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ANTHELMINTIC ACTIVITY OF *POLYALTHIA KORINTI* LEAVES AND BARK EXTRACTS

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ABSTRACT

The anthelmintic activity of *Polyalthia korinti* leaves and bark extracts were tested against Indian earthworms *Pheretima posthuma* has anatomical and physiological resemblance with the intestinal parasites of human beings. From the results it was observed that all the extracts of *P.korinti* leaves and bark were found to show a potent anthelmintic activity when compared to the standard drug. According to our results, the effect of plant extracts on worms may be described as methanol extract of leaves > Methanol extract of bark > water extract of leaves > water extract of bark > chloroform extract of leaves > chloroform extract of bark > hexane extract of leaves > hexane extract of bark. It is proposed that further research be done to isolate the active compounds in plant extracts that are responsible for anthelmintic activity, as well as their mechanisms of action.

Key Words: *P.korinti*, Anthelmintic activity, *Pheretima posthuma*, Intestinal parasites

I. INTRODUCTION

Helminthiasis is a disease that affects people of all ages around the world, especially in developing countries. Parasitic diseases have a significant effect on the population in endemic areas, resulting in high morbidity and economic and social effects (Tagbota and Townson, 2001). Helminth infections are one of the most prevalent human infections, affecting a significant portion of the global population. Malnutrition, anemia, eosinophilia, and pneumonia are all common in developing countries as a result of them. Although the majority of worm infections occur in tropical areas, they can also affect tourists who have traveled to those areas, and some can also occur in temperate climates (Bundy, 1994). Helminthiasis is a worm-infested disease in which pinworms, roundworms, or tapeworms infest a portion of the body. Infected people excrete helminth eggs in their feces, which contaminate the soil in areas with poor sanitation. Worms live in the gastrointestinal tract, but they may also burrow into the liver and other organs (Idika et al., 2012). Only synthetic drugs are used to treat human helminth infestations, according to the World Health Organization, but synthetic drugs are out of control for millions of people and come with a range of side effects. As a result, scientists have attempted to examine plant extracts' antihelmintic properties.

II. MATERIALS AND METHODS:

Polyalthia korinti leaves and bark extracts were screened for anthelmintic activity against Pheretima posthuma using hexane, chloroform, methanol, and water extracts. *Polyalthia korinti* leaves and bark extracts were screened for anthelmintic activity against Pheretima posthuma using hexane, chloroform, methanol, and water extracts. At different concentrations of each extract (10, 20, 30, 40, and 50 mg/ml), the bioassay method was used to assess the time of paralysis and death of the worms. Albendazole was used as a standard drug, and saline water served as a control. With minor modifications, Ajaiyeoba et al's anthelmintic test was performed (Ajaiyeoba et al., 2001). Adult Indian earthworms, Pheretima posthuma, were used in the study because of their anatomical and physiological similarities to the human intestinal roundworm parasite (Suresh et al., 2011; Vidyarthi, 1967; Chatterjee, 1967). Earthworms are commonly used for in vitro testing of anthelmintic compounds due to their widespread availability (Sollmann,1918; Das et al., 2002; Shivkar and Kumar,2003).

The earthworms were taken out of damp soil and washed in regular saline to remove any feces before being used in the anthelmintic test. Earthworms with a length of 6-8 cm and a width of 0.2-0.3 m were used in every experiment. There were fifty groups of earthworms, each with six earthworms. All of the extracts and standard drug solutions were prepared fresh in normal saline prior to the start of the experiments. Petriplates were filled with various extracts and standard drug solutions. All the earthworms were released into 10ml of formulation as follows: *P.korinti* leaves and bark extracts and Albendazole in five different concentrations (10, 20, 30, 40, and 50mg/ml). Five groups were maintained with saline water as a control. Time for paralysis was noted when there was no movement of any kind except when the worms were shaken violently. When the worms were dipped in warm water (50^{o}C), their motility was lost, followed by the fading of their body colors.

