FORMULATION & EVALUATION OF ANTHELMINTIC HERBAL CHOCOLATE

1-Mr.Sameer s. mahangade, 2- Miss.Pranali R. Wagh,
3- Mr.kshirsagar D.C

½- student , 3- assistant proffeser (guide)
1/2/3- Gourishankar Institute of Pharmaceutical Education and Research, Limb, Satara

1. Abstract:

The chocolate is most loving food of children whereas the medicine is hating substance. So, objective of present study was to formulate the chocolate that contain drug i.e., medicated chocolate to prevent the disease. *Ocimum Sanctum* (Tulsi) is the herbal drug which having several medicinal properties, anthelmintic activity is one of them. Thus, we have to formulate the chocolate with aqueous extract of Tulsi that gives anthelmintic activity. Further, prepared medicated chocolate is evaluated for general appearance, dimension, weight variation, blooming test, , physical stability , moisture content determination etc

Oral drug delivery is one of the most common routes of drug administration due to its patient compliance and ease of usage. But this route is an immense challenge for the drug delivery to the pediatric patients. Our present research work emphasizes on the solution to this problem. The present research work deals with the formulation and evaluation of a medicated herbal chocolate which is one of the most common medicines used for pediatrics for the treatment of intestinal worms and related problems

Keywords :

- Formulation
- Evaluation
- Anthelmintic
- Herbal
- Chocolate
- Helminths
- Parasitic worms
- Natural remedie

2. Introduction:

One of the finest delivery methods for patient compliance is oral. It offers advantages of its own. Chocolate is an incredibly sophisticated and adaptable delicacy that can be mixed to produce unique tastes and textures. Chocolate is resistant to microbial growth and the hydrolysis of active ingredients that are water-sensitive because it is anhydrous. In many ways, using chocolate as a delivery system for active compounds makes sense. For instance, chocolate's general characteristics are great for hiding the disagreeable flavors of active ingredients as well as giving otherwise unappealingly granular active ingredient compositions a smooth and creamy texture.

Chocolate is rich in Polyphenols, saturated fat, methylxanthines and aliphatic alcohols. Phenylethylamine, sometimes known as "the love drug," is a chemical that naturally arises in the brain and gives people a sensation of happiness and pleasure. 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. Helminthiasis is the term for an infection of the human body with parasitic worms like roundworms, pinworms, etc.

According to the WHO, helminthiasis is controlled through pharmacological therapy, biological control, good hygiene, and health education. Herbs known as anthelmintics can be used therapeutically to treat helminthiasis because they have qualities that either kill parasitic helminths and protozoal parasite worms or stop their growth or replication. 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. Banana peel contain compounds like tannins saponins alkaloids having a anthelmintic activity. Tulsi extract contain Eugenol shows anthelmintic activity, it is also used as antioxidant, anti-inflammatory, stress reduction, anticancer etc. Papaya Seed, pumpkin seed also having Anthelmintic activity.

Need of Investigation:

Investigations are crucial in pharmaceutical projects for various reasons:

1. Quality Control
2. Compliance
3. Root Cause Analysis
4. Continuous Improvement
5. Risk Management

Investigations ensure that the pharmaceutical products meet the required standards and specifications, minimizing risks to patients and ensuring product efficacy and safety.
When issues arise, investigations help identify the root causes, whether they are related to manufacturing, supply chain, or quality control processes. This enables corrective and preventive actions to be implemented effectively.
Overall, investigations play a critical role in ensuring the quality, compliance, and safety of pharmaceutical products, ultimately contributing to the success and reputation of pharmaceutical projects.

Plan of work:

Formulating and evaluating an anthelmintic herbal chocolate involves several key steps. Here's a plan of work to guide the process:

1. **Literature Review:**
2. **Selection of Anthelmintic Herbs:**
3. **Formulation of Anthelmintic herbal chocolate:**
4. **Evaluation of Anthelmintic herbal chocolate**:
   a. General appearance
   b. Weight variation
   c. Sugar bloom test
   d. Stability
   e. Dimension
   f. Anthelmintic activity

6. **Report writing:**

Literature Review:

