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Phytochemical analysis, analgesic, anti-inflammatory, antispasmodics and antioxidants activities of *Chenopodium album*

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Abstract

In the present research work Anti-inflammatory, analgesic, antioxidant, antispasmodic activities and phytochemicals potential of *Chenopodium album* was carried out. The plant was extracted using (methanol, ethanol and aqueous) solvents. Acetic acid induced writhing test was used for analgesic activity. Anti-inflammatory activity was evaluated by carrageenan-induced mice paw edema. For antioxidant activity used 2, 2-diphenyl-1-picrylhydrazyl (DPPH). For antispasmodic activity charcoal was used. In qualitative investigation, the phytochemical such as carbohydrates, alkaloids, phenols, flavonoids, saponins, tannins and phlobatannins were screened. In analgesic activity after the injection of methanolic extract at a dose of 300mg/kg the writhing was reduced to $(21 \pm 0.13)/5$ minutes and showed 63.44% inhibition, compared with standard drug aspirin which reduced to (14 ± 0.21) , 78.43% inhibition. In anti-inflammatory activity at a dose of 300 mg/kg after four hours showed significant activity when compared with standard drug Diclofenac sodium. The maximum rate of inhibition of antioxidant was observed in the methanolic extract. In the qualitative analysis of the methanol extract showed highest amount of phenols. The atropine sulphate showed 87.34% inhibition. The extract 100mg/Kg, 200mg/Kg and 300mg/Kg showed 43.5%, 52.23%, 69.38% inhibition as compared to the standard drug atropine sulphate. We concluded that the *Chenopodium album* plant showed high potential of inflammation, antioxidant, antispasmodic activities and phytochemical compounds.

Keywords: *Chenopodium album*, anti-inflammatory, analgesic, antioxidant, antispasmodic activities, phytochemicals

1. Introduction

Free radicals play an important role in degenerative diseases like cancer, cataract, immune system weakness and brain problems (Sies *et al.*, 1992) [27]. Free radicals can also induce nutrition and medicine deterioration. Fortunately, formation of free radicals is controlled by a variety of systems which called "antioxidant. Antioxidants are defined as compounds which can reduce oxidation rate considerably. When availability to antioxidants depot in our body cells decrease or in the cases of oxidants attack like smoking, air pollution, inflammation, and ischemia) free radicals induce oxidative damages (Azemi *et al.*, 2010) [4]. Inflammation is the complex biological response of vascular tissues to harmful stimuli including irritants, pathogens, or damaged cells. It is a protective attempt by the organism to remove the injurious stimuli as well as initiate the healing process for the tissue (Denko, 1992) [6]. The process of inflammation is necessary in healing of wounds. Inflammation however, if runs unchecked, lead to onset of diseases like vasomotor rhinorrhea, rheumatoid arthritis and atherosclerosis (Savill *et al.*, 1989) [24]. Pain may be define "unpleasant sensory and emotional experience that is caused by actual or potential tissue damage". The emotional component differs from one person to the other and in the same individual from time to time and it can be classified in several ways, but in therapeutic application into; nociceptive and neuropathic (Koech *et al.*, 2017) [9]. In the body, Sensory nerve endings are generally found in every part of the body such as the blood vessels, internal organs, muscles, joints, and the skin (Rouse *et al.*, 2008) [22]. In many cases, these man-made drugs cause side effects or adverse responses. As a result, more attention was given to the study then use of medicinal plants has remained taken place through the last two decades.