III. RESULTS AND DISCUSSION

P.korinti leaves and bark extracts were tested for anthelmintic activity against Indian earthworms. Human intestinal parasites are anatomically and physiologically similar to *Pheretima posthuma* (Suresh et al., 2011)

3.1 Evaluation of Anthelmintic Activity

From the observations made all the extracts of *P.korinti* leaves and bark were found to show a potent anthelmintic activity when compared to the standard drug

(Table: 1 and 2). According to our results, the effect of plant extracts on worms may be described as methanol extract of leaves > Methanol extract of bark > water extract of leaves > water extract of bark > chloroform extract of leaves > chloroform extract of bark > hexane extract of leaves > hexane extract of bark (Fig. 1 to 6). Methanol extract of leaves at 50 mg/ml concentration shows paralysis at 14.67±0.82 minutes and death 28.00±1.41 minutes, whereas methanol extract of bark shows paralysis at 20.33±1.21 minute and death 39.83±1.83 minutes respectively. Among the three extracts, hexane extracts of leaves and bark show the least anthelmintic activity. The reference drug Albendazole (50mg/ml) exhibited paralysis and death at 8.00±0.89 and 16.50±1.05 minutes respectively.

Table: 1 Anthelmintic activity of the extracts of *P.korinti* Leaves extracts.

Extract	Concentration (mg/ml)	Time taken for Paralysis (min)	Time taken for death (min)
Albendazole	**10**	38.33±1.63	65.00±2.19
	20	29.50±1.22	54.00±1.41
	30	19.83±2.23	36.67±1.75
	40	13.83±0.75	23.83±1.17
	50	8.00±0.89	16.50±1.05
Hexane Extract	**10**	144.83±2.71	199.00±3.22
	20	109.33±1.21	171.00±2.37
	30	88.33±1.21	134.50±2.59
	40	68.33±1.21	106.00±1.90
	50	53.00±2.10	82.83±2.23
Chloroform Extract	**10**	96.33±1.21	149.00±2.76
	20	78.00±0.63	123.50±2.17
	30	61.00±1.26	104.00±1.79
	40	44.83±0.98	79.33±2.16
	50	34.83±0.75	60.67±1.75
Methanol Extract	**10**	57.83±1.33	89.83±2.04
	20	42.67±2.07	62.83±2.14
	30	32.33±1.51	56.00±1.41
	40	20.50±1.22	44.50±1.76
	50	14.67±0.82	28.00±1.41
Water Extract	**10**	73.00±1.79	119.67±4.27
	20	55.50±1.52	90.83±1.83
	30	41.33±1.51	75.17±2.48
	40	32.00±0.89	64.33±2.25
	50	25.00±1.26	51.00±1.55

*Each value is represented as mean ± SD (n=3).

Fig: 1 Anthelmintic activity of the extracts of *P.korinti* Leaves extracts.