1. Aditi. A. Ghadage, Vrushali. R. Raut, Gaurav. D. Mahamulkar, Dhanashri. T. Jawal, Z. K. Khan [2024]

In the indigenous medical system, Calotropis gigantean is one of the most widely used and advantageous medical herbs for the treatment of asthma disorder. This thorough analysis offers the most recent information on the traditional uses, phytochemistry, pharmacological data, toxicological data, clinical. efficacy, safety and efficacy of Calotropis gigantean. It also lays out plans for future studies and development of substantiate the plant's therapeutic potential through. scientific means. A through web and library search of numerous indexed and non-indexed journals, some local literature and a variety of publications published on ethno pharmacology, phytochemistry and traditional usage were used to gather information about Calotropis gigantean The pleiotropic advantages associated with Calotropis gigantean, comprising its toothache and Head ache Sprain, Stiff joints and to cure pain anthelmintic intestinal worms, ascites, and laxative and is useful in bronchitis, cutaneous disease, arthralgia swellings and intermittent fevers, Calotropis gigantean.

2. Najmin Ansar Shaikh, Sakshi Omprakash Jaju, Anand Daulatrao Khendke [2024]

The consumption of chocolate is enjoyed by people of all ages, yet health concerns such as obesity, high blood pressure, diabetes, and coronary artery disease persist. The consumption of chocolate is enjoyed by people of all ages, yet health concerns such as obesity, high blood pressure, diabetes, and coronary artery disease persist

3. Mahendra Dwivedi1, K.K.Jha , Swati Pandey , Ankush Sachan , Himanshu Sharma , Shloke Kumar Dwivedi [2023]

The goal of this study is to develop and assess a polyherbal medicated chocolate for stomach deworming and other related issues that has higher bioavailability and compliance than standard treatment options. 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.

4. K. Khan, Viraj. H. Lambhate, Rutuja R. Raut, Vaishnavi A. Jagadale, Dhanashri.T. Jawal [2023]

the indigenous medical system. Tamminalia arjuna is one of the most widely usst and advantagens medicinal herbe for the westment of cardiovascular disorders. This though analysis offen the most mcent information on the traditional uses, phytochemistry, pharmacological data, toxicological data, clinical efficacy, safety and efficacy y of Terminalia arjuna. It also lays out plans for development to substantiate the plant's therapeutic potential through scientific means. further study and development to substantiate the plant's therapeutic potential through scientific means. further study and Materials and Methods: A thorough web and library search of numerous indexed and non- indexed journals, some local literature and a variety of publications published ethnopharmacology, phytochemistry and traditional usage were used to gather information about Terminalia arjuna. Regarding the effectiveness and safety protile of Terminalia arjuna, numerous pre-dinical (2000-2014) and clinical investigations (1990-2014) have also been taken into considention. The pleiotropic advantages associated with Terminalia arjuna, comprising its anti- athesogenic, hypotensive, inotropic, anti-inflammatory, anti- thammbotic and antioxidant properties, have been demonstrated in aumerous in vitro, vive and clinical investigations.

5. Dhanashree R. Thakare and Priyanka G.Dhumal [2023]

The chocolate is most loving food of children whereas medicine is hating substance. So, the objective of this study is to fabricate and design chocolate. The essential target of this study was to formulate and evaluate nutritious chocolate and nutritional supplement containing antioxidant and anti- cancer property. Chocolate is a range of products derived from cocoa (cocoa) mixed with fat and finely powered coconut sugar to produce a solid confectionery, Ocimum sanctum, Tulsi is the herbal drug which having several medicinal properties, like antitussive property, antioxidant property, from the prevention of heart disease and also for the treatment of skin. Black sesame was used to improved blood pressure and as a anti aging agent. Thus, we have to formulate the chocolate with aqueous extract of black sesame and Tulsi that gives antitussive and anti-cancer activity. Chocolate is sophisticated and infinitely adaptable food that can be mixed and matched to generate a variety of taste and texture sensation, Henceworth, in the present

examination, endeavor was to make to get ready chocolate plan of black sesame and Tulsi which enhances the patient's compliances and worthiness.

6. Ajay Patole, Mis. Y.L. Ghule, Dr. Prachi Jain [2023]

The chocolate is most loving food of children whereas the medicine is hating substance. So, objective of present study was to formulate the chocolate that contain drug ie., medicated chocolate to prevent the disease. In children cough, viral infection is most common diseases. Ocimum sanctum, Tulsi is the herbal drug which having several medicinal properties, antitussive activity is one of prope them. Thus, we have to formulate the chocolate with aqueous extract tulsi that gives antitussive activity. Further, prepared medicated chocolate is evaluated for general appearance, dimension, hardness, blooming test, drug content determination, physical stability etc. The main objective of the present invention to provide a novel herbal chocolate and a process for preparation of the product. To use in the viral infection treatment. in the children's. The chocolate is most loving food of children whereas the medicine is hating substance. So, objective of present study was to formulate the chocolate that contain drug ie., medicated chocolate t that contain drug ie., medicated chocolate to prevent the disease. In children cough, viral infection is most common diseases. Ocium. sanctum. Tulsi is the herbal drug which having several medicinal properties, antitussive activity is one of them. Thus, we have to formulate the chocolate with aqueous extract of Tulsi that gives antitussive activity.

