



## EVALUATION OF ANTHELMINTIC ACTIVITY OF MORUS ALBA STEM

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### ABSTRACT

Modern synthetic drugs are faster and more effective to treat helminthiasis but they also have several side effects which alter some body functions which are not desired. Over synthetic medicines we can use easily available natural plants present in our nature or crude form of plant parts. We can also make medicines of these plant parts and take it in a proper way as a medicament. For the purpose of dedication and to enhancing the use of natural sources I have done this research on Morus Alba as some of the part of world population cannot afford medicines but they can have plants to treat helminthiasis as it causes major problem in the human body and if not treated severe helminthiasis may cause the death of person. For the purpose of checking antihelmintic activity Indian adult earthworm is used. Ethanolic extract of M. Alba is used and piperazine citrate is used as a standard drug. Time is obtained for death and its closer at higher dose still it's preferable as it is a natural plant source.

**KEYWORD:** Morus Alba, earthworm. Anthelmintic activity, stem bark, Soxhlet extraction, ethanolic extract.

### INTRODUCTION

Anthelmintic are drugs that act either locally to expel worms from the gastrointestinal tract or systemically to eradicate adult helminthes or developmental forms that invade organs and tissues. Due to discovery and development of Anthelmintic, particularly for veterinary applications, physicians now have effective and in some cases broad-spectrum, agents that will cure or control most human infections caused by either flukes or intestinal helminths. But cysticercosis, echinococcosis, filariasis and trichinosis are examples of systemic infections caused by tissue-dwelling helminths that at best respond only partially to currently available drugs. Because metazoan parasites generally are long-lived and have relatively complex life cycles, acquired resistance to Anthelmintic in humans has yet to become a major factor limiting clinical efficacy. However, based on extensive use of Anthelmintic, such as the benzimidazoles in veterinary medicine, the potential for drug resistance among helminths in humans cannot be discounted.

#### ➤ Morphology of plant

### PLANT PROFILE

- ☐ **Biological Source**
- ☐ It is obtained from the dried leaves of Morus alba belonging to family Moraceae.
- ☐ **Botanical Name(s):** Morus Alba
- ☐ **Kingdom:** Plantae
- ☐ **Division:** Magnoliophyta
- ☐ **Class:** Magnoliopsida
- ☐ **Order:** Urticales
- **Family:** Moraceae.
- **Tribe:** Moreae.
- **Genus:** Morus L.
- **Species:** Morus Alba L.
- **Popular Name(s):** White Mulberry, White Mulberry, Silk Worm Mulberry and Sang Zhi
- **Parts Used:** stem Bark, leaves and roots.

| Sr. No | Characters   | Morus alba                |
|--------|--------------|---------------------------|
| 1.     | Bark         | Grayish brown or brown    |
| 2.     | Scaly Buds   | Brown and triangular      |
| 3.     | Leaves       | Thin, integral and lobate |
| 4.     | Leaf apex    | Acuminate                 |
| 5.     | Leaf Surface | Lustrous                  |
| 6.     | Idioblasts   | small                     |

### ➤ Habitat

Native to warm temperate and subtropical regions of Asia, Africa and North America, with the majority of the species native to Asia.

### ➤ Varieties

Four or Five species occur in India. The species in India were designed as *M. alba*, *M. indica* Linn, *M. atropurpurea* Roxb, *M. nigra*, *M. serrata* and *M. larviguta*. A large number of Mulberry types have been introduced into India from China and Japan. The introduction is reported to belong to two species – *M. multicaulis* Perr and *M. latifolia* Poir but some authorities regard them as a variety of *M. alba*.

### ➤ Chemical Constituents

The extract of mulberry has revealed that it encloses coumarins, flavonoids, sugars and tannins. In addition, the berries or fruits of the mulberry tree contain a number of vitamins – vitamin A, vitamin B1, vitamin B2 and vitamin C.<sup>[4]</sup>

They found that many biochemical compounds such as Moranoline, Albafuran, Albanol, Morusin, Kuwanol, Calystegin and Hydroxymorcin are isolated from mulberry plants which play an important role in pharmaceutical industry.<sup>[2]</sup>

New polyhydroxylated alkaloids, (2R,3R,4R)-2-hydroxymethyl-3,4-dihydroxy-pyrrolidine-N-propionamide from the root bark of *M. alba* L., and 4-O- $\alpha$ -Dgalactopyranosyl-calystegine B2 and 3 $\beta$ ,6 $\beta$ -dihydroxynortropane from the fruits, were isolated by column chromatography using a variety of ion exchange resins. Fifteen other polyhydroxylated alkaloids were also isolated (Asano et al., 2001). 1-deoxynojirimycin (DNJ), a polyhydroxylated piperidine alkaloid present.<sup>[3]</sup>

### ➤ Pharmacological Activities

#### 1. Cures Certain Diseases

The rich anthocyanin that is found in the fruits has curative properties for certain diseases and is also used as natural food colorant.