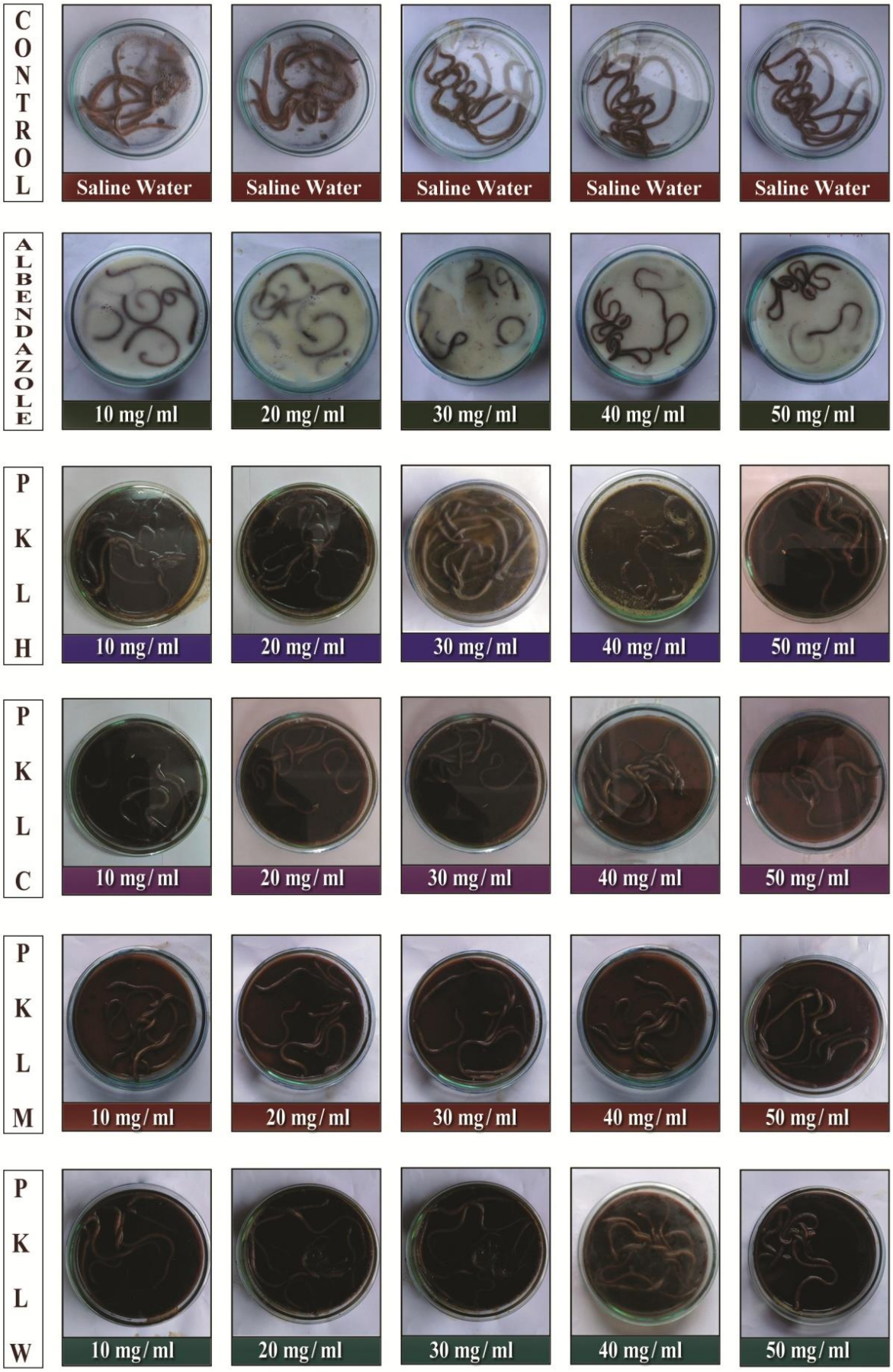


Fig: 2 Anthelmintic activity (Paralysis) of the extracts of *P.korinti* Leaves extracts.

