irritable bowel syndrome (IBS) or gastritis (8).

Interactions with Medications: Ginger, when consumed in large amounts, may interact with certain medications, including blood thinners and medications for diabetes and hypertension. It's important for individuals taking such medications to consult with their healthcare provider before regularly consuming herbal chocolate with ginger.

Citric Acid Sensitivity: Citric acid, while generally recognized as safe, can cause oral irritation or exacerbate symptoms of acid reflux in sensitive individuals. Excessive consumption of citric acid may also contribute to dental erosion over time (9).

Cost: Depending on the sourcing of ingredients and production methods, herbal chocolate may be more expensive than conventional chocolate products. This could limit accessibility for individuals on a tight budget (10).

Limited Scientific Evidence: While individual ingredients like ginger have been studied for their potential pain-relieving properties, there is limited scientific evidence specifically supporting the efficacy of herbal chocolate for alleviating menstrual cramps. More research is needed to validate its effectiveness and determine optimal dosages (11).
MATERIALS:

Ginger

Synonyms: Rhizoma zingiberis, Zingibere (12).

Biological Source: Ginger consists of the dried rhizomes of the *Zingiber officinale* Roscoe, belonging to family Zingiberaceae (12).

Chemical Constituents: Ginger contains 1 to 2% volatile oil, 5 to 8% pungent resinous mass and starch (13,14). The volatile oil is responsible for the aromatic odour and the pungency of the drug is due to the yellowish oily body called gingerol which is odourless (13). Volatile oil is composed of sesquiterpene hydrocarb like α-zingiberol; α-sesquiterpene alcohol α-bisabolene, α-farnesene, α-sesquiphellandrene. Less pungent components like gingerone and shogaol are also present. Shogal is formed by the dehydration of gingerol and is not present in fresh rhizome (15). The prevailing hypothesis is that ginger components offer palliative and curative properties via an antioxidant effect (16). As ginger contains a number of coactive constituents, which per se (or after structural modification) might be potentially useful in the treatment of various diseases including hypercholesterolemia, gastric ulcer, irritable bowel syndrome, pain, cancer, microbial infections or cardiovascular diseases, we reviewed the literature on the significance of ginger in various areas since other reviews were less systematic (17).

GINGEROL, a phenolic phytochemical compound found in fresh ginger (16).

Pumpkin Seeds

Pumpkin seeds are also known as “pepitas,” a Mexican Spanish term (18). The pumpkin belongs to the family of Cucurbitaceae, is a well-known edible plant that has been frequently used as functional food or herbal medicine. Pumpkins contain rich unsaturated fatty acids, phytoestrogens and vitamins E in their seeds that have potential pharmaceutical, nutraceutical, and cosmeceutical properties (19). Information regarding their nutritional components
and therapeutic properties of pumpkin seeds has expanded dynamically in the recent years and this review focus on the three main components of pumpkin seeds that described before. Several types of unsaturated fatty acids are the dominant component in pumpkin seeds which can play a role in the disease prevention and promote health. Pumpkin seeds also contain the important phytoestrogen compounds, i.e., secoisolariciresinol and lariciresinol that have estrogenic-like effect such as preventing hyperlipidemia and osteoporosis for menopausal women. Phytoestrogens in pumpkin seeds also could be related to a reduced hormone-dependent tumor. Pumpkin seeds are rich in vitamin E contents as an emerging free radical scavenger, anti-aging and antioxidant such as α-tocopherol and γ-tocopherol (19). In addition to the nutrients listed above, pumpkin seeds also contain some antioxidants and small amounts of potassium, riboflavin (20).

