Pharmacological and Phytochemical analysis of *Rumex thyrsoides* desf. Medicinal plant of District Buner

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Abstract

The aim of this study was to evaluate the pharmacological, phytochemical, and antioxidant potential of *Rumex thyrsoides* Desf. The ethanolic extract of the plant was used to examine its antipyretic, analgesic, and antispasmodic activities. The results showed that at a dose of 300mg/kg, the extract reduced the temperature to 93.66a±0.69°C in antipyretic activity and the amount of writhing's to 7.6a±2.84 in analgesic activity, indicating (82.32 %) inhibition. In antispasmodic activity, the extract exhibited 44.50% inhibition, which was significantly lower than the standard drug atropine sulphate (94.15% inhibition). Qualitative investigation of the ethanolic extract showed the presence of proteins, carbohydrates, flavonoids, alkaloids, phenols, tannins, saponins, glycosides, and steroids. However, terpenoids were absent in the extract. The quantitative analysis of *Rumex thyrsoides* Desf revealed that the total phenol content was 3.58c±0.35, and the flavonoids content was 3.79c±0.36. Furthermore, the extract exhibited significant antioxidant activity at a concentration of 300mg/ml. These findings suggest that the plant contains effective chemical constituents that can be used to treat diseases effectively.

Key words: pharmacological, phytochemical, antipyretic, analgesic, *Rumex thyrsoides* Desf medicinal plants, qualitative, antioxidant.

Introduction

The study of the relationship between plants and humans is known as ethnobotany, which uses plants in human society for food, medicinal purposes, distribution, architecture, tools, money, clothing, ceremonies, and harmony (Choudhary *et al.,* 2008; Selin *et al*., 2013). According to an estimation, 80% of developing countries' population depends on traditional medicines (Umair *et al.,* 2017). Current pharmacopeia includes 25% of herbal medicines and several synthetic medicines**.** The study of drugs is referred to as pharmacology. Any material can be used as a drug,

and when given to an organism, it will alter its function. However, any drug used to diagnose, cure, or treat disease is referred to be a drug. Anatomy, physiology, pathology, and other medical disciplines are all required foundation knowledge in pharmacology. Pharmacology, in this respect, is a complete research course that uses all relevant medical science material to the treatment of disorders (Hitner and Nagle, 2012).

The majority of medicines were derived from plant or animal sources in the early days of medicine. Active compounds can be isolated, refined, and synthesised into efficient pharmacological formulations from plants and creatures. The analgesics morphine and codeine, which are extracted from the poppy plant (*Papver somniferum*); the heart drug digitalis, which is extracted from *Digitalis purpurea*; and Quinine, an antimalarial drug, which is extracted from the bark of the *cinchona* tree, are all examples of plant-derived drugs that are still widely used today (Mokhber-Dezfuli *et al*., 2014). The search for novel plant medications is still going strong. Many commonly abused drugs, such as cocaine, marijuana, mescaline, heroin, and others, are derived from plants. Many diverse cultures have utilised most of these medicines in religions and rituals for hundreds of years. Hormones such as insulin (from pigs) and growth hormone (from the pituitary gland) are examples of medicines derived from live beings (Onsare *et al*., 2013). When a medicine is administered, its properties decide what effect it will have. Each medicine has its own intended or therapeutic impact, as well as other side effects. Some medication effects have been regarded as unwanted in addition to therapeutic effects. Side effects, adverse effects, and toxic effects are the three types of unfavorable medication effects. Pharmacology is at the heart of our efforts to guarantee that everyone has the chance to live a longer, healthier life (Abbasi *et al*., 2013).

Physiology and clinical medicine began to rely on observation and experiment at the turn of the century, replacing theorization. As the value of these methods in disease research became obvious, clinicians in the United Kingdom and continental Europe began to utilize them to investigate the effects of traditional remedies in their own practices. As a result, Materia Medica—the science of drug manufacture and medicinal application of drugs—began to emerge as a pharmacology pioneer. However, the lack of means to purify active agents from available raw materials, as well as methods to test hypotheses about drug action features, inhibits any genuine knowledge of drug action mechanism. In the 18th, 19th, and early 20th centuries, advances in chemistry and physiology set the groundwork for understanding the role of pharmaceuticals at the organ and tissue level. Surprisingly, throughout this time, substantial advances in basic

pharmacology were followed by an explosion of questionable claims by producers and marketers of worthless "patented drugs." (Katzung *et al*., 2004). The pharmaceutical and scientific communities have recently focused on medicinal plants, and several writings have shown the therapeutic benefit of natural substances to back up their biological activity claims (Ncube *et al*., 2008).