7. Kaushik Singh, Komal Shevkar, Omkar Selmokar, Prof, Poonam Harpale, Dr. Rajesh Oswal [2022]

The chocolate is most loving food among the people whereas the medicine is hating substance. So, objective of present study was to formulate the chocolate that contain drug Le, medicated chocolate to prevent various kind of disorder. Withania somnifera (Ashwagandha) is an herbal drug which having several medicinal properties like Anti stress, anti-inflammatory effect and nervous system effect and Asparagus racemosus (Shatavari) is the herbal drug which having medicinal

properties, like prevents miscarriage, increases lactation, removes the infertility, and regulates the menstruation. Thus, we must formulate the chocolate with powder of Ashwagandha and Shatavari that gives the desired pharmacological effect. Further, prepared medicated chocolate is evaluated for general appearance, dimension, hardness, blooming test.

8. Sharma Mayank, Jain Dinesh Kumar [2022]

Chocolate is highly sophisticated and infinitely a versatile food that can be combined to create completely different taste and texture sensations. The objective of the present study is to develop a palatable chocolate formulation of Domperidone and Cetirizine for pediatric administration and to increase patient's desire to consume the medication. In present investigation chocolate base is prepared by use of cocoa powder, coco butter, lecithin, and pharmaceutical grade sugar. Thereafter drug is incorporated to prepared chocolate base. The medicated chocolate prepared is evaluated for appearance, moisture content determination using digital Karl Fischer titrator, blooming test, drug content determination & drug excipient interaction by differential scanning calorimetry.

9. Yogesh S. Kolekar1 , Sajid A. Mulani1 , Firoj A. Tamboli1, Harinath N. More1 and Ashish A. Misal [2021]

The chocolate is most loving food of children whereas the medicine is hating substance. So, objective of present study was to formulate the chocolate that contain drug i.e., medicated chocolate to prevent the disease. In children cough, viral infection is most common diseases. Ocimum sanctum, Tulsi is the herbal drug which having several medicinal properties, antitussive activity is one of them. Thus, we have to formulate the chocolate with aqueous extract of tulsi that gives antitussive activity. Further, prepared medicated chocolate is evaluated for general appearance, dimension, hardness, blooming test, drug content determination, physical stability etc

10. Reddy Sunil, K. Mounika, S. Shalini, A.Venkatesham [2017]

The objective of this study is to design and fabricate Chlorpheniramine Maleate chocolate formulation by chocolate drug delivery system. Chlorpheniramine Maleate binds to histamine H1 receptor. This blocks action of endogenous histamine, which subsequently leads to temporary relief of negative symptoms brought on by histamine. Chocolate is a range of products derived from cocoa (cacao), mixed with fat (i.e., cocoa butter) and finely powdered sugar to produce a solid confectionery. Medicated chocolate formulation is widely used for pediatric administration and increases patient compliance. Chlorpheniramine Maleate chocolate formulation is prepared to improve patient compliance

Aim:

Formulation and evaluation of anthelmintic herbal chocolate

Objective

- Developing a novel anthelmintic herbal chocolate formulation for effective parasite control.
- To develop and evaluate a polyherbal medicated chocolate for stomach deworming with higher bioavailability
- Develop an anthelmintic herbal chocolate formulation to enhance efficacy, ensure safety
- To evaluate Anthelmintic herbal chocolate activity against parasitic infections
- Explore the potential of the herbal chocolate as cost effective and acceptable solution for parasitic treatment.