Almonds

Almonds (the almond or sweet almond), from the Rosaceae family, They are placed in sub-family (Prunoideae or Amygdaloideae). Almond are also placed in their own family (Prunaceae or Amygdalaceae) so, it has become pretended that prunus advanced from sub-family, Spiraeoidae.(21) have long been known as a source of essential nutrients. Prunus dulcis, the cultivated sweet almond, has long been recognized as a source of nutrients in many traditional diets, and is increasingly promoted as a healthy snack and ingredient. This paper reviews the global research over the past 50 years that has contributed to knowledge on the composition and characterization of almond macronutrients and micronutrients, specifically the lipids and fatty acids, proteins and amino acids, carbohydrates (including dietary fiber), minerals and vitamins. In Almond, kernel part produces fixed oil “oleum amygdalae”. It is insoluble in water but soluble in chloroform and ether. It is used as a supernumerary of olive oil. Sweet almond oil is obtained from dry kernel of plant. This oil is also used for massage, anti-inflammatory, immunity-boosting and anti-hepatotoxicity effects (21). One serving of almonds equals one ounce, about 23 almonds or ¼ cup. It is a calorie-dense food but also nutrient-dense with the majority of its fat being monounsaturated. One ounce provides about 165 calories, 6 grams protein, 14 grams fat (80% monounsaturated, 15% polyunsaturated, and 5% saturated), 6 grams carbohydrate, and 3 grams fiber (21).
Vitamin C

**Source:** Citrus Fruits like Oranges, grapefruits, lemons, and limes are rich in vitamin C (22).

**Chemical Constituents:** Vitamin C, also known as ascorbic acid, (22,23) is a water-soluble vitamin that plays a crucial role in various physiological processes in the human body (24). Its chemical structure consists of several key constituents:

**Ascorbic Acid:** Ascorbic acid is the primary chemical form of vitamin C. It is a six-carbon compound with the molecular formula C$_6$H$_8$O$_6$ (24,25). It is abundantly available among animals and plants naturally. Only very few species of the animals such as guinea pigs, human beings, and most of the primates require ascorbic acid in their diet. Humans are unable to synthesize vitamin C endogenously because of the deficiency of an enzyme, L-gulono-gamma-lactone oxidase that catalyzes the terminal step in ascorbic acid biosynthesis (25).

**L-Ascorbate:** Vitamin C exists in two isomeric forms: L-ascorbate and D-ascorbate. L-ascorbate is the biologically active form of vitamin C (26,27).

**Dehydroascorbic Acid:** Ischemia-reperfusion injury in brain, caused by stroke or trauma, also involves oxidative stress. Interventions that increase cerebral AA concentration may be beneficial. Experiments with transgenic mice lacking one of the most widely distributed Na$^+$–ascorbate cotransporters (28) Dehydroascorbic acid is an oxidized form of ascorbic acid. It can be converted back to ascorbic acid within the body (28).

**Mineral Ascorbates:** Vitamin C can also form salts with minerals, such as sodium, calcium, and potassium. These mineral ascorbates are alternative supplemental forms of vitamin C (29).
Dark Chocolate

Dysmenorrhea, menstrual pain often experienced by women of reproductive age, including teenage girls, can cause discomfort and hinder daily activities, necessitating treatment. Chocolate contains copper, which synthesizes neurotransmitters like collagen and endorphins, serving as an analgesic and natural sedative to alleviate pain. This study aimed to assess the effect of dark chocolate on reducing dysmenorrhea in adolescents (30). Chocolate enhances mood due to its copper content, releasing endogenous morphine that inhibits pain impulses. This makes chocolate a non-pharmacological alternative for alleviating dysmenorrhea (30). Cocoa Flavanols: Flavanols are a group of bioactive compounds found in cocoa beans. They have antioxidant properties and may help improve blood flow by promoting the production of nitric oxide (31). Theobromine: Theobromine is a stimulant found in chocolate that is structurally similar to caffeine but has a milder stimulant effect. It may contribute to mood enhancement and overall well-being (32). Magnesium: Dark chocolate contains magnesium, a mineral that plays a role in muscle relaxation and may help alleviate cramps and muscle tension associated with menstruation (33). Serotonin Precursors: Dark chocolate contains tryptophan, an amino acid that is a precursor to serotonin, a neurotransmitter that contributes to mood regulation. Increased serotonin levels may help improve mood during menstruation (34). Phenylethylamine (PEA): PEA is a compound found in chocolate that is sometimes referred to as the "love chemical." It is believed to have mood-enhancing and anti-depressant-like effects (35). Iron: Dark chocolate contains some iron, which is important for maintaining healthy blood levels and preventing iron deficiency anemia (36). Fiber: Dark chocolate contains dietary fiber, which may help regulate digestion and contribute to a feeling of fullness (37).