Native communities in many parts of Pakistan have known the traditional uses of local plants for hundreds of years. These plants are used to treat a wide range of ailments, including headaches, gastrointestinal difficulties, and cuts and wounds (Bhardwaj and Gakhar, 2005). Commercial harvesting of several significant plants is utilized to extract various sorts of active compounds. Despite the fact that the systems of Unani and Ayurvedic [Oriental Medicines] differ and are primarily based on the medicinal characteristics of plants, the unique wealth of indigenous knowledge is in threat. The use of traditional knowledge reflects the values embodied in the traditions. In Pakistan, there are around 6000 medical plant species, of which 600 are recognized therapeutic. Local therapists and hakims, who provide health advice in rural areas, suggest these herbs (Shinwari 2010). Half of the 6000 species are found in the northern hemisphere (3000 species), with 124 species having therapeutic significance. Pakistan is home to 4940 flowering plant species (if cultivated flowering plants are included, the number becomes 5738). Unfortunately, just 10% of Pakistan's plant species have therapeutic use (Sharif *et al*., 2018).

Rumex Thyrsoides Desf is a member of Family Polygonaceae it is thyrse like dock, with sorrel leaves. Flowers dioicous; penile, contracted in manner of a thyrse leaves are hastate. It has antifungal and antioxidant potential (Amri *et al*., 2015). The aim of the current study were to document qualitative and quantitative phytochemical analysis of *Rumex thyrsoides* antioxidant potential and pharmacological activities

Material and methods

3.1 Plant Collection and Identification

Plant that are in good condition ***Rumex thyrsoides*** **Desf.** leaves were obtained in 2019 from the district Buner. With the help of the Pakistan Flora and available literature, the plant was identified and confirmed. After cutting into pieces, plant leaves were cleaned with tap water and dried in the shade for about 20 days at 20-30 °C room temperature.

Plate2; *Rumex thyrsoides* Desf.

3.2 Extract preparation

A clean glass container was filled with about 250 g of finely ground plant material, which was soaked in 800 mL of ethanol. After that, the container was sealed and maintained for 15 days. It was shaken and stirred every now and then during this time. Cotton was used to filter the final mixture. Whatman filter paper was used to filter it (Hasan *et al*., 2017).

3.3 Pharmacological effects

All pharmacological actions, such as analgesic, antipyretic, and anti-spasmodic were performed in ethanol and doses were 150mg/kg and 300mg/kg of ***Rumex Thyrsoides*** **Desf**. Mice were placed into four groups, each with three mice, for each activity, with the first group receiving a normal saline solution as a negative control, the second group serving as a standard (positive control) for the administration of standard drugs, the third group administering ethanolic concentrations at doses of 150 mg/kg, and the ethanolic fractions of 300mg/kg formed the fourth group.

3.3.1. Animals used in research

Albino mice weighing 25 to 30gm in both sexes were used. Mice were placed in polypropylene cages in a sanitary environment following ethical roles. The room was kept at a constant 25-30°C temperature. A 12-hour light/dark cycle was implemented for the animals. All of the animals were equally provided rodent pellet diet and free access to water (Thakuria *et al*., 2018).

3.3.2. Drugs

Standard medications in the experiment were aspirin (Bayer, Germany), paracetamol (Glaxo Smith Kline, United Kingdom), diclofenac sodium (Pfizer, United States), and atropine sulphate.

3.3.3. Chemicals

Normal saline (Immunasol NS, A.Z. Pharmaceuticals Co. Pak), carrageenan (Lewis Labs, U.S.), Acetic acid, 95 percent methanol (Merck, Germany) (Petrochemical International Limited), charcoal, brewer's yeast (Lewis Labs, U.S.),

3.4 Analgesic Effect

Induced by acetic acid Analgesic activity was determined using writing tests.

3.4.1. Writhing Test caused by Acetic Acid

Using an acetic acid-induced writhing effect, the ethanolic extract of *Rumex Thyrsoides* Desf. was examined for analgesic activity in mice, as described by Srivastava *et al*., (2013); Franzotti *et al*., (2000) with minor alterations. A total of four groups of mice were created. Normal saline (10ml) was given to the control group (group I). A 1.cc acetic acid solution was administered to the mice in the 2nd, 3rd and 4th groups and ten minutes later the number of writhing's was observed. The mice in Group II were given positive controls of 1 cc aspirin (10 mg/kg), the number of writhing was counted every 10 minutes and 1.cc ethanol plant extracts of 150 mg/kg and 300 mg/kg was given to group III and IV, respectively. The number of writhes after twenty minutes was noted for the ethanolic extracts from plant of both doses and aspirin (standard). It was then calculated the inhibition in writhes. Finally, the analgesic inhibition % was computed using the following formula.

% inhibition = writhing value of tested drug / Writhing value of negative control

3.5 Antipyretic activity

To test for antipyretic activity, plant extract of various doses was utilized, by using the Brewer's yeast induce pyrexia method (Bhowmick *et al*., 2014). The mice were separated into four groups during antipyretic activity. Mice in all groups were given access to water but were denied food for six hours before to start the experiment. Normal temperature for all mice was measured prior to yeast administration. A Saline Injection was administered to mice of Group I (control group), whereas mice of Groups II, III and IV were treated with 1.cc brewer's yeast solution. After 18 hours of yeast treatment, all mice temperatures were checked (with digital thermometer). The mice were given regular 1.cc medicine with 500mg (paracetamol) medicine with 150mg/kg in the second group. To make a paracetamol solution in 50 mL of water, one 500 mg paracetamol pill is dissolved. Dose of 1.cc ethanol extract plants were administered in groups III and IV at doses of 150 mg/kg and 300 mg/kg each. Rectal temperatures were assessed at 1 hour, 2 hours, 3 hours and 4 hours compared with paracetamol following injecting the concentration of ethanol extracts. In order to compute the antipyretic percentage reduction, the following formula was employed.

$$\% \text{ reduction} = B - Cn / B - A \times 100$$

B is the temperature after pyrexia induction

Cn is the temperature after 1, 2, 3, 4, and

A is the usual body temperature.