The new isolation methods and pharmacological testing processes, new plant drugs originate their way into new drug. Such use of single unadulterated compounds with artificial medicines (Trease & Evans, 2003). Pteridophytes are the primitive land plants group on earth and established large group of vascular cryptograms. The position of the pteridophytes, between the lower cryptograms and higher vascular plants. Pteridophytes have a long ecological history on earth planet. They were known as far back as 380 million years ago. In our neighbor country India, Pteridophytes are mostly distributed in the Himalayan and coastal regions (Ullah *et al.*, 2018) [30, 31, 32, 33]. Pteridophytes also showed pharmaceutical ability and many of them are being used therapeutically (Kumar & Kaushik, 1999) [10]. The rural societies, ethnic groups and traditional throughout the world are using plant parts like rhizome, stem, fronds, pinnae and spores in various ways for the usage of several traditional since early time. Many researches are working on taxonomy, ecology and distribution of pteridophytes has been published from time to time but enough responsiveness has not been paid towards their pharmaceutical useful aspects (Singh, 2012) [28]. In the present study efforts have been made to search medicinally important pteridophytes and properly recognized their useful feature. *Chenopodium album* (Chenopodiaceae) is an annual shrub used as folk medicine and widely grown in North America, Europe, Africa and Asia. As therapeutic agents, it is used as laxative, anthelmintic against round and hook worms, as blood purifier in hepatic disorders, spleen enlargement, intestinal ulcers and burns. It is also known to cure dysentery, diarrhea and skin diseases. Various bioactivities such as antifungal, antipruritic, antinociceptive and hypotensive properties of crude and isolated compounds from the plant justified its uses in traditional medicine. The plant is very nutritious and rich in protein, vitamin A, vitamin C, calcium, phosphorus, iron and potassium content (Agrawal *et al.*, 2014).

2. Materials and Methods

2.1 Plant collection and identification

Chenopodium album was collected from in September 2018 Maidan Chinar Kot and identified with the help of flora of Pakistan and compared with the already specimen present in the herbarium of Department of Botany, Govt. Post Graduate Collage Timargara, Lower Dir, Pakistan.

2.2 Drying and powdering

The collected plant *Chenopodium album* was clean from dust with the help of tape water and then shade dried for 25 days in room temperature. The dried plant was powdered with the help of electric grinder and then the powdered material was stored in air tight bottle and weighed in selected amounts for further pharmacological activities and phytochemicals screening (Kumaran, 2006) [11].

2.3 Preparation of extracts

The powdered was used for the preparation of extracts. For the preparation of plant extracts using methanol, ethanol and aqueous. The extracts was filtered through watchman No.1 filter paper. The solvent was recovered by rotary vacuum evaporator and the concentrated extracts were further evaporated to get dry extracts. The dried extract was stored in an airtight bottle (Ullah *et al.*, 2018) [30, 31, 32, 33].

2.4 Chemicals used

Methanol, ethanol, carrageenan, acetic acid, Distilled water and DPPH were used.

2.5 Animal used

Young and healthy Swiss albino mice of 25-30 gm weight at the age of one month were selected for the studies. The mice were bring from animal house of NIH (National Institute of Health) Islamabad. Mice were kept in hygienic condition in polypropylene cages and feed at standard supplement obtained from NIH. The room temperature were kept at 25-30 °C and acclimatized at 4 days.

3. Analgesic activity

For *in vivo* analgesic activity the acetic acid induced writhing method was used.

3.1 Acetic acid induced writhing method

Acetic acid induced writhing test was carried out for analgesic activity. The mice were divided into five groups. Mice of group 1st (control group) was injected 1ml normal saline (1% v/v). Then 1ml acetic acid was injected to all mice of group 2nd, 3rd, 4th and group 5th. Ten minutes after then injected acetic acid solution, the writhing were count for 5 minutes. After the writhing the group 2 mice were injected 1ml of aspirin solution. The mice of group 3rd, 4th and 5th were injected 1ml methanolic extract solution at the dose of 100 mg/kg, 200 mg/kg and 300 mg/kg respectively. After the inhibition of writhes were determined (Ullah *et al.*, 2018) [30, 31, 32, 33]. Finally the percentage (%) of analgesic activity was used by the following formula.

$$\% \text{ inhibition} = 1 + \frac{\text{No. of writhings in tested drug}}{\text{No. of writhings in control}} \times 100$$