#### 2. Prevents Cancers

Mulberries are a good source of resveratrol, a potent phytonutrient that researchers believe to prevent cancer. It contains high level of anti-oxidants which stunts the growth of prostrate cells and tumour growth.

#### 3. Reduces Risk Of Blood Clots And Strokes

Mulberries are known to improve blood circulation and are beneficial as an anti-inflammatory that helps to lower the blood pressure and makes you less susceptible to blood clots and strokes. Mulberry juice may help to alleviate some of the symptoms if you suffer from anaemia. In addition to all, these help to prevent heart diseases.

#### 4. Cleanses Blood

In Chinese medicine, mulberries are considered as a blood tonic. They cleanse the blood, improving its circulation and helps in strengthening the entire system. It enriches the blood in the process while soothing and calming the nerves. It also helps in promoting the metabolism of alcohol.

#### 5. Cleanses Liver And Strengthens Kidney

Mulberries are noted to strengthen Kidneys and cleanse the liver.

#### 6. Prevents Flu And Cold

Mulberry is high in Vitamin C and flavonoids which makes it a natural immune booster and prevents flu, cough and cold and other ailments. Mulberry also helps with gastritis.

#### 7. Speeds Up Recovery

Mulberry juice is extremely beneficial for post-operative patients. It accelerates healing, improves blood circulation and prevents the onset of infection. It is often used to speed up recovery after birth and is used as an inflammatory solution after surgery.

#### 8. Controls Blood Sugar

Mulberries contain compounds that support balanced sugar and control blood sugar in diabetic patients. Flavonoid present in mulberries prevents the rise and fall of sugar level in patients. So it is highly effective to prevent complication in diabetic patients due to sugar level spike.

#### 9. Maintains Heart Health

Eating mulberries proves beneficial to the heart's health. It strengthens the nervous system and reduces bad cholesterol thus preventing the blockage in flow of blood. So it is highly effective in preventing heart attacks and strokes.

#### 10. Controls Cholesterol

Eating mulberry on regular basis will keep the cholesterol level within limits.

#### 11. Enhances Appetite

Regular consumption of mulberry improves the digestive system, enhancing the appetite level.

#### 12. Enhances Immunity

Mulberry can balance internal secretion and enhance the immunity. It promotes proper body fluid production. It also helps people who suffer from dehydration. People suffering from body fluid deficiency should take ten milligrams of mulberry daily.

#### 13. Improves Vision

Drinking a glass of mulberry juice also improves vision. It has a high content of Vitamin A which strengthens our eye sight and relieves eye strain, which is ideal for people who spend hours on computer. It also protects

eyes from free radicals which is the cause of eye sight loss and retina degeneration.

#### **Mulberry: Skin Benefits**

##### **14. Anti-Ageing Properties**

Mulberries, like other berries, are rich in **anti-oxidants** which are renowned as effective anti-aging agents.

##### **15. Clears Skin**

It has properties that help in clearing out dark spots and other blemishes on the facial skin.

##### **16. Rejuvenates Skin**

The process of melanin synthesis is regulated effectively, allowing you to get the clear and bright skin that you have always wanted. Experts recommend eating the fruit or drinking mulberry tea and juice to rejuvenate your skin.

##### **17. Treats Skin Problems**

The leaves of its tree can be left in a hot pot of water for 30 minutes or so to treat skin problems as well as colds, sore throat, fever, etc.

##### **18. Treats Dry And Sensitive Skin**

Mulberry leaves can be used to treat extremely dry skin by steeping them in coconut or olive oil for a few days and applying the oil onto your skin. It can be used with lotion to treat skin that is dry and prone to irritation.

##### **19. Makes Skin Soft And Radiant**

You can also find bath salts and soaps made of mulberry to make your skin soft and radiant. The leaves can be used in saunas and hot baths to help open up your pores as well as detoxify your body. The steam that contains infused mulberry leaves allows your body to sweat and regulates your body's metabolism as well.

#### **Mulberry: Hair Benefits**

##### **20. Rejuvenates Hair Follicles**

Mulberries have properties that can help make your hair healthier. It is well-known that this berry promotes hair growth, thus preventing hair loss. It is especially good for cancer patients who have undergone chemotherapy as the hair follicles are rejuvenated by the substance extracted from the fruit.

##### **21. Promotes Hair Growth**

If you suffer from hair loss, mulberry extracts are a safe and natural alternative to getting chemical or surgical treatments. You can apply the juice onto your hair to promote its growth.