3.6 Antispasmodic Activity

The antispasmodic activity of the Charcoal meal test model was determined using the approach of (Taiwo *et al*., 2000). The mice were divided into 4 groups, with the first receiving 10 mL of normal saline with the use of a feeding tube, the 2nd, 3rd, and 4th groups were administered 4 ml charcoal through the mouth. The inactive charcoal solution was made by dissolving 5-gram chemicals in 20ml distilled water. The second group of mice were administered standard (atropine sulphate) 10mg/kg after twenty minutes. The mice received plant extract amounts in the third and fourth groups, respectively, at doses of 150mg/kg and 300mg/kg. The mice were dissected after 20 minutes to measure the overall intestinal length, as well as the length of time the charcoal meal moved through the intestine to compare the extract concentration to a

standard of low or high antispasmodic action. The given standard formula was used to calculate the initial transit percentage (percent) of antispasmodic action.

Intestinal transit (%) = D/L ×100

D is the length of the charcoal meal and

L is the whole length of the intestine (cm).

3.7 Analysis of plant chemicals

A study (qualitative and quantitative) on phytochemical analyses was conducted by following standard methods.

3.7.1. Test for proteins.

Millon's analysis

When 2ml Millon's reagent was taken and combined with crude extract, a white precipitate formed become red, which showed the presence of protein following gentle heating (Yadav and Agarwala 2011).

3.7.2. Test for carbohydrates

Test of Benedict

A reddish-brown precipitate showed the existence of carbohydrates when raw extract was heated by the reagent of Benedict 2ml (Yadav and Agarwala 2011).

3.7.3. Test for flavonoids.

Test using alkaline reagent

2 mL of crude extract was combined with 2 mL of a 2% NaOH solution. The intense yellow color became colorless when several drops of diluted acid were introduced suggesting flavonoid content. (Agarwala and Yadav 2011).

3.7.4. Test for Alkaloids

Wagner's test

Wagner's test Along the walls of the test tube, to a few ml of plant extract a few drops of Wagner's reagent will be added. The occurrence of a reddish-brown precipitation shows a positive test (Banu *et al*., 2015)

3.7.5. Ferric chloride test for Phenolic chemicals

The extract is dissolved in 5 ml of clean water (50 mg). Adding a few drops of neutral ferrous chloride solution (5% ferric chloride). The presence of phenolic compounds is shown in a dark green color (Banu *et al*., 2015).

3.7.6. Test for tannins

To see if any precipitations or color changes had occurred, a few drops of 10% ferric chloride were added, and 1 mL of cool filtrate was distilled to 5 mL with distilled water. With tannins, a bluish-black or brownish-green precipitate has been seen (Ajayi *et al*., 2011).

3.7.7. Test for saponins

Frothing test was used to assess the presence of saponins. Each plant's crude dry powder was violently agitated with distilled water for 10 minutes before being categorized for saponin concentration as follows: The absence of froth indicates the absence of saponins, while the presence of saponins is indicated by stable foam more than 1.5 cm (Vaghasiya *et al*., 2011).

3.7.8. Glycoside's test

Test of Salkowski

2 mL chloroform was added to the crude extract. After that, 2 mL of H2SO4 was added slowly and gently shaken. A steroidal glycoside component, i.e., a reddish-brown coloring, was discovered (Yadav and Agarwala 2011).

3.7.9. Test for steroid

Test was carried out using 2 ml of chloroform, combining crude extract. The mixture was then filled with 2ml each of concentrated H2SO4 and acetic acid. The appearance of a greenish tint showed that steroids occur (Yadav and Agarwala 2011).

3.7.10. Terpenoids test

The extract of raw material was diluted in chloroform of 2 mL and evaporated till dry. After adding 2ml of concentrated H2SO4 this was heated for 2 minutes. A greyish colour showed that terpenoids are present (Yadav and Agarwala 2011).

3.9 Quantitative analysis

3.9.1. Estimation of Flavonoids

The combined samples were of 0.5 mL (1 mg/mL), of aluminum chloride of 10 percent and potassium acetate of 0.1 ml. (1M). In order to get a volume of 5mL, the mixture was added 4.3mL of 80% methanol. Spectrophotometrically, 415nm after it was vortexed, the absorption of this combination was measured. The total flavonoid content in the sample was determined by the amount of optical density (Daffodil *et al*., 2013).