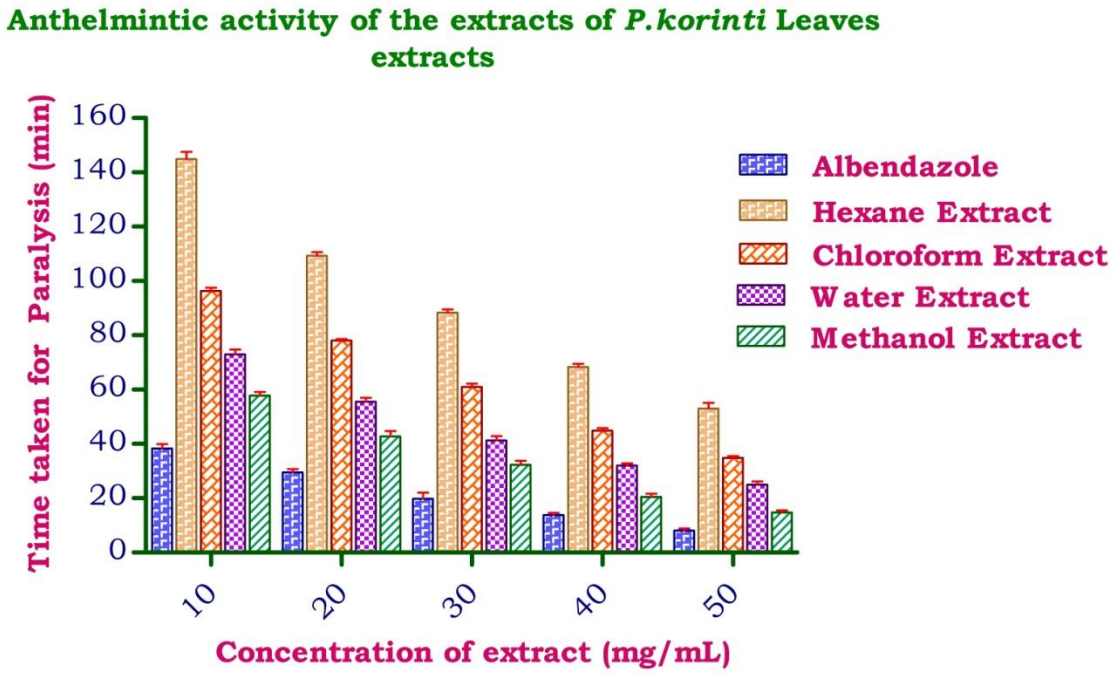


Fig: 3 Anthelmintic activity (Death) of the extracts of *P.korinti* Leaves extracts.

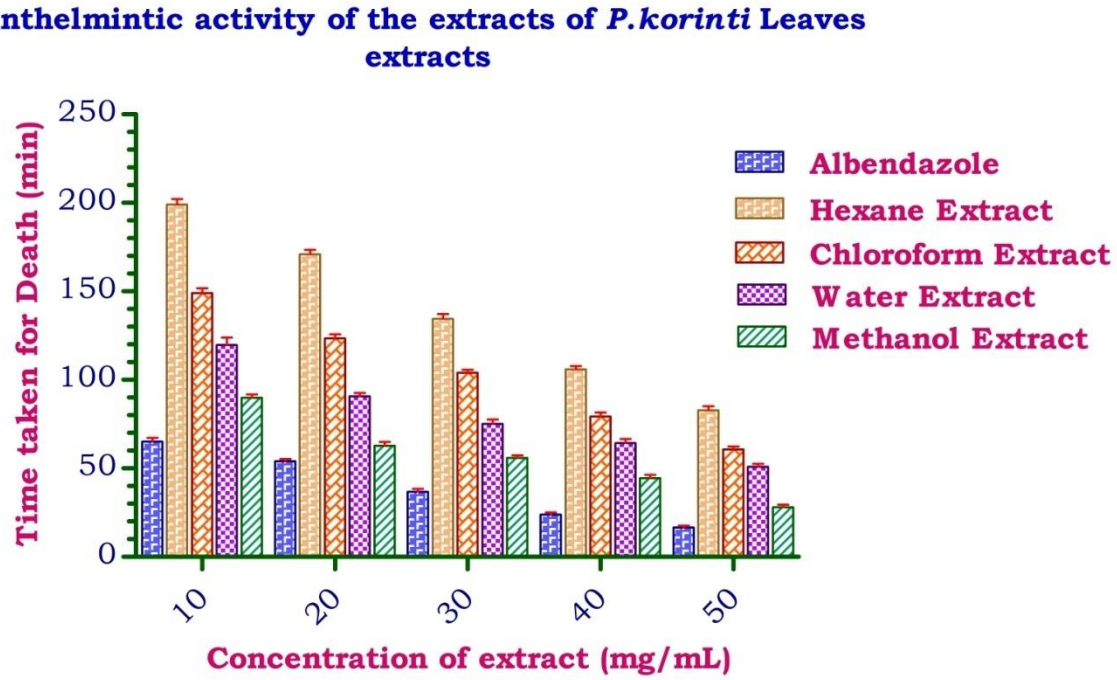


Table: 2 Anthelmintic activity of the extracts of *P.korinti* Bark extracts.