FABRICATION OF FORMULATION:

Ingredients: Dark Chocolate: Use high-quality dark chocolate with a cocoa content of at least 70%. Dark chocolate contains antioxidants and may have anti-inflammatory properties (38).

Herbal Infusions: Choose herbs known for their potential benefits in alleviating period cramps. Some options include:

- **Ginger:** Has anti-inflammatory effects and may help reduce pain (39).
- **Vitamin C (Citric Acid):** Prevent cramps and maintain energy levels (40).
- **Pumpkin seeds:** Magnesium, zinc and Omega 3 which helps in relieving period cramps (41).
- **Almond:** Vitamin B6 and riboflavin keeps active in periods (42).

Optional Add-ins: Consider adding ingredients like nuts, seeds, or dried fruits for texture and additional nutrients (43).
Each chocolate contains:

1. **Ginger extract**: 350 mg  
2. **Vitamin C**: 50 mg  
3. **Pumpkin Seeds powder**: 500 mg  
4. **Almond powder**: 500 mg  
5. **Quantity Sufficient**: 5 gm

Table No. 1: Formulation Table for herbal chocolate

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Ingredients</th>
<th>Quantity</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ginger extract</td>
<td>7 gm</td>
<td>Reduces prostaglandin activity.</td>
</tr>
<tr>
<td>2</td>
<td>Vitamin C (Citric Acid)</td>
<td>1 gm</td>
<td>Prevent cramps and maintain energy levels.</td>
</tr>
<tr>
<td>3</td>
<td>Pumpkin seeds</td>
<td>10 gm</td>
<td>Magnesium, zinc and Omega 3 which helps in relieving period cramps.</td>
</tr>
<tr>
<td>4</td>
<td>Almond</td>
<td>10 gm</td>
<td>Vitamin B6 and riboflavin keeps active in periods</td>
</tr>
<tr>
<td>5</td>
<td>Dark chocolate</td>
<td>Q.S.</td>
<td>Reduce cramps and inflammation.</td>
</tr>
</tbody>
</table>

**Preparation of Chocolate:**

Brew strong infusions of the chosen herbs. You can do this by steeping the herbs in hot water for an extended period. Strain the liquid to obtain the herbal infusion (44).

**Melt the Chocolate:** Melt the dark chocolate using a double boiler or a microwave. Stir the chocolate until smooth (45).

**Combine with Herbal Infusions:** Gradually mix the herbal infusions into the melted chocolate. Start with a small amount and taste the mixture to adjust the flavor according to your preference (46).

**Add Optional Ingredients:** If desired, incorporate nuts, seeds, or dried fruits into the chocolate mixture for added texture and flavor.

**Pour into Molds:** Pour the herbal chocolate mixture into molds. You can use silicone molds for various shapes or a chocolate bar mold.

**Cool and Set:** Allow the herbal chocolate to cool and set. You can speed up the process by placing the molds in the refrigerator (46).

**Store:** Once the chocolate has fully set, remove it from the molds and store it in a cool, dry place (47).
Note: While certain herbs are traditionally believed to help with period cramps, individual responses may vary. Consult with a healthcare professional, especially if you have any pre-existing conditions or are taking medications.