3.9.2. Estimation of phenolic compounds

100 mg test separate has been weighed cautiously and weakened into 100 ml of multiple times refined water (TDW). 1 ml of this arrangement has been put to the cylinder, trailed by the expansion of 0.5 ml of 2N Folin Ciocalteu and 1.5 ml of 20% of Na2CO3, with a TDW, lively shaking volume at long last expanding to 8 ml and afterward estimating assimilation at 765 nm inside 2 hours. Using a standard calibration curve constructed from varied diluted quantities of gallic acid, the total phenolic content was determined (Gresolin *et al*., 2013).

3.10 Antioxidant Activity

The method of (Rangkadilok *et al*., 2007; Daffodil *et al*., 2013) with slight changes will be used to estimate free radical scavenging for leaf extracts of chosen plant using 1,1-diphenyl-2-picrylhydrazyl (DPPH).

3.10.1 DPPH Radical Slavenging Activity.

DPPH is a steady free extremist used to test the radical searching limit of the cell strengthening part. This method depends in the foundation of the non-revolutionary DPPH structure when DPPH within the sight of hydrogen-giving cancer prevention agent is diminished into a methanol arrangement. All concentrates were assessed utilizing 1, 1-diphenyl-2-picryl-hydrazyl. In a short, a 0.1mM DPPH arrangement in methanol was created, and 1mL of this arrangement was added to 3 mL of the concentrate arrangement at different focuses (50,100 and 150g/mL). The combinations were joined and held at room temperature for 30 minutes. The retention was estimated with a 517 nm UV-VIS spectrophotometer. The norm for examination was ascorbic corrosive. Higher free extremist searching movement is shown by lower absorbance upsides of the response blend. The capacity to rummaging the DPPH extremist was determined by utilizing the accompanying recipe. DPPH searching impact

(% Inhibition) = {(A0 – A1)/A0) *100}.

Results

4.Pharmacological Activities

4.1 Antipyretic Activity

The antipyretic activity of *Rumex Thyrsoides* Desf. Was evaluated in ethanolic extracts by the brewery yeast induced pyrexia in albino mice. second group (G2) Injected with Standard Paracetamol (10mg/kg) and 1.cc of our selected doses of 150mg/kg and 300mg/kg were injected to group three and four (G3 and G4) respectively. The control group had given values of 98.65b±0.03 prior to injection of brewery yeast. Pyrexia in the mice recorded 103.7c±0.20 after the injection of brewer's yeast. The measurement was then obtained as 98.90c±0.16 using the standard medication paracetamol (10mg/kg) and after eighteen hours the temperature was 103.3^{c}±0.33 and temperature of control G1 after 1,2,3, and 4 hours was 103.6^{c}±0.19, 103.6^{d}±0.18, 103.6^{d}±0.18 and 103.5^{d}±0.18 respectively. Temperature of standard after 1^{st} ,2^{nd} ,3^{rd}, and 4^{th} hour was 102.3^{c}±0.37, 101.5^{c}±0.34, 100.6^{c}±0.36 and 99.37^{c}±0.15 . Reading of group three (G3) ethanolic extract concentration (150mg/kg) of *Rumex Thyrsoides* Desf. before the injection of brewery yeast was 92.33^{a}±0.40. After eighteen hours of injection the reading was 94.46^{a}±0.75 and temperature after 1,2,3 and 4 hours was 94.16^{a}±0.90, 93.43^{a}±0.63, 92.96^{a}±0.43 and 92.63^{a}±0.29. Reading of group four (G4) ethanolic extract concentration (300mg/kg) before the injection of brewery yeast was93.36^{a}±0.77 and 93.36^{a}±0.77 after eighteen hours of injection. The reading was 94.70^{a}±0.81, 94.36^{a}±0.80, 93.93^{a}±0.63 and 93.66^{a}±0.69 after the first, second, third, and fourth hours.

