IJBPAS, July, 2026, 15(7): 3273-3279

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

DESIGN DEVELOPMENT AND EVALUATION OF POLYHERBAL CHOCOLATE FOR AN ANTHELMINTIC ACTIVITY

YELMATE AA*[1], SURYAWANSHI SS[2], GAJMAL GK[3] AND SHAIKH SS[4]

[1,2,3,4]Department of Pharmaceutics, Dayanand Education Society's, Dayanand College of Pharmacy Latur, Maharashtra, India

***Corresponding Author: Dr. Yelmate Archana Ashok: E Mail: archanayelmate1@gmail.com**

Received 20th June 2025; Revised 25th July 2025; Accepted 15th Oct. 2025; Available online 1st July 2026

https://doi.org/10.31032/IJBPAS/2026/15.7.10329

ABSTRACT

Chocolate is the most loved food of children, whereas medicine is a hated substance. So, the objective of the present study was to formulate the chocolate that contains the drug, i.e., medicated chocolate, to prevent the disease. Clove oil is the volatile oil drug which has several medicinal properties; anthelmintic activity is one of them. Also pumpkin seed and ginger juice are used to prepare medicated chocolate. Thus, we have to formulate the polyherbal medicated chocolate with pumpkin seed, clove oil, and ginger juice, which 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 paediatric patients. Our present research work is the solution to this problem. The present research work focuses on the formulation and evaluation of a medicated polyherbal chocolate, one of the most commonly used medicines in paediatrics for treating intestinal worms and related issues.

Keywords: Anthelmintic, Herbal Chocolate, Helminths, Parasitic worms, Natural remedies etc.

INTRODUCTION:

Anthelmintic are a group of Antiparasitic drugs that expel parasitic worms (Helminths) and other internal parasites from the body. They are used to treat people who are infected by Helminths, a condition called helminthiasis. These drugs are also used to treat infected

animals. The anthelmintic expel the worms from the host body by either stunning their growth or killing them, without causing significant damage to the host. With the use of the synthetic anthelmintic come various side effects **[1]**.

The commonly used synthetic anthelmintics are mebendazole, flubendazole, piperazine, praziquantel, pyrantel, etc. The common side effects associated with these synthetic anthelmintics are abdominal pain, headache, dizziness, vomiting, nausea, diarrhoea & drowsiness. Other effects observed with the use of specific anthelmintics are urticaria (piperazine), rashes (piperazine), malaise (praziquantel), anorexia (pyrantel), etc. **[2]**.

The chocolate is most loving food of children whereas the medicine is heating sub. So, objective of present study was to formulate the chocolate that contain drug that is medicine chocolate. Anthelmintic herbal chocolate is a novel and child-friendly formulation designed to treat helminthic (parasitic worm) infections using natural plant extracts **[3]**. Anthelmintic action of natural ingredients targets intestinal worms like nematodes, cestodes, and trematodes. Natural alternative reduces reliance on synthetic drugs like Albendazole and piperazine citrate, which may cause side effects or resistance. Chocolate base improves taste and compliance, especially in paediatric patients who dislike bitter medicines. The chocolates mask the unpleasant taste of herbal extracts, making it easier for children to consume. Helminthic Infections Are Common: Especially in regions with poor sanitation, infections from parasitic worms like roundworms and pinworms are widespread. Need of the present study is poor compliance with traditional drugs because conventional anthelmintic medications often have a bitter taste and unpleasant dosage forms, making them hard for children to take **[4]**.

Also increasing resistance to synthetic anthelmintic drugs urgent calls for alternative, natural treatments. Child-friendly delivery of chocolate is easily accepted by children and we can mask the taste of herbal medicines, improving patient compliance.

MATERIAL AND METHODS:

The herbal drugs like pumpkin seed, Cloves, and ginger were purchased from local market and preliminary phytochemical screening were performed to confirm the authenticity of these drugs.