3.2 Anti-inflammatory activity

Carrageenan induced paw edema test model was carried out for anti-inflammatory activity. Ethanolic extract of *Chenopodium album* was tested for anti-inflammatory activity against carrageenan paw edema in mice. Mice were divided into five group, 3rd, 4th and 5th. Diclofenac sodium (dissolved in 10 ml water) and then 1ml Diclofenac sodium was injected to group 2nd. The mice of group 3rd, 4th and 5th were injected 1ml ethanolic extract solution at the dose of 100 mg/kg, 200 mg/kg and 300 mg/kg respectively. The reduction of paw edema of mice was compared with standard drug (Olajide *et al.*, 2000) [17]. The percent inhibition was calculated by the following formula

$$\% \text{ inhibition} = \frac{V_c - V_t}{V_c} \times 100$$

VC represent the edema value of control group, "Vt" represent the edema volume of treated groups.

3.3 Antioxidant activity

The free radical scavenging activity of different extracts of *Chenopodium album* were checked, using stable free radical, DPPH (2,2-diphenyl-1-picrylhydrazyl) or Reducing power or Superoxide anion radical scavenging activity was determined spectrophotometrically. The optical density of the oxidation reaction were measured at 517 nm using spectrophotometer with solvent and DPPH as blank. Percent inhibition of the radical scavenging activity of test sample was calculated by the following formula (Ayoola *et al.*, 2008) [3].

% inhibition of DPPH Assay calculated by = $1 - \frac{A_s}{A_b} \times 100$
 A_b = Absorbance of the blank sample A_s = Absorbance of the tested sample

3.4 Anti-spasmodic activity

The mice were divided into five groups as discussed earlier. For the evaluations of anti-spasmodic activity a solution of deactivated charcoal was prepared. For the preparation of deactivated charcoal solution in 20ml distilled water 5gm charcoal was dissolved. For the preparation of buscopan solution, 1 tablet of buscopan (10mg) was dissolved in 10 ml of water. Charcoal solution was fed to the mice of all groups through feeding tube. Mice in the group 1 (control group) were given normal saline 10ml/kg. Buscopan solution was feed in to the mice of group 2nd with help of feeding tube. To the groups 3rd, 4th and 5th methanolic extract at the dose of 200mg/Kg, 400mg/Kg and 600mg/Kg were feed through to feeding tube. After 20 minutes of methanolic extract, the mice were dissected to measure the total length of intestine and charcoal meal length and compared with the standard buscopan for low or high antispasmodic potential. % inhibition is calculated by using the following formula (Seifi *et al.*, 2017) [25]. Intestinal Transit (%) = $D/L \times 100$.

Where D = Charcoal meal length (cm) and L = Total intestinal length (cm)

4. Phytochemical analysis

The plant extract i.e. methanol, ethanol and aqueous were tasted for the absence or presence of phytochemical constituents' like carbohydrates, alkaloids, tannins flavonoids, carbohydrates, phenols, saponin and Phlobatannins (Ullah *et al.*, 2018) [30, 31, 32, 33].

4.1 Tests for alkaloids

For detection of alkaloids, a few drops of Wagner's reagent (Potassium iodine) are add to 2 ml of all three methanol, ethanol and chloroform extracts. The formation of reddish brown precipitate showed the presence of alkaloid (Kavitha & Gunavathy, 2014) [8].

4.2 Tests for tannins

For the detection of tannins Ferric chloride test was done. Ferric chloride (FeCl₃) solution was mixed with all three (methanol, ethanol and chloroform) extracts separately. Formation of blue green coloration indicated the presence of tannins (Zohra *et al.*, 2012) [35].

4.3 Tests for flavonoids

For flavonoids detection, methanol, ethanol and chloroform extracts were treated with sodium hydroxide (NaOH) solution. Red precipitation formation of indicate the presence of flavonoids (Ullah *et al.*, 2018) [30, 31, 32, 33].

4.4 Tests for carbohydrates

For detection of carbohydrates, 0.5 ml of all three extracts were treated with 0.5 ml of Benedict's reagent. The solution were heated for 2 minutes on a water bath. By the formation of reddish brown precipitate the presence of carbohydrate was confirmed (Ullah *et al.*, 2018) [30, 31, 32, 33].