Extract	Concentration (mg/ml)	Time taken for Paralysis (min)	Time taken for death (min)
Albendazole	10	38.33±1.63	65.00±2.19
	20	29.50±1.22	54.00±1.41
	30	19.83±2.23	36.67±1.75
	40	13.83±0.75	23.83±1.17
	50	8.00±0.89	16.50±1.05
Hexane Extract	10	155.17±2.04	227.67±4.50
	20	124.67±1.51	188.00±2.53
	30	97.50±1.22	155.00±2.10
	40	76.83±1.83	130.67±1.63
	50	60.00±1.41	96.00±1.41
Chloroform Extract	10	111.33±1.21	173.17±2.23
	20	92.33±0.82	140.17±1.60
	30	73.50±1.22	118.67±2.07
	40	54.83±0.75	94.83±0.98
	50	40.00±1.10	71.83±1.17
Methanol Extract	10	67.33±1.21	96.00±2.10
	20	47.33±1.03	79.50±0.84
	30	37.83±1.17	69.17±1.33
	40	27.17±0.98	58.83±1.83
	50	20.33±1.21	39.83±1.83
Water Extract	10	80.83±2.32	126.67±2.25
	20	62.17±1.47	109.33±2.16
	30	47.67±1.37	83.50±2.17
	40	37.50±1.38	69.00±1.55
	50	27.83±0.98	55.17±1.17

*Each value is represented as mean ± SD (n=3).

Fig: 4 Anthelmintic activity of the extracts of *P.korinti* Bark extracts.

