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INVESTIGATIONS OF ANTHELMINTIC ACTIVITY OF AQUEOUS EXTRACT OF SOME MEDICINAL PLANTS OF BANGLADESH

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ABSTRACT: The aqueous leaf extract of *Corchorus olitorius* Linn. (Family, Tiliaceae) and *Carica papaya* Linn. (Family, Caricaceae) was screened for *in-vitro* anthelmintic activity against earthworms (*Pheretima posthuma*) by brine shrimp lethality bioassay. The extract showed anthelmintic activity at all the concentrations of 100mg/ml, 50mg/ml and 25mg/ml. However, at a dosage of 100 mg/ml, strong anthelmintic action was identified. The time needed for earthworms to become paralyzed and death at this concentration was *Corchorus olitorius* Linn. about 80 and 120 minutes (conc. 100mg/ml) and *Carica papaya* Linn. about 74 and 90 minutes(Conc. 100mg/ml) whereas time taken for paralysis and death by the standard drug Albendazole at 50mg/ml was about 180 and 203 minutes respectively. The experimental results suggest that *Corchorus olitorius* Linn. and *Carica papaya* Linn. has *in-vitro* anthelmintic activities.

INTRODUCTION: Being one of the most common infections in humans, helminth infections affect a vast portion of the global population. Even so, the majority of helminth infections are typically found only in tropical areas, pose a serious risk to health, and increase the incidence of pneumonia, eosinophilia, anemia, and undernourishment [1]. The population in endemic areas is mostly affected by the merciless morbidity caused by parasitic illnesses [2]. Although synthetic anthelmintics are frequently used to treat these illnesses, overuse of these medications has led to drug resistance, decreased effectiveness, and environmental issues [3].

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As a result, demand for natural anthelmintics is rising. Plants can be a better alternative as they have nutritive value as well as possess number of pharmacological activities with fewer side effects [4]. Drugs made from plants are used as a model to create safer and more effective medications [5]. *Corchorus olitorius* L., commonly called Nalta jute and jute mallow widespread with numerous medicinal properties [6]. This plant is an employee of the Tiliaceae family. It is grown in India, Myanmar, Nepal, China, Taiwan, Thailand, Vietnam, Cambodia, Brazil and some other countries [7].

These leaves are used productively in Ayurvedics for the treatment of fever, liver disorders, ascites, algesia, piles and tumors [8]. The leaves are also use in appetizer, carminative, laxative, stimulant and stomachic. *Carica papaya* Linn. commonly known as Pepe (Bengali) belongs to the family Caricaceae. 30% came from Asia, 20% from Africa, and 47%

came from Central and South America, primarily Brazil. Papaya's many health benefits are due to its high vitamin A, B, and C content as well as the presence of proteolytic enzymes such papain and chymopapain that have antiviral, antifungal, and antibacterial properties [9].

MATERIAL AND METHODS: Normal saline water were used during the experiment. Aqueous extract of leaves of *Corchorus olitorius* Linn. and *Carica papaya* Linn. It was investigated in each group for various concentrations. Normal saline water was used as control. Albendazole collected from Albion Laboratories Ltd. was used as the standard drug was comparative study in the *in-vitro* anthelmintic activity. The aqueous extract's anthelmintic capabilities have been investigated in this study.

Earthworms: Anthelmintic activity has been tested *in-vitro* on adult earthworms (*Pheretima posthuma*). Earthworms were collected in Narsingdi district and identified in the Pharmacology Laboratory of the Department of Pharmacy, Primeasia University. The earthworms approximately 4-5 cm in diameter and 0.1-0.2 cm spread.

Plant Collection and Identification: *Corchorus olitorius* Linn. and *Carica papaya* Linn. plants were collected from Narsingdi district of Bangladesh. Authenticity of the specimens was confirmed at the Bangladesh National Herbarium, Mirpur, Dhaka, under accession *Corchorus olitorius* DACB135488 and *Carica papaya* DACB 135489. The plants parts were collected and were cropped into small pieces, then the plants part was thoroughly washed with normal water and allowed to dry at room temperature in the shade in order to retain their phytochemical constituents.

Preparation of Fresh Leaves Extract: 100 mg/ml, 50 mg/ml, and 25 mg/ml of the collected leaves were weighed and mixed with a maximum of 50 ml of normal saline to obtain a solution. The supernatant was sieved into a conical flask through a sterile filter paper.

Anthelmintic Activity: The anthelmintic test was performed using the methods detailed by Ajaiyeoba [10]. Because of its morphological and physiological similarities to human intestinal roundworm parasites, the assay was conducted *in-vitro* using adult Bangladeshi earthworms (*Pheretima posthuma*) in order to assess their potential anthelmintic effects. Test samples of the extract were prepared at the concentrations of 25mg/ml, 50mg/ml and 100mg/ml in normal saline water and six earthworms (*Pheretima posthuma*) approximately equal size (same type) were placed in each beaker containing 50ml of above test solutions of extract. Albendazole (50mg/ml) was used as reference standard and normal saline water as control.