3. Experimental work:

3.1 Materials:

All the fruits and herbs are *Ocimum Sanctum* (Tulsi), Banana Peel, Papaya Seeds, Pumpkin Seeds, honey, chocolate Base. In addition to this equipment is taken as of analytical grade obtained from Gourishankar Institute of Pharmaceutical Education and Research Limb, Satara

- **Herbs profile:**
  1]Tulsi

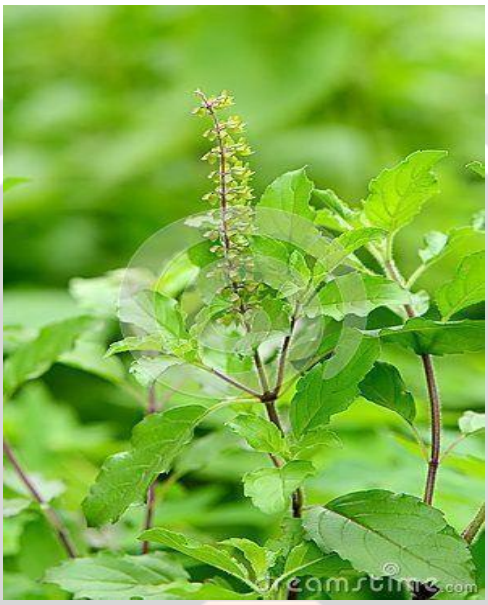


Figure 1 Tulsi

1. Scientific Name: *Ocimum Sanctum*
2. Family: Lamiaceae
3. Common Name: Ajaka, Manjari (Sanskrit), Tulsi (Hindi), Thulasi (Tamil) 4.Varieties: Sri Tulsi, Krishna Tulsi,
5. Distribution: India, Andaman and Nicobar Islands
6. Uses: Drugs, Flavouring, Insecticide, Perfumery etc

2] Banana peel:

Figure 2 Banana peel

Scientific Name: Musa paradisiaca Linn.

Family: Musaceae

Common Names: Banana (English), Kela (Hindi), Vazha (Tamil)

Varieties: Cavendish, Gros Michel, Plantains, Lady Finger, etc.

Distribution: Tropical regions worldwide

Uses: Consumed as fruit, cooking ingredient, source of fiber and vitamins, and in some cultures, the leaves are used for cooking or wrapping food.

3]Pumpkin seed:

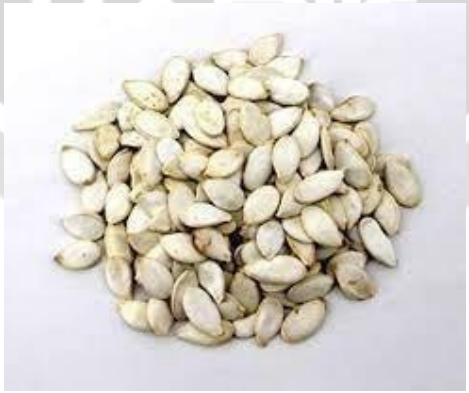


Figure 3 :Pumpkin seed

Scientific Name: Cucurbita pepo (for most common varieties)

Family: Cucurbitaceae

Common Names: Pumpkin (English), Kaddu (Hindi), Poosanikai (Tamil)

Varieties: Jack-o'-lantern, Sugar Pie, Cinderella, etc.

Distribution: Cultivated worldwide in temperate and tropical regions.

Uses: Consumed as a vegetable, ingredient in cooking, seeds eaten as a snack, decorative use during Halloween, and traditional medicine uses for seeds and flesh.

4] Papaya seed:

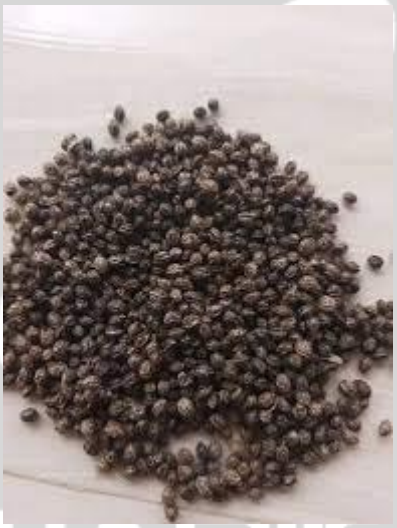


Figure 4 papaya seed

Scientific Name: Carica papaya

Family: Caricaceae

Common Name: Papaya

Varieties: Hawaiian, Mexican, Solo, Sunrise

Distribution: Tropical regions worldwide

Uses: Culinary, Medicinal, Cosmetic, Seeds as Vermifuge

3.2 Methodology:

1. Extraction of Fruits Used in Formulation:

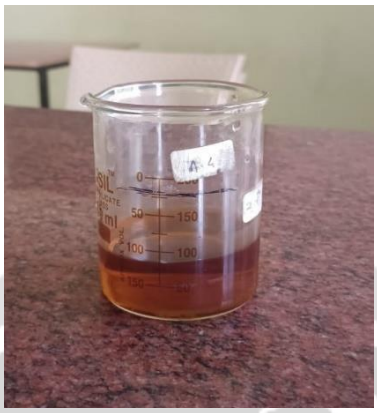


Figure 5 Extraction of Fruits used in formulation

Banana fruits were purchased from a nearby fruit market. Manually separating the peels, allowing them to dry in the shade, and preserving a sample allowed for future research. The dried peels were mechanically ground into powder. The powdered plant material is extracted repeatedly using various solvents, including water, methanol, and chloroform. Maceration was used for extraction using methanol and chloroform.

Soxhlet apparatus is used to produce an aqueous extract. The process that was used was as follows: For six days, chloroform is macerated with the powder. Then vacuum filtration is used to filter the contents. The same solvent is used to treat the marc once more for three days. Filtered, blended, and concentrated materials are used. Following methanol extraction, the solid material was suitably dried before being subjected to an eight-hour soxhlet extraction with water. It was a concentrated extract. A desiccator was used to store each extract.

2. Extraction of Tulsi leaves:

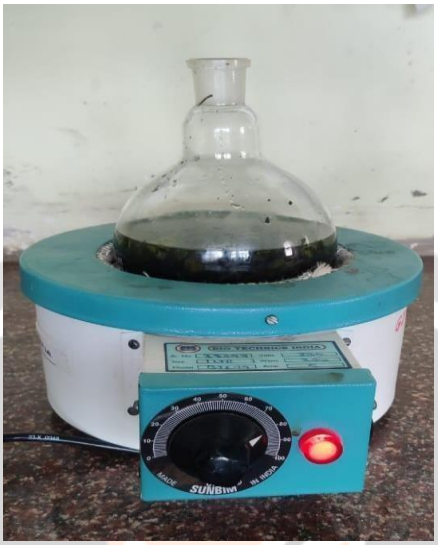


Figure 6 Extraction of Tulsi Leaves

Leaves of Ocimum sanctum L. (tulsi) were collected from different sites of Dibrugarh District, Assam, washed with sterile water and dried in shades. Then the samples were powered in mechanical grinder. The dried tulsi (50g) powder was placed in the thimble of Soxhletand ethanol was used for extraction procedure and the experiment was done separately for all the two solvents and distilled water. The extraction was continued till clear solvent or water was seen in the thimble. The extract was concentrated using rotary evaporator. Then the extract was dried in a digital water bath till a dark green residue was obtained.

3. Extraction of papaya seed:

Figure 7 Extraction of Papaya seed

Grinding:

1. Start by grinding the papaya seeds into a fine powder using a mortar and pestle or a grinder.
2. Packing the Soxhlet apparatus: Place the ground papaya seed powder into the thimble of the Soxhlet extractor. Make sure the thimble is properly packed but not too tightly to allow for proper extraction.
3. Solvent selection: Choose an appropriate solvent for extraction. Ethanol or a mixture of ethanol and water is commonly used for extracting phytochemicals from plant materials.
4. Solvent circulation: Set up the Soxhlet apparatus with the extraction flask containing the selected solvent and the condenser. Heat the flask to boil the solvent, causing it to vaporize and rise into the condenser.
5. Continuous extraction: As the solvent vapor condenses, it drips onto the packed papaya seed powder in the thimble, extracting the desired compounds. The solvent then evaporates, rises, and repeats the cycle. This continuous process ensures efficient extraction.
6. Extraction duration: Allow the Soxhlet apparatus to run for several hours or overnight to ensure maximum extraction efficiency.
7. Collection: The extracted solution collects in the extraction flask. Once the extraction is complete, remove the flask from heat and allow it to cool down.
8. Concentration: If necessary, concentrate the extract by evaporating the solvent using a rotary evaporator or similar equipment.
9. Filtration: Filter the concentrated extract to remove any remaining solid particles or impurities.
10. Storage: Transfer the filtered extract into a clean, airtight container and store it in a cool, dark place to maintain its stability and efficacy

Pumpkin seed powder:

1. Selecting and Cleaning: Start by selecting fresh, high-quality pumpkin seeds. Remove any debris or dirt from the seeds by rinsing them in water.
2. Drying: Spread the cleaned pumpkin seeds in a single layer on a baking sheet and allow them to dry completely. This can be done either by air-drying them for a few hours or by roasting them in the oven at a low temperature (around 150°F or 65°C) for about 15-20 minutes.
3. Grinding: Once the pumpkin seeds are dry, transfer them to a food processor or a high- powered blender. Pulse or blend the seeds until they form a fine powder. You may need to stop and scrape down the sides of the processor or blender periodically to ensure even grinding.