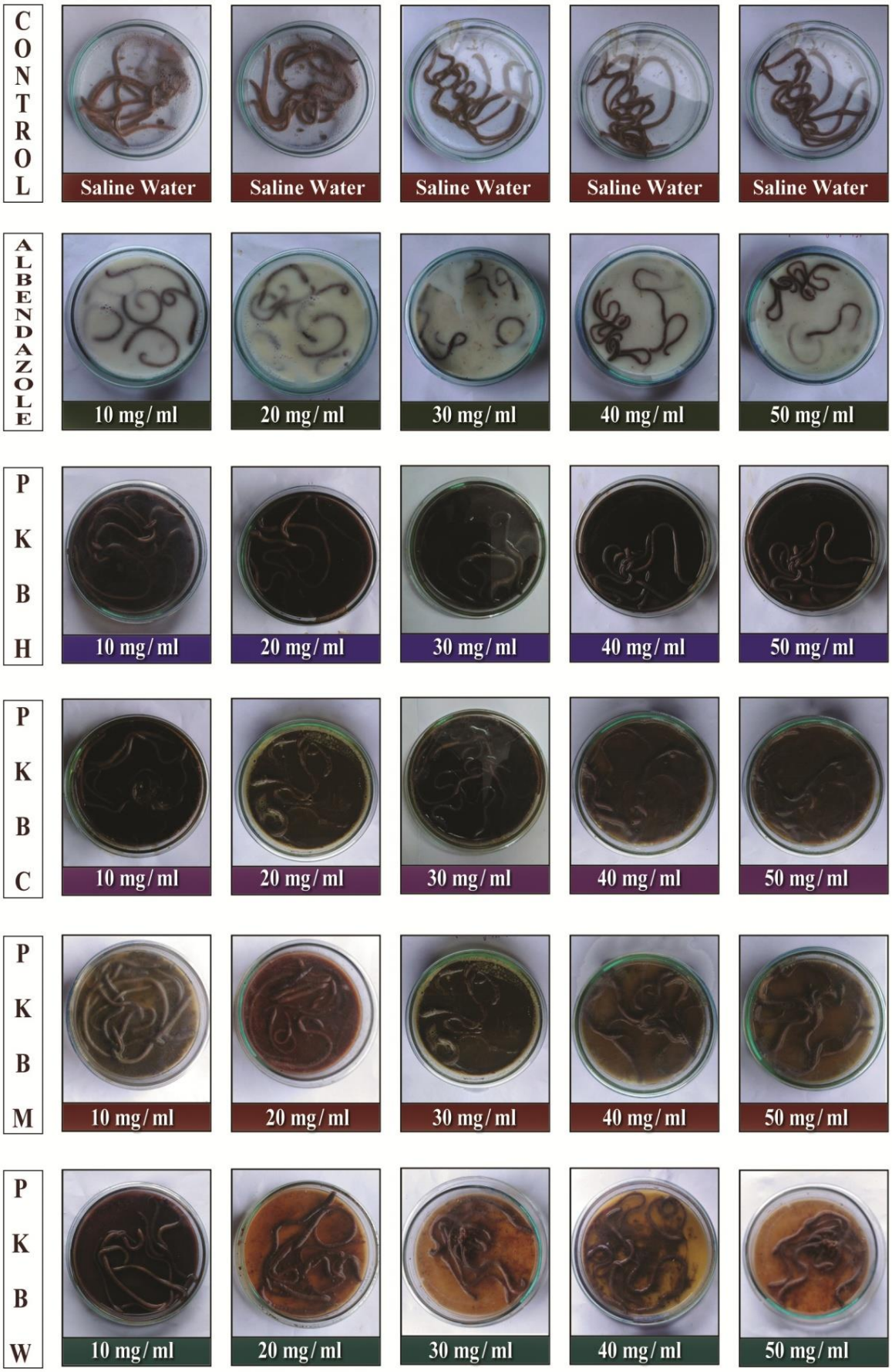


Fig: 5 Anthelmintic activity (Paralysis) of the extracts of *P.korinti* Bark extracts.

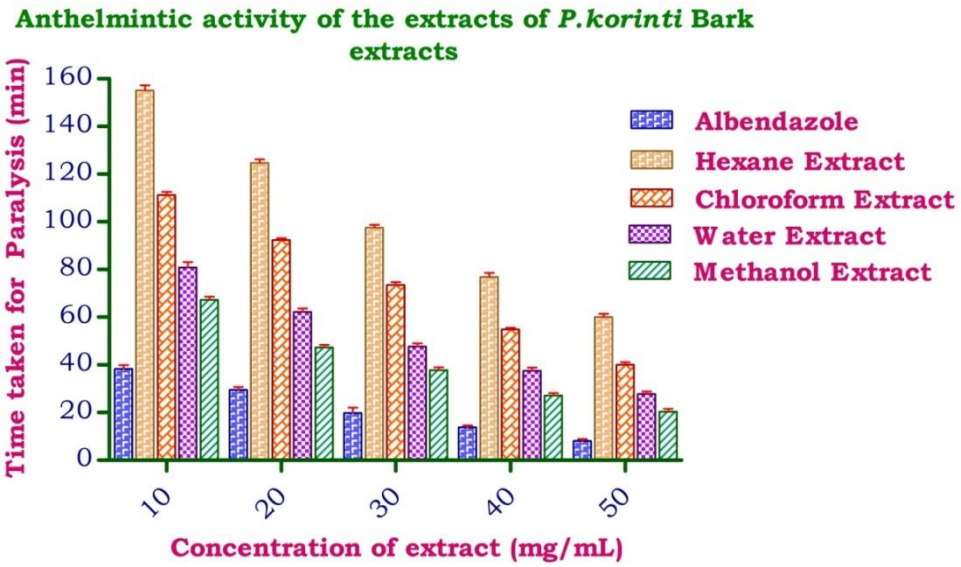
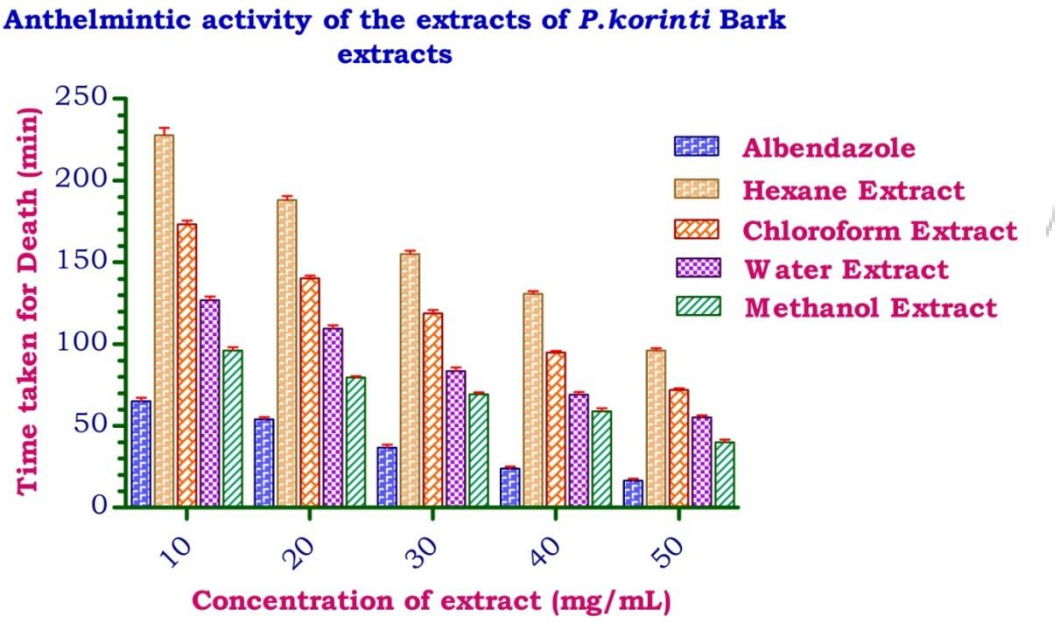