Before the clinical studies took place, all of the test solutions and the sample medication solution had been developed from fresh. Before testing started off, all of the test solutions and the reference medication solution were made from fresh. The duration of paralysis was recorded when there was no discernible movement other than when the worms were shaken energetically.

After confirming that the worms did not move when shaken violently or when soaked in heated water (50°C), the time it took for them to die was noted.

Phytochemical Screening: The leaf samples were subjected to a phytochemical screening in order to identify secondary metabolites. Generally realized techniques were used for performing the phytochemical investigations.

Numerous qualitative assessments have been conducted to ascertain whether functional chemical substances are present. The freshly generated crude extract was qualitatively analyzed for the presence of various phytochemical components, including alkaloids, tannins, reducing sugar, flavonoids, steroids, terpenoids, and saponins, using recognized phytochemical procedures [11, 12, 13, 14].

TABLE 1: RESULT OF PHYTOCHEMICAL SCREENING OF *C. OLITORIUS* AND *C. PAPAYA*

Extract	Alkaloids	Tannins	Reducing Sugar	Flavonoids	Steroids	Saponins	Terpenoids
C. olitorius extract	+++	+	+	+++	+	++	+
C. papaya extract	+	+++	+	+++	+	+	+

Key: Present (+); Strongly present (++); highly present (+++); Absent (-)

TABLE 2: RESULT OF *IN-VITRO* EVALUATION OF THE ANTHELMINTIC ACTIVITY OF *C. OLITORIUS*

Animal group	No of worms	Concentration	Time taken for paralysis (min)	Time taken for death (min)
Control Group	6	100mg/ml	-	-
Standard Group (Albendazole)	6	100mg/ml	180±2	203±5
C. olitorius extract	6	100mg/ml	80±2	120±3
		50mg/ml	90±1	160±5
		25mg/ml	109±2	190±2

Standard means Albendazole solution

TABLE 3: RESULT OF *IN-VITRO* EVALUATION OF THE ANTHELMINTIC ACTIVITY OF *C. PAPAYA*

Animal group	No of worms	Concentration	Time taken for paralysis (min)	Time taken for death (min)
Control Group	6	100mg/ml	-	-
Standard Group (Albendazole)	6	100mg/ml	180±2	203±5
C. papaya	6	100mg/ml	74±3	90±2
extract		50mg/ml	132±1	170±3
		25mg/ml	180±3	190±5

Standard means Albendazole solution

RESULTS: *C. olitorius* and *C. papaya* leaves extract underwent phytochemical screening, which identified alkaloids, tannins, reducing sugar, flavonoids, steroids, terpenoids, and saponinsin the aqueous extract of *Corchorus olitorius* and *Carica papaya.*

Anthelmintic Activity: The *Corchorus olitorius* Linn. leaf extract showed potent Anthelmintic activity which was comparatively to the *Carica papaya* Linn. leaf extract. On the other hand, the standard drug albendazole (200mg) are comparatively potent activity *Corchorus olitorius* Linn. and *Carica papaya* Linn. The result is showen in **Table 2** & **3**. The *Corchorus olitorius* leave extract showed the most potent Anthelmintic activity at the dose of 25mg/ml at which paralysis and death of earthworms occurred within about 109 and 190 minutes respectively whereas time required for paralysis and death earthworms by Albendazole were about 180 and 203 minutes respectively.

DISCUSSION: It is broadly accepted that intestinal parasite infections in humans and animals lead to poor health outcomes and diminished resistance to other infections. To evaluate compounds having anthelmintic effect, worm species such as earthworms, Ascaris, nippostrongylus, and tetrakis were used to study a number of chemicals. Because of their accessibility and proximity to intestinal "worms" in terms of their reaction to anthelmintics, earthworms have been used extensively among all of these species for the initial *in-vitro* testing of anthelmintic substances. Anthelmintics have been experimentally discovered to comprise any material that is damaging to earthworms [15]. Ciliary movement allows earthworms to move. The exterior layer of the earthworm is composed of a mucilaginous layer composed with complicated polysaccharides. The earthworm might move. Although this layer is slimy, the earthworm circulates freely. Whenever the mucopolysaccharide membrane is damaged, the outer layer becomes readily apparent which prevents it from moving and may result in paralysis. Due to it destroys the mucopolysaccharide layer, the above method can harm the worm. According to one literature review phytochemical analysis, the plant *C. olitorius* and *C. papaya contains* phenolic chemicals, which occur when tannins adhere to free proteins on the parasite's cuticle in the host animal's gastrointestinal tract. This can lead to the parasite's death, and its effectiveness and mode of action can be further reviewed [16].

CONCLUSION: Biological parameter can be deduced that the plant *C. olitorius* & *C. papaya* has significant anthelmintic action. To determine the efficacy and pharmacological justification for the use of leaves as an anthelmintic medication, more research employing an in vivo model is necessary. Given the pharmacological actions listed above, it can be said that this plant extract has the most potential for anthelmintic activity when compared to other *C. olitorius* and *C. papaya* leaf extracts.

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CONFLICT OF INTEREST: Nil

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