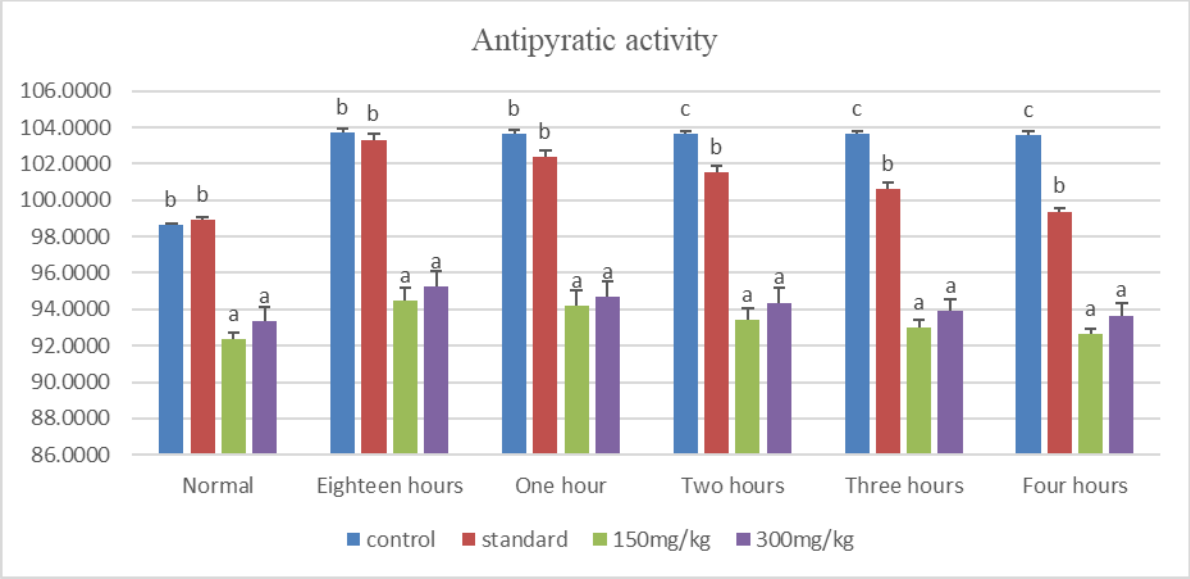

Fig .2: Graphical presentation of leaves of *Rumex thyrsoides* Desf

Analgesic activity

In the present study analgesic activity of *Rumex Thyrsoides* Desf. was carried out in ethanolic extract at different doses (150mg/kg and 300mg/kg). The results demonstrated substantial dosages dependent on writhing. in *Rumex Thyrsoides* Desf. Number of writhing in control group (G1) of saline water was (43^{b}±2.000). It is shown that standard drug aspirin treated group (G2) shows 81.39% writhing (8a±.57735) inhibition number. Group 3 (G3) showed the number of writhing's (5.3a±1.45) at a dose of 150 mg/kg in ethanol and had a percent (87,67%) inhibition. The group (4th) demonstrated inhibition of ethanol in the dose of 300 mg/kg (7.6a±2.84) of ethanol extracts in all concentrations with a percentage of inhibition (82.32 %) and the observations of writhing's in five minutes with a dose of 300mg/kg ($p<0.001$) was significant. The dose of all levels was compared with standard drug aspirin (8a±.57735) following 4th treatment.

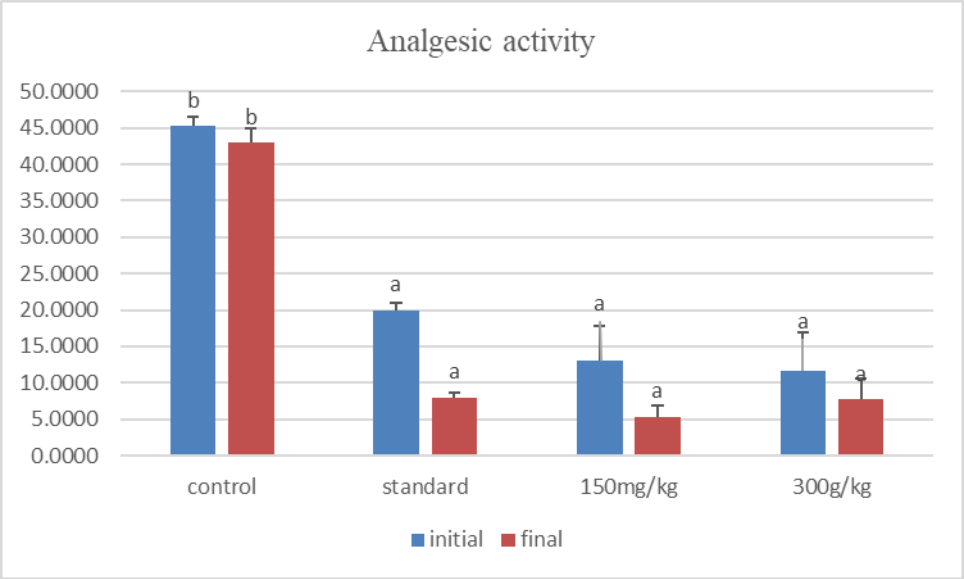

Fig.4. Graphical presentation Analgesic activity of leaves of *Rumex thyrsoides* Desf.

Antispasmodic activity

During this action, the total intestinal length of Group I (control group) was measured at 45.3a±0.33; the total atropine sulphate (standard medication) of Group 2 was measured at 51.3b±2.07 and 48.3c±2.48 respectively; and the total intestinal length and charcoal meal length of Group 3 were measured at 20.8a±0. 16.. percent inhibition of control was 46% and standard were 94.15%. In group 3rd of *Rumex Thyrsoides* Desf. extract concentration (150mg/kg) of the total intestinal length were 54.6^{b}±1.76 and charcoal meal length was 24.3^{b}±2.02 and showed percent inhibition of44.50%. Total length of group 4th (300mg/kg) were53.6^{b}±1.45 and charcoal meal length was $17±1^{a}$.52 and showed percent inhibition of 31.71%.