Storage: Transfer the pumpkin seed powder to an airtight container and store it in a cool, dry place away from direct sunlight. It can be stored for several weeks to a few months, depending on the conditions.

Formulation of Anthelmintic Herbal Chocolate:

Procedure:

1. Prepare the Ingredients:

- Grind banana peels and Tulsi leaves separately and extract the juices. You should have 2 grams of banana peel extract and 1.2 grams of Tulsi extract.
- Grind papaya seeds and pumpkin seeds separately into fine powders. You should have 0.8 grams of each powder.
- Measure 2 grams of honey.

2. Chocolate Base Preparation:

- Melt 3 grams of chocolate base in a double boiler or microwave until smooth. Allow it to cool slightly.

3. Mixing:

- In a mixing bowl, combine the melted chocolate with the following:
  - 2 grams of banana peel extract
  - 1.2 grams of Tulsi extract
  - 0.8 grams of papaya seeds powder
  - 0.8 grams of pumpkin seeds powder
  - QS grams of honey
- Stir the mixture thoroughly until all ingredients are well incorporated.

4. Pouring and Setting:

- Pour the mixture into a chocolate mold or onto a lined baking sheet.
- Allow the chocolate to set at room temperature or in the refrigerator until firm.

5. Storage:

- Once the chocolate has set, store it in an airtight container in a cool, dry place.

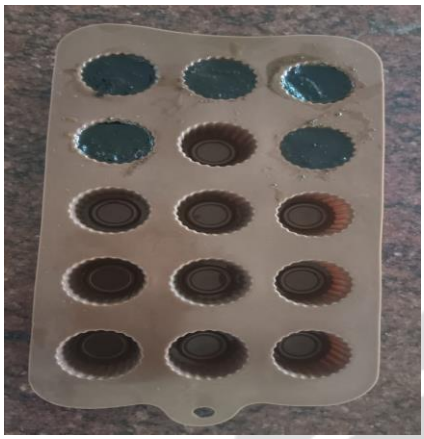
6. Dosage Consideration:

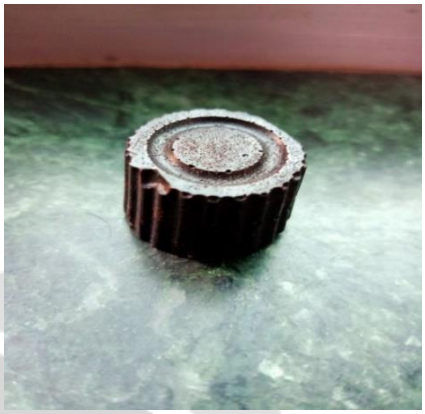
- Determine the dosage per serving based on the potency of your extracts and powders. Label the chocolate accordingly with dosage information.

7. Testing and Packaging:

- Test the medicated chocolate for taste, texture, and potency.

- Once satisfied, package the chocolate attractively and include dosage information on the packaging.





SR.NO	Ingredients	Intended Use	Quantity gm or ml
1	Banana Peel Extract	Antiparasitic, Preventing constipation, Anthelmintic	2ml
2	Tulsi Extract	antimicrobial and anthelmintic effects, reduces inflammation, boosts immunity, and supports digestive health.	1.2ml
3	Papaya seed Extract	It help to expel parasitic worms,paralyzes or kills worms	0.8ml
4	Pumpkin seed powder	paralyzing the worms, preventing them from holding onto the intestinal walls	0.8 ml
5	Chocolate base	Palatability, Bioavailability,Masking Flavor	3gm
6	Honey	sweetning agent	QS

IJARIIE

3.3 Evaluation of Anthelmintic Herbal Chocolate:

1. General appearance:

The visual identity and overall elegance of a chocolate formulation are what determine its overall appearance, which is important for consumer acceptability and trouble-free manufacture

2. Dimensions:

The dimension of the chocolate was evaluated while using Vernier's callipers

3. Moisture content determination:

A desiccator was used to determine the moisture content. 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

$$\%\text{Moisture} = \frac{\text{initial weight-final weight}}{\text{Final weight}}$$