Fig: 6 Anthelmintic activity (Death) of the extracts of *P.korinti* Bark extracts.



The extracts of *P.korinti* leaves and bark contained alkaloids, phenols, sterols, tannins, saponins, flavonoids, steroids, and other bioactive compounds. These compounds may responsible for the anthelmintic activity of the plant extracts (Azando et al., 2011; Quijada et al., 2015; Saddiqe et al., 2013). Alkaloids are phytochemical compounds that have antihelmintic properties (Wang et al., 2010) The anthelmintic activity of *Curanga felterrae* leaves ethanol extract against *P.phostuma* was reported by Patilaya and Husori, the extract contains flavonoids, glycosides, saponins, tannins, and terpenoids (Patilaya and Husori, 2015). The hydrophobicity of alkaloids determines their antihelmintic behavior (Wang et al., 2010; Klu et al., 2016). According to Guimaraes et al. (2015), the alkaloid (epiisopiloturine) has in vivo anthelmintic activity . The anthelmintic activity of ethanolic and petroleum ether extracts of Murraya koenigii fruits was reported by Waghmare et al (2015). Wang et al. (2010), found that steroid saponin (dioscin and polyphyllin D) has potential antihelmintic activity against Dactylogyrus intermedius. While Hernández-Villegas et al (2011) reported that saponins from Phytolacca icosandra have ovicidal and larvicidal activity against Haemonchus contortus, Hernández-Villegas et al (2011) discovered that saponins from *Phytolacca icosandra* have ovicidal and larvicidal activity against *Haemonchus contortus*. Saponin isolated from *P. hydropiper* has also been shown to have broad-spectrum in vitro cytotoxic activity (Ayaz et al., 2016). Patel et al. explored the antihelmintic activity of triterpenoids (2011). Unfortunately, the mode of action of phytochemicals compounds as anthelmintics has not been clearly recorded. However, Kamal et al (2015) reported that flavonoids and saponins killed the infectious worms by acting as anticholinesterase.

Several investigators have confirmed that tannins, the secondary metabolite, found in several plants show anthelmintic property (Athnasiadau et al., 2001, Waller et al., 1997). It has been documented that tannins have a mechanism of action to disrupt energy output by uncoupling oxidative phosphorylation (Sutar et al., 2010). Another mechanism of tannin is its ability to associate with free protein in the host animal's digestive tract or a glycoprotein on the worms' cuticle, causing death. According to some research, the tannins present in the plant can help with protein absorption. This is accomplished by protein complexes forming in the rumen, which then degrade at the low pH of the small intestine. Increased protein absorption in the host animal

resulted in lower worm infection rates (Patel et al., 2011), while tannin's direct action on the worms is hydrogen bonding. This reaction results in skin stiffness, resulting in worm paralysis and death (Vidyadhar et al., 2010).

IV. CONCLUSION

From this research, concluded that the leaves and bark extracts of *P.korinti* exhibit an anthelmintic property. Out of all extracts methanol extracts of leaves and have potential anthelmintic effects against worms. It is proposed that further research be done to isolate the active compounds in plant extracts that are responsible for anthelmintic activity, as well as their mechanisms of action.

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