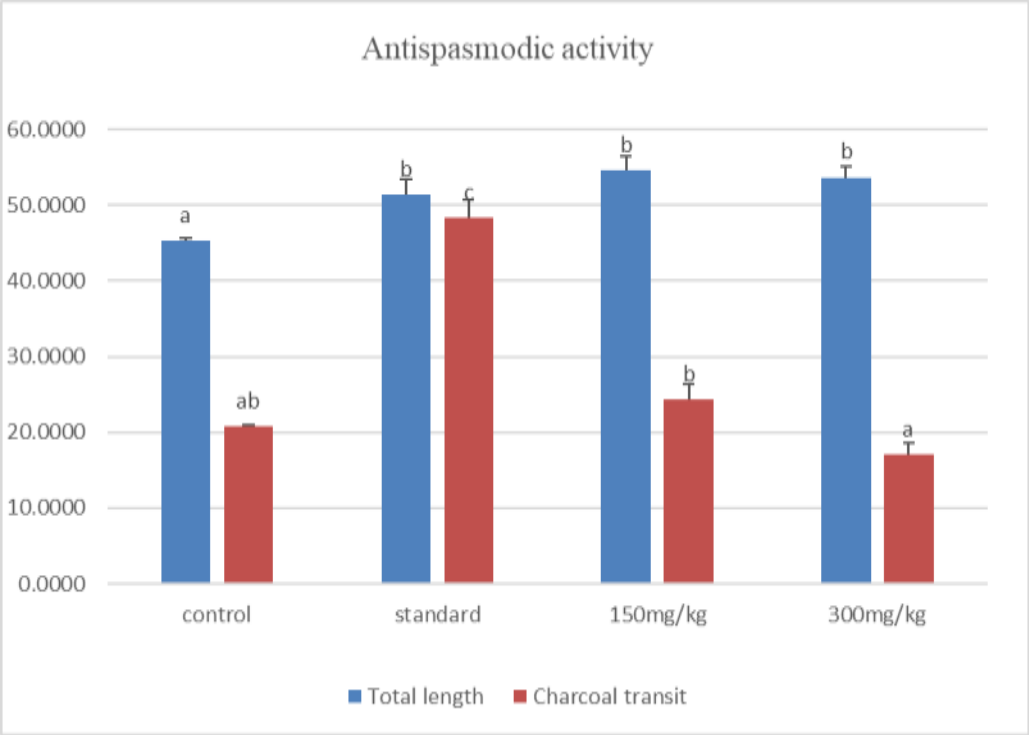

Fig .6. Graphical presentation of Antispasmodic activity of leaves of *Rumex Thyrsoides* Desf.

Phytochemical analysis

4.4.1. Qualitative analysis

All ethanolic concentrates of the plant contain flavonoids, alkaloids, phenols, tannins, starches, saponins, and glycosides. The ethanolic concentrate of the plant showed the absence of terpenoids.

Table. 4.4.1. Qualitative Analysis of Phytochemical of *Rumex Thyrsoides* Desf.

S.No	Compounds	*Rumex Thyrsoides* Desf.
1	Flavonoids	+
2	Alkaloids	+
3	Phenol	+
4	Tannins	+
5	Carbohydrates	+
6	Saponins	+
7	Glycosides	+
8	Terpenoids	-
9	Proteins	+
10	Steroids	+

The positive (+) sign indicates the presence of a component, whereas the negative (-) sign indicates the absence of a compound in a plant extract.

4.2 Qualitative analysis

Total flavonoid content (TFC) and Total phenolic contents (TPC)

Evaluation of total phenolic content was carried out in ethanolic extract of leaves of *Rumex Thyrsoides* Desf. Statistically analyzed data was compared with the gallic acid taken as standard for phenol determination having y = 0.0039, x = 0.3297 R^2 = 0. 8694. For analysis of statistical data quercetin was taken as standard. *Rumex Thyrsoides* Desf showed highest phenol determination in 150 µg/ml concentration (3.58^{c}±0.35) followed by 100 and 50 µg/ml (3.45^{c}±0.24) and 1.84^{ab}±0.32. *Rumex Thyrsoides* Desf also showed maximum determination of flavonoids with 150 µg/ml concentration (3.79^{c}±0.36) followed by 100 and 50 µg/ml (2.43^{b}±0.26) (1.21^{a}±0.15).