4.5 Tests for phenols

For phenol detection, 2 ml of ferric chloride (FeCl₃) solution was added to 2 ml methanol, ethanol and chloroform extracts in a test tube separately. Formations of deep bluish green solution showed the presence of phenol (Ullah *et al.*, 2018) [30, 31, 32, 33].

4.6 Tests for saponins

For the detection of saponin, in test tube 5 ml of methanol,

ethanol and chloroform extracts were shaken vigorously. The formation of froth indicated the presence of saponins (Ullah *et al.*, 2018) [30, 31, 32, 33].

4.7 Tests for phlobatannins

In test tubes 0.5 ml of all the three extracts was taken separately, added 3ml distilled water and shaken for a few minutes then 1% aqueous hydro chloride (HCl) was added and boiled on water bath. The presence of phlobatannins is indicated by the formation of red color (Ullah *et al.*, 2018) [30, 31, 32, 33].

5. Statistical analysis

The data were analyzed by one-way ANOVA (mean \pm SEM & Mean \pm SD) followed by application of Duncan test (Pro 8 SRO v8.0724 (B724)), Northampton, MA, USA. A P value of <0.05 was considered as a statistically significant.

6. Results

6.1 Analgesic activity

The result of acetic acid induced writhing test was mentioned in a table 1. The mice of group 1 (control group) showed writhing i.e. (27.4 \pm 0.10)/5 minutes. Group 2nd mice significantly reduced writhing i.e. 14 \pm 0.21/5 minutes and showed 78.43% inhibition. Among the group 3rd, 4th and 5th, the highest writhing counting was observed in Group 5th at the concentration of 300mg/kg (21 \pm 0.13 in /5 minutes and showed 63% inhibition reduction) followed by group 4th mice at a concentration of 200mg/Kg (28 \pm 0.32/5 minutes) showed 51.34% inhibition reduction (Table 1).

Table 1: Analgesic activity of ethanolic extract of *Chenopodium album*

Groups	Dose	Number of writhing in 5 minutes (mean \pm SEM)	Percent inhibition of writhing
Group 1	10ml/kg	27.4 \pm 0.10	
Group 2	150mg/kg aspirin	14 \pm 0.21	78.43
Group 3	100mg/kg	30** \pm 0.10	42.23
Group 4	200mg/kg	28* \pm 0.32	51.34
Group 5	300mg/kg	21** \pm 0.13	63.44

(Value are expressed in mean \pm SEM) P* < 0.05 used as significant

6.2 Anti-inflammatory activity

The initial paw edema volume was noted in all the mice of 5 groups i.e. G1 (0.65 \pm 0.05), G2 (0.42 \pm 0.03), G3 (0.62 \pm 0.05), G4 (0.586 \pm 0.05), G5 (0.566 \pm 0.05) in mm³. After measuring the initial paw edema volume, 1ml carrageenan was injected to all the mice of group 2 to 5. After one hour the paw edema volume were recorded i.e. G1 (1.12 \pm 0.03), G2 (1.96 \pm 0.03), G3 (1.84 \pm 0.05), G4 (1.94 \pm 0.03) and G5 (1.76 \pm 0.04). After the administration of carrageenan, the mice were injected standard drug (Group 2nd) and ethanolic extract at selected dose (G3 to G5). The results were noted at the interval of 1 hour. The group 2nd result was recorded 1.48 \pm 0.03, 1.11 \pm 0.03, 1.01 \pm 0.03 and 0.08 \pm 0.04 (mm³) after 1st, 2nd, 3rd and 4th hours respectively. The mice of group 3rd 1ml ethanolic extract was injected at a dose of 100mg/kg and the paw edema volume was noted 1.534 \pm 0.05, 1.33 \pm 0.03, 1.244 \pm 0.05 and 1.636 \pm 0.05 (mm³) after 1st, 2nd, 3rd and 4th hours respectively. The mice of group 4th 1ml ethanolic extract was injected at a dose of 200mg/kg and the paw edema volume was recorded 1.69 \pm 0.03, 1.41 \pm 0.03, 1.37 \pm 0.03 and 1.22 \pm 0.03 (mm³) after 1st, 2nd, 3rd and 4th hours respectively. The mice of group 5 was injected 1ml ethanolic extract at a concentration of 300mg/kg and the paw volume was noted 1.65 \pm 0.03, 1.32 \pm 0.03, 1.2 \pm 0.03 and 1.04 \pm 0.03 (mm³) after 1st, 2nd, 3rd and 4th hours respectively. The group 5th mice at