4. Weight Variation: Five 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

$$\%\text{Deviation} = (\text{Individual weight} - \text{Average weight})/\text{Average weight} \times 100$$

5. Stability: Medicinal products are defined as being stable if they can maintain their physical, chemical, microbial, therapeutic, and toxicological specifications in a specific formulation in a specific container. To put it another way, the stability of a drug is its capacity to withstand degradation. The lowest permissible potency level is typically accepted to be 90% of the labelled potency. Due to changes in its physical, chemical, and microbiological properties, drug degradation can happen in a variety of ways. The modifications could reduce the preparation's medicinal efficacy or raise its toxicity.

6. Sugar bloom test: This is a rough and irregular layer on top of the chocolate formulation. Sugar bloom is caused by condensation (when the chocolate is taken out of the refrigerator). This moisture will dissolve the sugar in the chocolate. When the water evaporates afterwards, the sugar secrystallizes into rough, irregular crystals an the stuface This gives the chocolate an uppicasant look Each sample was subjected to treatment cycles comprised (1) 30°C for 11 hours,
(2) temperature shifting for 1 hour, (3) 18°C for 11 hours, and (4) temperature shifting for 1 hour. A est chocolate formulation observed,
after the step at 18°C for 11 hours, whether or not blooming has taken place.

7. Anthelmintic activity:

Experimental Model: Adult earthworms were collected and grouped for the study, Piperazine citrate used as the standard drug. Concentrations of both the standard drug and the herbal chocolate formulation were prepared.
Anthelmintic Activity: Groups of earthworms were treated with normal saline (control) herbal chocolate formulation, and standard drug. Paralysis and death times were recorded for each group

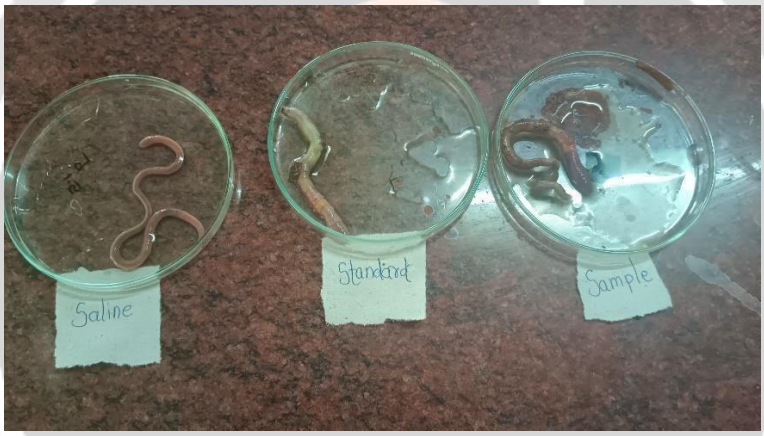


Figure 8 Anthelmintic activity on earthworms

4. Results and Discussion:

A. Organoleptic Properties:

Sr. No.	Characteristics	Result
1.	Colour	Brown
2.	Odour	Pleasant with no burnt smell
3.	Taste	Sweet
4.	Surface	Smooth & even

B. Dimensions:

It was measured by Vernier's callipers Avg. width of 5 chocolate formulations:

1.85 + 1.90+ 1.84 + 1.85 +1.86 / 5

The average width of 5 chocolate is observed to be = 1.86

C. Moisture Content Determination:

Weight of Formulated chocolate = 7.8gm Weight of empty Crucible = 45.32 gm
Weight of formulated chocolate + weight of empty crucible = 53.12 gm Weight after moisture loss = 53.03 gm
Therefore, the final weight obtained = 0.09gm

Weight of one formulated chocolate = Final weight obtained

7.8gm = 0.09gm 100gm = X
X = 0.09×100 /7.8

So, the percentage of moisture content = 1.15%

D. Sugar bloom Test:

Sugar bloom is characterized by a rough and irregular layer on top of the chocolate formulation. This phenomenon occurs due to condensation when the chocolate is taken out of the refrigerator. The moisture dissolves the sugar in the chocolate, and as the water evaporates, the sugar recrystallizes into rough, irregular crystals on the surface, giving the chocolate an unpleasant look.