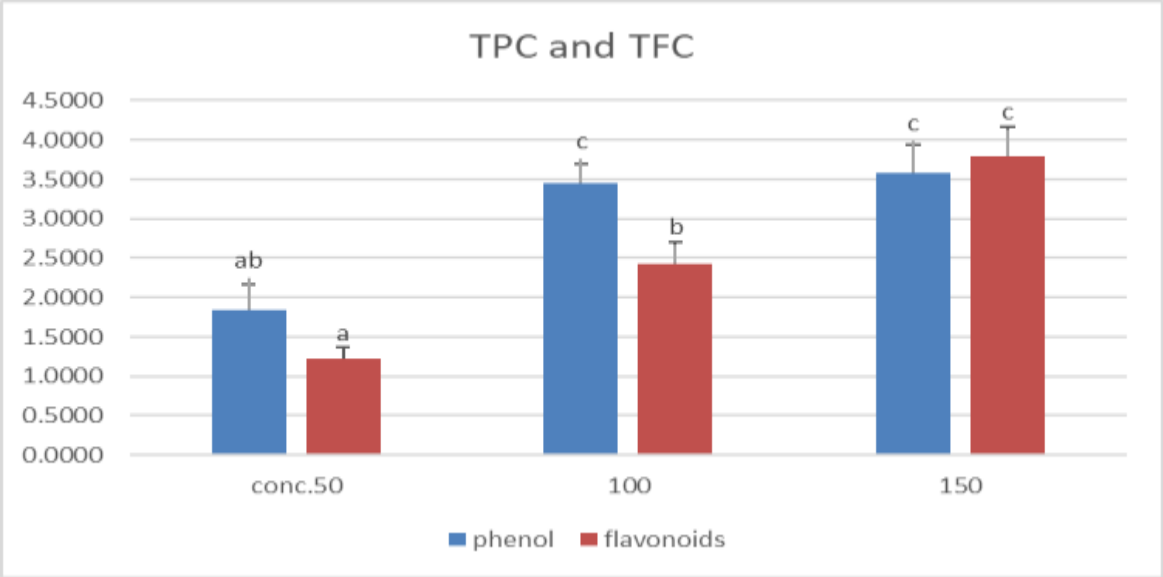

Fig 7. Graphical presentation of TPC and TFC determination of leaf extract of *Rumex Thyrsoides* Desf.

Antioxidant activity

Ethanolic extract of *Rumex Thyrsoides* Desf. were checked for Antioxidant effect through 2,2-diphenyl-1-picrylhydrazine (DPPH) scavenging antioxidant assay. The extracts showed significant antioxidant activity at all concentrations, ascorbic acid was used as a positive control for the activity. With concentrations of 50mg/ml, 100mg/ml, and 150mg/ml, the value for decrease rate was taken in Mean and Standard deviation (Mean ± SEM). The potential values of *Rumex Thyrsoides* Desf were 0.026^{a}±0.012, 0.016^{a}±0.005 and 0.014^{a}±0. 007.Standard showed 96.8% maximum inhibition followed by 95.7% of 150mg/ml extract concentration and 100mg/ml concentration showed 95% inhibition followed by 91.78% respectively.

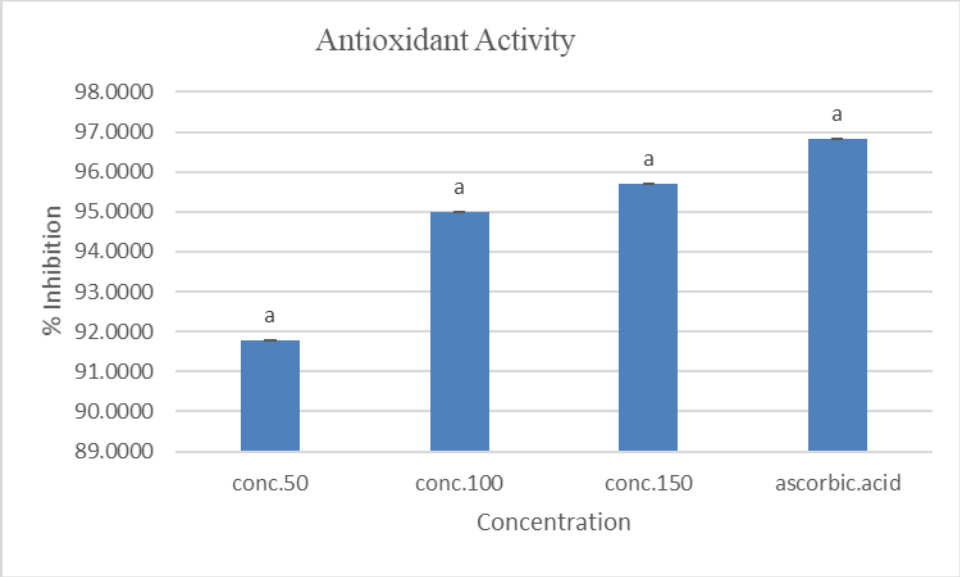

Fig 11. Graphical presentation of antioxidant activity of *Rumex Thyrsoides* Desf ethanolic extract.

Discussion

In the present study ethanolic extract of *Rumex Thyrsoides* Desf was used to examine the phytochemistry, pharmacological potential and antioxidant activity. The ethanolic extract of plant showed significant results in antipyretic, analgesic and antispasmodic activities. The phytochemical investigation both (qualitative and quantitative) showed that ethanolic concentrate of plant contains alkaloids, proteins, flavonoids, starches, phenols, tannins, saponins, glycosides, and steroids while terpenoids were missing in the plant ethanolic extract. Therapeutic plants have bioactive mixtures which are utilized for restoring different human sicknesses. It assumes a

significant part in recuperating. Restorative plants have antifungal, antibacterial, and hostile to aggravation exercises. In therapeutic plants, Phytochemicals normally happen in leaves, vegetables, and roots with guard systems and insurance against various infections. Essential and auxiliary mixtures are phytochemicals. Essential mixtures contain chlorophyll, proteins, and normal sugars, while auxiliary mixtures contain terpenoid, alkaloid, and phenolic compounds. Terpenoids are available with an assortment of significant microorganisms, e.g., mitigating, anticancer, hostile to malarial, cholesterol restraint, against viral, and against bacterial combination (Wadood *et al*., 2013).