the concentration of 300mg/kg was observed a significant result (Table 2). at the 4th hours (1.04±0.03) followed by G3 and G4 (1.16±0.03)

Table 2: Anti-inflammatory activity in ethanolic extract of *Chenopodium album*

Groups	Dose	Paw edema (mm ³)		Paw edema (mm ³) after drug administration			
		Before carrageenan injection (mean±SEM)	1 hr. after carrageenan injection (mean±SEM)	1 hour (mean±SEM)	2 hour (mean±SEM)	3 hour (mean±SEM)	4 hour (mean±SEM)
Group1	10mg/kg	0.65±0.05	1.12±0.03	1.13*±0.05	1.13*±0.03	1.23**±0.03	1.13**±0.03
Group2	150mg/kg Diclofenac sodium	0.42±0.03	1.96±0.03	1.48**±0.03	1.11**±0.03	1.01**±0.03	0.08*±0.04
Group3	100mg/kg	0.62±0.05	1.84±0.05	1.53*±0.05	1.33**±0.03	1.24*±0.05	1.13*±0.05
Group4	200mg/kg	0.586±0.05	1.94±0.03	1.69**±0.03	1.41**±0.03	1.37**±0.03	1.22**±0.03
Group5	300mg/kg	0.566±0.05	1.76±0.04	1.65**±0.03	1.32**±0.03	1.2**±0.03	1.04**±0.03

(Value are expressed in mean ±SEM) P* < 0.05 used as significant

6.3 Antioxidant activity

(DPPH radical scavenging activity) Antioxidant activity of *Chenopodium album* was carried out by using methanolic, ethanolic and aqueous extracts. Extracts were subjected for the evaluation of antioxidant activity by using *in vitro* model systems. DPPH radical scavenging activity was observed in all the extracts.

6.3.1 % inhibition antioxidant activity of the *Chenopodium album* at concentration 1, 1.5 and 2mg/ml

The antioxidant activity of *Chenopodium album* % inhibition was carried out at concentration of 1 mg/ml. The high %

inhibition of *Chenopodium album* was observed in the methanolic extract 53.5% (0.31±0.03) followed by the ethanolic extract 46.6% (0.532±0.05) and aqueous extract 30.58% (0.64±0.004).

The % inhibition at 1.5mg/ml concentration the high % inhibition of *Chenopodium album* was observed in the methanolic extract 63.08% (0.58±0.11) followed by the ethanolic extract 53% (0.32±0.001) and aqueous 33.7% (0.63±0.01). The % inhibition at 2 mg/ml concentration, the high % inhibition was observed in methanolic extract 67.5% (0.34±0.05) followed by ethanolic extract 42% (0.51±0.06) and aqueous extract 27.9% (0.53±0.001) (Table 3).

Table 3: Antioxidant activity of *Chenopodium album* Plant extracts

Plant part used	Concentration	Extraction	Mean ± SD	% inhibition
Rhizome	1 mg/ml	Methanol	0.31** ± 0.03	53.5
		Ethanol	0.532* ± 0.05	46.6
		Aqueous	0.64** ± 0.004	30.58
Rhizome	1.5 mg/ml	Methanol	0.58* ± 0.11	63.08
		Ethanol	0.32** ± 0.001	53
		Aqueous	0.63** ± 0.01	33.7
Rhizome	2 mg/ml	Methanol	0.34* ± 0.05	66.7
		Ethanol	0.51* ± 0.06	42
		Aqueous	0.53** ± 0.001	27.9