Table 1: Herbal drugs and preliminary phytochemical screening

Sr. No.	Ingredients name	Botanical Name	Family	Pharmacological Activity
1.	Pumpkin seed extract	*Cucurbita maxima.*	Cucurbitaceae	Anthelmintic use paralyzes
2.	Clove extract	*Eugenia carryophyllus*	Myrtaceae	Anthelmintic use, Antiparasitic, kills the worms
3.	Ginger extract	*Zinziber officinalis,*	Zingiberaceae	Anthelmintic use, it helps to expel the worms

Method of preparation: Selecting and cleaning: selecting fresh, high-quality pumpkin seeds. Remove any debris or dirt from the seeds by rinsing them in water.

Drying: Spread the cleaned pumpkin seeds on a baking sheet and allow them to dry 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.

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.

Clove extraction: Current extraction methods for clove bioactive compounds include steam distillation, solvent extraction, and supercritical fluid extraction.

Ginger extraction: Ginger Juice prepared by grinding **[5, 6]**.

Figure 1

Formulation Table:

Table 2: Formulation Table

sr. no	Ingredients name	Intended use	Quantity (gm.) or (ml)
1.	Pumpkin seed extract	Anthelmintic	0.8gm
2.	Clove extract	Anthelmintic, Antiparasitic, kills the worms	0.5ml
3.	Ginger extract	Anthelmintic, it helps to expel the worms	0.5ml
4.	Marketed chocolate base	Base for drug,	3 gm.
5.	Honey	Sweeting agent	Quantity Sufficient

Evaluation of Polyherbal Chocolate:

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

Dimensions: The dimension of the chocolate was evaluated while using Vernier's callipers **[7]**.

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 %Moisture = initial weight-final weight/Final weight.

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 %Deviation= (Individual weight –Average weight)/Average weight ×100. **[8, 9]**.

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.

Anthelmintic activity: Experimental Model: Adult earthworms were collected and grouped for the study, Albendazole used as the standard drug. Concentrations of both the standard drug and the herbal chocolate formulation were prepared.

The anthelmintic activity was assessed on Eisenia foetida. The adult earthworms (*E. foetida*), with lengths of 6–12 cm and diameters of 0.2–0.4 mm, were separated into 6 groups, each consisting of two earthworms. The vehicle control (Group I) was administered with normal saline. The standard groups (Group V) received the Albendazole suspension at concentrations of 0.25, 0.50, 0.75, and 100 mg/ml, respectively. The entire test samples (Group II, III, IV, VI) were also administrated with different concentrations, i.e., 0.25, 0.50, 0.75, 100 mg/ml, respectively. The time taken by each group to cause paralysis and fatality to Eisenia foetida was observed separately for each worm. The paralysis was confirmed when there is the loss of movement and contraction in earthworms when it is pressed by a finger, whereas the fatality of the earthworm is represented by the loss of their motility with the fading of their body color. The experiment was carried out in triplicate.

Preparation of standard

The suspension of Albendazole was dissolved in normal saline to prepare the stock solution

(20 mg/ml). The various dilutions (0.25-100 mg/ml) were prepared with normal saline from the stock solution. These dilutions were administrated as a standard drug in the earthworm.

Preparation of test sample

The stock solution (200 mg/ml) was prepared from all the extracts using carboxyl methyl cellulose (1% CMC), and normal saline was used for preparing the extract. Further various dilutions (0.25–100 mg/ml) were prepared from the stock solutions for all the extracts **[10]**.

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.