Figure 9. Observation from bloom test of Chocolate

F. Weight variation determination:

Average Weight of 5 formulations: W1+W2+W3+W4+W5/ 5 Average weight calculated to be: 7.68+7.71+7.62+7.65+7.60/5

= 38.26/5

= 7.692

H. Stability testing:

After being kept at room temperature for 24 hours in the foil container with shiny butter paper on the outside.

Figure 10 Stability Testing

I. Anthelmintic activity:

Sr. No.	Treatment	Concentration(gm%)	Paralysis Time (min)
1.	Normal saline	0.5	–
2.	Herbal chocolate sol.	0.5	25 ± 3
3.	Piperazine citrate	0.5	30± 2

The herbal chocolate formulation exhibited significant anthelmintic activity, with the ethanolic extract showing higher efficacy compared to the aqueous extract. Further research is warranted to explore its application in combating helminth infections in humans and animals.

5. Conclusion:

In conclusion, based on the above-mentioned study, we can say that medical chocolate with ingredients like banana extract, apple peel extract, s. chirata, and Ferula asafoetida, which have a bland flavour, are smooth in texture, pleasant to the taste, and have patient compliance and safety for stomach deworming. The shape, size, taste, texture, dimensions, moisture content, bloom test, viscosity, weight variation, hardness, and stability of the formed chocolate were all analyzed. We concluded from the study that medicated chocolate gives the formulation a smooth and creamy texture and is effective at disguising unpleasant tastes while achieving a greater therapeutic effect.

6. Reference:

1. Mahendra Dwivedi1*, K.K. Jha2, Swati Pandey3 , Ankush Sachan4 , Himanshu Sharma5 , Shloke Kumar Dwivedi: Formulation and Evaluation of Herbal Medicated Chocolate in Treatment of Intestinal Worms and Related Problems, *IJFANS International Journal of Food and Nutritional Sciences,2*002, Volume 11, 1426-1439

2. Yogesh S. Kolekar1 , Sajid A. Mulani1 , Firoj A. Tamboli1*, Harinath N. More1 and Ashish

A. Misal FORMULATION AND EVALUATION OF PEDIATRIC HERBAL CHOCOLATE,

European Journal of Biomedical AND Pharmaceutical sciences, 2021,8,458-462

3. Of F, Masked MT-, Chocolates M, An FOR, Proton E, Lansoprazole I, et al. DESIGN AND FABRICATION OF MODERN TASTE- MASKED MEDICATED CHOCOLATES FOR AN ESTABLISHED PROTON PUMP. 2022;11(6):1037–58.

4. Sarmah R, Khan RA, Devi KR. Microbes in human oral cavity: a review. Rev Med Microbiol [Internet]. 2021 Apr;32(2):75–82. Available from: https://journals.lww.com/10.1097/MRM.0000000000000227

5. Sastry SV, Nyshadham JR, Fix JA. Recent technological advances in oral drug delivery – a review. Pharm Sci Technolo Today [Internet]. 2000 Apr;3(4):138–45. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1461534700002479

6. Neck L, Data RUSA. Delivery of active agents using a chocolate vehicle. Vol. 2. 2012.

7. Mayank S, Dinesh Kumar J, Sharma M. Chocolate Formulation As Drug Delivery System for Pediatrics. J Pharm. 2012;23(4):216–24.

8. Naqvi RF, Khan A, Umer MF, Malik O, Shahwani NA. Design and Optimization of Novel Taste-Masked Medicated Chocolates of Dextromethorphan with In vitro and In vivo Taste Evaluation. J Pharm Innov [Internet]. 2022 Jun 2;17(2):376–90. Available from: https://link.springer.com/10.1007/s12247-020-09511-8

9. Chaudhari SA, Devare RR, Dewang PS, Patil VB, Patil AM, Pawar SP. Review: Chocolate Formulation As Drug Delivery System. Indian J Drugs [Internet]. 2018;6(2):136–41. Available from: www.drugresearch.in

10. Gravina SA, Yep GL, Khan M. Human Biology of Taste. Ann Saudi Med [Internet]. 2013 May;33(3):217–22. Available from: http://www.annsaudimed.net/doi/10.5144/0256- 4947.2013.217

11. Sunil R, Mounika K, Venkatesham A. DESIGN AND FABRICATION OF MEDICATED CHOCOLATE FORMULATION BY CHOCOLATE DRUG DELIVERY SYSTEM. Int J Curr Pharm Res [Internet]. 2017 Sep 21;128–33. Available from: https://innovareacademics.in/journals/index.php/ijcpr/article/view/22156

IJARIIE