(Value are expressed in mean ±SEM)

6.4 Anti-spasmodic activity

The methanolic extracts of *Chenopodium album* was used at different doses i.e. 100mg/Kg, 200mg/Kg and 300mg/Kg and showed dose depended response in albino mice. In control group, the total intestinal length was 46.8±0.08 cm and the charcoal meal length was 28.4±1.5cm. In the atropine sulphate 10mg/Kg, the total intestinal length was 43±0.5cm and charcoal meal length was 36.1±0.04cm. In the *Chenopodium album* extracts 100mg/Kg the total intestinal length was 39.6±0.07cm and charcoal meal length is 22.8±0.05cm. In the extract 200mg/Kg

the total intestinal length was 46±0.07cm and charcoal meal length is 35.1±0.04cm. In the extract 300mg/Kg, the total intestinal length was 47.4±0.05cm and the charcoal meal length was 37.8±0.02cm. The atropine sulphate showed 87.34% inhibition. The extract 100mg/Kg, 200mg/Kg and 300mg/Kg showed 43.5%, 52.23%, 69.38% inhibition as compared to the standard drug atropine sulphate. The maximum inhibition showed by the extract 300mg/Kg compared to the other two extract of the plant. (Table 4).

Table 4: Effect of methanolic extract *Chenopodium album* and Atropine sulphate on charcoal meal transit in mice

Groups	Dose mg/Kg	Total intestinal length (cm)	Charcoal meal length (cm)	% inhibition
Group 1	10mg/Kg	46.8±0.08	28.4a±1.5	
Group 2	150mg/Kg Atropine sulphate	43±0.05	36.1±0.04	
Group 3	100mg/Kg	39.6±0.07	*22.8±0.05	43.42
Group 4	200mg/Kg	46±0.07	*35.1b±0.04	52.23
Group 5	300mg/Kg	47.4±0.05	*37.8c±0.02	69.38

Value are expressed in mean ±SEM) P* < 0.05 used as significant

6.5 Qualitative phytochemical detection in *Chenopodium album*

Phytochemical detection of *Chenopodium album* in methanolic extracts showed the presence of carbohydrates, alkaloid, flavonoid, phenol, saponin and tannin, but quinine was found

absent. Ethanolic extract showed the presence of carbohydrates, alkaloid, flavonoid, tannin phenol, saponin and Phlobatannins. In aqueous extract, the detection of phytochemical showed the presence of carbohydrates, alkaloid, flavonoid, phenol, Phlobatannins and tannin, but saponin was found absent (Table 5).

Table 5: Qualitative detection of bioactive compounds in *Chenopodium album*

S. No.	Phytochemical	Methanol	Ethanol	Aqueous
	Carbohydrates	+	+	+
	Alkaloid	+	+	-
	Flavonoid	+	+	+
	Phenol	+	+	+
	Saponin	+	+	-
	Phlobatannins	-	+	+
	Tannin	+	-	+