The current investigation showed the maximum antipyretic activity of *Rumex Thyrsoides Desf* in 300mg/kg extract. Antipyretics are the specialists that diminish the high temperature of the body. Yeast-instigated pyrexia is known as pathogenic fever and its etiologic attributes incorporate the creation of prostaglandins at a lower temperature at the warmth guideline focus. To appears to be the last pathway responsible for the production of prostaglandins, mainly the potent pyretic agent, for fever induced from a number of pyrogens. Antipyretic activity is usually one of the properties of non-steroidal anti-inflammatory drugs as a result of their inhibitory effect on central nervous system prostaglandin (Bhattacharya *et al*., 2010).

The acetic acid produces writhing model of ethanolic extract exhibited a significant reduction in writhing at a dose of 300mg/kg. Extract of Rumex Thyrsoides Desf had the highest percentage inhibition of writhing at percent (82.32%) at a dose of 300 mg/kg. The analgesic property was assessed using an acetic acid-induced writhing technique. Pain is described as "an unpleasant sensory and emotional experience connected with real or potential tissue damage," according to the International Association for the Study of Pain (IASP). In recent decades, common pain relievers such as aspirin and morphine have become increasingly popular. In the majority of cases, analgesic medicines, particularly opioids and nonsteroidal anti-inflammatory drugs (NSAIDs), can only relieve 50% of pain in roughly 30% of patients (Fan *et al*., 2014).

maximum antispasmodic value of *Rumex Thyrsoides* Desf in 300mg/kg extract was 17±1^{a}.52 (31.71%). Antispasmodics are medications that help to treat or prevent muscle spasms. These medications assist to recover the gastrointestinal muscle to its correct tone by lowering the intestinal hypercontractility of smooth muscles, therefore alleviating numerous stomach pains and symptoms. As a result, antispasmodics are commonly given for a variety of gastrointestinal disorders, including irritable bowel syndrome, which affects 10 to 25% of the general population.

The most often available antispasmodium medicines (such as otilon and pinaverium) are antimuscarinic compounds (e.g., plant belladonna alkaloids and their synthetic analogues) and calcium channel blockers (N'Guessan et al. 2015).

The current study was attempted to find out qualitative and quantitative phytochemical of *Rumex Thyrsoides* Desf in ethanolic extract. . The qualitative investigation suggested that plant extract contained alkaloids, proteins, flavonoids, carbohydrates, phenols, tannins, saponins, glycosides and steroids while terpenoids were absent in plants ethanolic extract. The phytochemical part creation and optional metabolites of plants, for example, phenolic compounds, flavonoids, alkaloids, tannins, and other effective quality reaction items, are related to their helpful potential (Mondal *et al*., 2019).

Maximum Significant value of phenol 3.58c±0.35 was found in the 150µg/ml extract of *Rumex Thyrsoides* Desf followed by 3.45c±0.24 in 100 µg /kg and 1.84ab±0.32 was present in 50 µg /kg. The highest flavonoids value was 3.79c±0.36 in 150 µg /kg followed by 2.43b±0.26 in 100 µg /kg and 1.21a±0.15 in 50 µg. Phenols and flavonoids are the most common phytoconstituents of different fruits, vegetables, and medicinal and aromatic plants, which are responsible for antioxidant activities (Phuyal et al., 2020). *Rumex Thyrsoides* Desf showed highest significant antioxidant value at dose of 150mg/ml 0.014^{a}±0.007 with 95.7% inhibition followed by 0.016^{a}±0.005 with dose of 100mg/ml (95%) followed by 0.026^{a}±0.012 with 50mg/ml dose and 91.78% inhibition. The data was statistically analyzed using ANOVA, the results showed that the antioxidant activity among ethanolic extracts with different concentration was significant. Recent research has confirmed that antioxidants are the most effective tools to eliminate free radicals which cause oxidative stress and are possible protective agents that protect the cells from reactive oxygen spices and retard the progress of many diseases as well as lipid peroxidation. Additionally, they also possess anti-inflammatory, anti-viral and anti-cancer properties (Mondal et al., 2019).

Conclusion and Recommendation

The present investigation revealed that *Rumex Thyrsoides* Desf ethanolic extract has a strong potential for pharmacological, phytochemical, and antioxidant activities. The presence of flavonoids, phenolic contents, and antioxidant abilities contributed to the greatest potential.

Analgesic, antipyretic, and antispasmodic properties were found in the ethanolic extracts. This study encourages greater research into bioactive molecules that will aid in the development of various drugs with less diverse effects that are beneficial against various disorders. This study is expected to lead to greater research in the fields of bioactive chemical isolation and identification in the plants. This will aid in the development of innovative medicines with minimal side effects, cheap cost, and great efficacy in the treatment of many ailments.

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