RESULT AND DISCUSSION:

Table 3

Sr. No.	Characteristics	Result
1	Colour	Brown
2	Odour	Pleasant with no burnt smell
3	Taste	Sweet
4	Surface	Smooth & even
5	Dimensions	1.86
6	Moisture Content Determination	1.15%
7	Anthelmintic activity	Significant

Anthelmintic Activity of Polyherbal Chocolates:

Table 4: Anthelmintic Activity of Polyherbal Chocolates

Sr. No	Treatment	Concentration mg/ml				Result
1	Normal Saline	5 ml	-	-	-	No Paralysis or death
2	Cove oil	0.25	0.50	0.75	100	Paralysis time- 50 sec Death time- 1 min 30 sec.
3	Ginger Juice	0.25	0.50	0.75	100	Paralysis time- 3 min Death time- 4 min 28 sec
4	Pumpkin seed	0.25	0.50	0.75	100	Paralysis time- 4 min. Death time- 5 min.
5	Albendazole	0.25	0.50	0.75	100	Paralysis time- 7 min Death time- 9 min
6	Herbal Chocolate	3 gm.				Paralysis time- 9 min Death time- 10 min

Figure 2: In-vitro anthelmintic activity of prepared polyherbal chocolates

CONCLUSION:

As chocolate formulations have quick onset of action in the event where water is unavailable, ease of use and enhanced patient compliance, they are most effective and preferable to other traditional dose forms. Patients with dysphagia and paediatrics can use the chocolate formulation more efficiently and conveniently. *Zingiber officinale*(ginger), *Cucurbita pepo* (pumpkin) and *Eugenia caryophyllus* (clove) have proved to be effective natural remedy for helminthiasis. The herbal chocolate prepared from combination of these three herbs was also effective but lesser than the standard Albendazole. As these have exhibited potency in a very low concentration so they provide a safer, effective and easily available anthelmintic remedy. The prepared herbal chocolate formulation exhibited significant anthelmintic activity.

REFERENCES:

[1] Jaiswal PD, Baig MN, Khandagale DV, Raut TD, Tribhuvan AN. Review on Formulation Of Anthelmintic Herbal Chocolate. International Journal of Sciences and Innovation Engineering. 2025 May 21; 2(5):379-91.

[2] Putranto HD. In vitro anthelmintic activity of the extract of coffee husk fermented with Pleurotus ostreatus for Ascaridia galli. Animal Production. 2017 Aug 17.

[3] Williams AR, Fryganas C, Ramsay A, Mueller-Harvey I, Thamsborg SM. Direct anthelmintic effects of condensed tannins from diverse plant sources against Ascaris suum. Plos one. 2014 May 8; 9(5):e97053.

[4] Sakti AA, Suwignyo B, Sofyan A, Hanim C, Herdian H, Jasmadi J, Pasaribu T, Julendra H, Gunawan G, Ratnawati P, Hartati L. In vitro anthelmintic activity of Chaetomorpha vieillardii ethanolic extract against adult worm motility and egg-hatching of Haemonchus contortus from sheep: https://doi.org/10.12982/VIS. 2024.031. Veterinary Integrative Sciences. 2024; 22(2):475-87.

[5] Ivanišová E, editor. Herbs and spices: new advances. Bod–Books on Demand; 2023 Mar 29.

[6] Ashok YA. Design Development and Evaluation of Topical Polyherbal Formulations for Bacterial Skin Diseases.

[7] Yelmate A, Satpute K, Vaishnavi K, Gajanan G, Shivaji S. Online Shopping Addiction in Youth: Need of Social Awareness.

[8] Yelmate AA, Satpute KL, SP MG, VP MP. Design, Development and evaluation of herbal soap against bacterial skin infections.

[9] Abdel-Moez G, Sayed H, Khalifa A, Abd-Elrahman S, Osman M, Mohamed

S. Evaluating anthelmintic, anti-platelet, and anti-coagulant activities, and identifying the bioactive phytochemicals of Amaranthus blitum L. BMC Complementary Medicine and Therapies. 2024 May 4; 24(1):183.

[10] Archana Y, Gundewar P. Novel Therapeutic Approaches Towards Type 1 Diabetes Mellitus. European Journal of Biomedical. 2018; 5(7):176-85.