(+) show presence and (-) show absence of phytochemical

7. Discussion

In the present study the analgesic, anti-inflammatory, antioxidant, anti-spasmodic activities and phytochemicals investigation of *Chenopodium album* was carried out. The ethanolic extract of *Chenopodium album* showed significant results in analgesic, antioxidant, anti-spasmodic and anti-inflammatory activities. In analgesic activity at a dose of 300mg/kg showed significant effect (21±0.13) writhing and 63.44% inhibition as compared to standard drug aspirin showed (14±0.21) writhing with 78.43% inhibition. The atropine sulphate showed 87.34% inhibition. The extract 100mg/Kg, 200mg/Kg and 300mg/Kg showed 43.5%, 52.23%, 69.38% inhibition as compared to the standard drug atropine sulphate. The analgesic activity showed high potential due to the presence of alkaloids, flavonoids and phenolic contents (Sultana *et al.*, 2014) [29]. Alkaloids have been reported to possess analgesic, antispasmodic and bactericidal, antimalarial activities (Okwu, 2005; Oomah, 2003) [16, 18]. It was concluded that plant extract have high flavonoids which showed high analgesic effect and without flavonoids contents no analgesic effect (Oweyele *et al.*, 2005) [19]. Anti-inflammatory activity at a dose of 300 mg/kg after four hour showed significant result followed by the dose of 100mg/kg, 200mg/kg and standard drug diclofenac sodium (10mg/kg). High dose of extract 300mg/kg reduce inflammation (1.04±0.03) after 4th hours followed by group 3rd at the concentration of 200mg/kg at 4th hours (1.22±0.03). Several reports are available on flavonoid groups which exhibited high potential biological activities such as analgesic, anti-inflammatory, antimicrobial, anti-angionic, anticancer and anti-allergic reactions (Anyasor *et al.*, 2010; Igbiosa *et al.*, 2009) [2, 7]. Phytochemical detection in methanolic extracts showed positive result except quinine. In ethanolic and aqueous extract all test were positive but only carbohydrates and saponin do not showed positive result in aqueous extract. (Ullah *et al.*, 2018) [30, 31, 32, 33]. Used methanolic extracts showed the presence of carbohydrates, alkaloids, flavonoids and phenol, saponins, glycosides and tannins. The antioxidant activity of *Chenopodium album* in 1mg/ml concentration showed different result. High percent inhibition showed in methanolic extract (53.5%) followed by the ethanolic extract (46.6%) and aqueous extracts (30.58%), while the percentage inhibition in 1.5mg/ml concentration mentioned in a table. The high percent inhibition was observed in methanolic extract (63.08%) followed by the ethanolic extract (42%) and aqueous (33.7%). The percent inhibition in 2mg/ml concentration were observed in methanolic extract (67.5%) followed by the ethanolic (42%) and aqueous (27.9%). Tannins and their derivatives are phenolic compounds considered to be primary antioxidants or free radical scavengers (Barile *et al.*, 2007) [5]. Flavonoids are known to possess antioxidant anticancer, antiviral and anti-inflammatory properties (Liu *et al.*, 2015) [12]. Phenolic compounds are well known to possess biological activities such an antioxidant,

antidiabetic, hepatoprotective, anti-inflammatory, antimicrobial and anticancer (Rao *et al.*, 2013). The saponins are used in hypercholesterolemia, hyperglycemia, antioxidant, anticancer, anti as inflammatory activity and weight loss (Murugan *et al.*, 2014) [14]. Saponins act as antimicrobial activity and extremely cold blooded animals, but toxicity to mammals is low (Verma *et al.*, 2013) [34]. Alkaloids have the analgesic, antispasmodic and antibacterial (Ullah *et al.*, 2018) [30, 31, 32, 33] properties. Alkaloids have been used as both antibacterial and antidiabetic properties and useful for such activities. Phenols and phenolic compounds have been extensively used in disinfections and remain the standard with which other bactericides are compared (Akinyeye *et al.*, 2014) [1]. Glycosides are known to lower the blood pressure according to many reports (Sharma *et al.*, 2017). Tannins are also known antimicrobial agent. Tannins (commonly referred to as tannic acid) are water soluble polyphenols that are present in many plant foods. Tannins are water soluble plant polyphenols that precipitate proteins. Tannins have been reported to prevent the development of microorganisms by precipitating microbial protein and making nutritional protein unavailable for them (Ullah *et al.*, 2018) [30, 31, 32, 33]. The growth of many fungi, yeasts, bacteria and viruses was inhibited by tannins (Prigione *et al.*, 2018) [20].

8. Conclusion

The above results confirmed that *Chenopodium album* have high analgesic, antioxidant, and anti-inflammatory and antispasmodics activities. The potential activity of the plant may be due to the presence of phytochemical constituents. Some of these compounds possess analgesic and antipyretic activity. Further studies involving the purification of the chemical constituents of the plant and investigation in the biochemical pathway may results in the development of a potent analgesic and anti-pyretic agent with low toxicity and better therapeutic index.

9. Acknowledgement

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