Figure No 1: Methodology for preparation of herbal chocolate

NORMAL MENSTRUAL CYCLE:

Menstrual Cycle
↓
[ Hormonal Fluctuations - Estrogen, Progesterone ]
↓
[ Release of Prostaglandins and Other Mediators ]
↓
Prostaglandins Induce:
Uterine Contractions, Inflammatory Response
↓
Ischemia (Reduced Blood Flow to Uterus) and Inflammation Contribute to Pain
↓
Individual Variability - Pain Perception
↓
External Factors - Stress, Diet
Menstrual Pain

Figure no 2. Normal Menstrual Cycle:

THERAPEUTIC ACTION OF HERBAL CHOCOLATE:
Menstrual Symptoms

External Factors and Lifestyle

(Stress, Diet, etc.)

↓

[ Incorporation of Nutrient-Rich Foods and Herbal Remedies ]

Potential Mechanisms of Action during Periods

↓

(HERBAL CHOCOLATE)

- Inhibition of

Prostaglandins

- Anti-inflammatory properties
- Muscle relaxant effects
- Prostaglandin modulation
- Maintain Energy level

↓

Potential Alleviation of Menstrual Symptoms
(Reduced Pain, Improved Mood, etc.)
↓

[ Overall Well-being ]
↓

[ Enhanced Quality of Life ](48)

EVALUATION TEST FOR HERBAL CHOCOLATE:

Table No. 2: Evaluation of herbal chocolate

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General appearance:</strong></td>
<td></td>
</tr>
<tr>
<td>1 Colour</td>
<td>Drak Brown</td>
</tr>
<tr>
<td>2 Odour</td>
<td>Pleasant</td>
</tr>
<tr>
<td>3 Taste</td>
<td>Sweet</td>
</tr>
<tr>
<td>4 Surface</td>
<td>Smooth &amp; Even</td>
</tr>
<tr>
<td><strong>Physical stability:</strong></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>5.6 pH</td>
</tr>
<tr>
<td>Hardness</td>
<td>3.9 Kg/cm²</td>
</tr>
<tr>
<td>Weight Variation</td>
<td>4.38</td>
</tr>
<tr>
<td>Moisture content</td>
<td>7.33%</td>
</tr>
</tbody>
</table>

**Physical stability:**

**pH:** Measuring the pH of chocolate involves using a pH meter or pH indicator strips specifically designed for food. Here's a general guide on how you can measure the pH of chocolate (49)

a. **Prepare the pH Meter:** Calibrated the pH meter according to the manufacturer's instructions.

b. **Sample Preparation:** Melting a small amount to create a more workable consistency. Create a chocolate slurry by mixing a small amount of chocolate with distilled water. Ensure that the water content is minimal to avoid affecting the pH.

c. **pH Measurement:** Dip the pH meter electrode or pH indicator strip into the chocolate sample. Allowing the reading to stabilize.

d. **Record the pH:** Once the reading stabilizes, note the pH value.
e. **Clean the Equipment:** Rinse the pH meter electrode used with distilled water between measurements to avoid contamination (49).

**Hardness:** Hardness testing is a common quality control measure used in the food industry, including the evaluation of herbal chocolates. The process involves using a texture analyzer to assess the resistance of the chocolate to deformation or breakage. Here's a general guideline for the hardness testing of chocolate (50). To shatter a chocolate bar across its circumference, a certain amount of hardness is needed. The strength of chocolate can be determined by how hard it is. Using a Monsanto Hardness tester, the hardness was determined. Kg/cm2 was used to express the values. Hardness testing is just one aspect of quality control in the production of herbal chocolates (51).