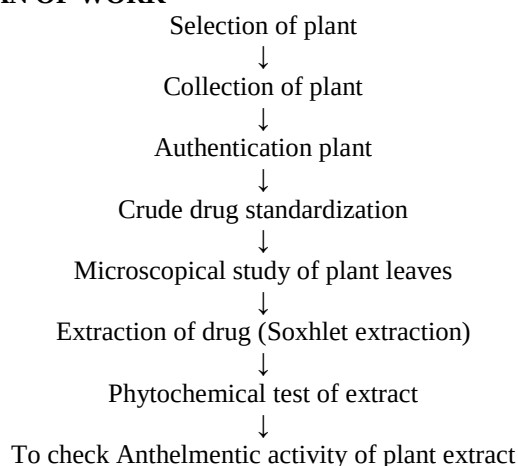
##### **22. Retains Hair's Natural Colour**

The production of melanin in your hair is enhanced by mulberries. This allows you to retain your hair's natural colour. This is great news, especially for people who suffer from premature greying of the hair. Drinking mulberry juice on a regular basis can benefit you if you wish to have healthy hair, whether it is greying or not.

#### **➤ Extraction**

Extraction is defined as the process of removing a substance or several substances from another substance. The process is extremely important in a wide range of technical applications, for instance biotechnology, the pharmaceutical and food industries as well as environmental protection. Extraction is a separating process which has the advantage of low energy consumption.<sup>[1]</sup>

#### **PLAN OF WORK**



#### **➤ Method**

##### **1. Collection of plant**

The stem bark of the plant will be collected from the Satara city, Maharashtra.

##### **2. Authentication of Plant**

The Plant was authenticated from head of department of Yashvantrao chavan institute of sciences, Satara.



##### **3. Preparation of extract**

- Firstly the collected stem barks dry in hot air oven.
- Then powdered the drug to get coarse powder.
- About 30 gm of powder was extracted with ethanol (78.37) by Soxhlet extraction.
- Then solvent is evaporated to get dried extract, and stored in refrigerator prior to the biological investigations.
- The test samples were prepared at concentration i.e. (40, 60, 80, 100mg/ml) in distilled water.



#### 4. Soxhlet Extraction of *Morus Alba*



#### 5. Phytochemical test Extract of *Morus Alba*

##### 6. Anthelmintic activity

- Indian adult earthworms were taken for checking activity.
- 4 groups of earthworm are done; to four groups of earthworm four different doses were given i.e. 40, 60, 80, 100 mg/ml of the extract of alba *Morus* stem bark.
- For standard Piperazine citrate used in 80mg/ml, 100mg/ml dose. And activity was checked out and observations were note down.

##### ➤ Procedure

Anthelmintic activity of the extracts was determined by following step:

1. Adult earthworms were collected (due to their anatomical and physiological resemblance with the

intestinal round worm parasite of human beings). Earthworms were washed to remove adhering material.

2. Petri dishes of equal sizes were taken cleaned and dried. 7 Petri dishes were arranged accordingly.

3. 1 ml of normal saline was poured in 1st Petri dish; 1 ml of Piperazine citrate solution containing 80mg/ml and 100mg/ml concentration were poured in 2nd and 3rd petri dish respectively.

4. 1 ml of the solution of extracts of 40 mg/ml, 60 mg/ml 80mg/ml and 100 mg/ml were taken in remaining petri dishes in an arranged manner.

5. Earth worms of equal sizes were introduced in all Petri dishes and time was started in stopwatch.

6. The time taken for paralysis (motion less) and complete death of earth worms were recorded, death of earthworms were confirmed by dipping it in water heated to 50° C.

7. The readings were recorded in the Table.<sup>[2][5]</sup>

##### ➤ Evaluation Test Observations

| Sr. No | Treatment                               | Concentration (mg/ml) | Time take for paralysis (min.) | Time taken for Death (min.) |
|--------|-----------------------------------------|-----------------------|--------------------------------|-----------------------------|
| 1.     | Control(normal saline)                  | —                     | No paralysis                   | No death                    |
| 2.     | Piperazine citrate                      | 80                    | 14                             | 23                          |
|        |                                         | 100                   | 11                             | 18                          |
| 3.     | Ethanollic extract of <i>Morus alba</i> | 40                    | 76                             | 84                          |
|        |                                         | 60                    | 74                             | 77                          |
|        |                                         | 80                    | 47                             | 52                          |
|        |                                         | 100                   | 24                             | 27                          |



## RESULT

In the present study the plant *Morus alba* was selected for its considerable Flavonoidal content, tannin, sugars, vitamins, amino acid, volatile oil, polyphenols content and an attempt was made to evaluate anthelmintic potential against Indian adult earthworm. As evident from the above observation table The death timings of ethanolic extracts were not much closer to the Standard drug but as the dose increases time requirement was reducing and it could be safer because of the pure natural source.

## CONCLUSION

This plant can be used for anthelmintic activity as it's a fruit n natural plant that it will not give side effect and have several beneficial activities. It is healthy for health with many more benefits.

As the dose increases time required for activity decreases and can be taken in large dose as it has high safety margin.

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