**Weight Variation:** Six chocolate recipes were weighed separately and collectively. The weight of all the chocolate was used to calculate the average weight. The average weight was contrasted with the individual weights. The weight variation's percentage difference must stay within the allowed bounds. The following formula was used to determine the per cent deviation:

\[
\% \text{ Deviation} = \left( \frac{\text{Individual Weight} - \text{Average Weight}}{\text{Average Weight}} \right) \times 100
\]  

(52)

**Moisture content determination:** A desiccator was used to determine the moisture content (53). This test was performed to determine the level of moisture in the chocolate when it was dry. The resulting chocolate mixture was precisely weighed and stored in a desiccator with anhydrous silica gel. After 24 hours, the formulations were removed, weighed, and the percentage of moisture absorption was determined using the formula:

\[
\% \text{ Moisture} = \left( \frac{\text{Initial Weight} - \text{Final Weight}}{\text{Final Weight}} \right) \times 100
\]  

(54)

**RESULTS:**

**Hardness Testing**

Initial reading on hardness tester = 3.3 kg/cm

After breakage of chocolate = 7.2kg/cm

Therefore, hardness present in the chocolate formulation = 8.5 kg/cm-3.5kg/cm

=3.9kg/cm

**Weight variation determination:**

Average Weight of 5 formulations: \[
\frac{W_1+W_2+W_3+W_4+W_5}{5}
\]

Average weight calculated to be \[
\frac{4.86+4.65+3.94+3.80+4.65}{5} = 4.38
\]

Average weight is found to be=4.38

**Moisture Content Determination:**

Weight of Formulated chocolate = 4.50 gm.

Weight of empty Crucible = 44.13 gm.

Weight of formulated chocolate + weight of empty crucible = 48.63 gm
Weight after moisture loss = 48.30 gm
Therefore, the final weight obtained = 0.33gm
Weight of one formulated chocolate = Final weight obtained
4.25gm = 0.09gm
100gm = X
\[ X = \frac{0.33 \times 100}{4.25} \]
X=7.33%

Table No. 3. Comparison of Herbal Chocolate With Marketed Product

<table>
<thead>
<tr>
<th>Marketed Product</th>
<th>Disadvantages</th>
<th>Advantages of chocolate over marketed formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSAID’S’S</td>
<td>Harmful for Liver</td>
<td>Compatible to admire</td>
</tr>
<tr>
<td></td>
<td>Drug Resistance</td>
<td>No Side effects</td>
</tr>
<tr>
<td>Heating bags</td>
<td>Not convenient for using outside.</td>
<td>Can be carried anywhere.</td>
</tr>
<tr>
<td>Heating patches</td>
<td>Uncomfortable and inconvenient to use.</td>
<td>Can be consumed during travelling and during any work.</td>
</tr>
</tbody>
</table>

CONCLUSION:
Based on the above-mentioned study, the formulation of Medical Herbal chocolate with ingredients like Alomand, pumpkin Seads, citric acid, Ginger Extract, which are smooth in texture, pleasant to the taste, and have patient compliance and safety for stomach Pain. The shape, size, taste, texture, dimensions, moisture content, weight variation, hardness, and stability of the formed chocolate were all analyzed. Concluded from the studies that medicated herbal chocolate is can used for relaxation of period cramps Inhibition of Prostaglandins secretion, having an Anti-inflammatory properties so its reduce the inflammation, Thus its have Properties to relaxant the Muscle, owing to presence of citric acid it Maintain the Energy level.

REFERENCES:


30. Ferina F, Hadianti DN, Fatimah YU. Dark chocolate as a non-pharmacological alternative to reduce dysmenorrhea in adolescents. Healthc Low-Resource Settings. 2023;11(2).


42. Etcheverry P, Grusak MA, Fleige LE. Application of in vitro bioaccessibility and bioavailability methods for calcium, carotenoids, folate, iron, magnesium, polyphenols, zinc, and vitamins B 6, B 12, D, and E. Front Physiol. 2012;3 AUG.


45. Roca J, Medina I. Casa Cacao: The Return Trip to the Origin of Chocolate. 2019; Available from: https://books.google.com/books?hl=en&lr=&id=K2iIEAAQBAJ&oi=fnd&pg=PT28&dq=cocoa+mucilage&ots=N4qXOge5x&sig=9Pc0NyyjxOyh01yKtSTKBRY_nSM


