



Studies on analysis of minerals, phytochemicals, proximate composition, and in vitro biological activities of methanolic extracts from the fruits of *Cordia dichotoma* Forst and *Cordia myxa* L.

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ABSTRACT

Plants have been the primary source of sustenance, medicinal remedies, and refuge for humans throughout history. Wild edible fruits, in particular, have played a significant role in shaping people's diets due to their nutritional value. This research aimed to investigate the mineral content, antioxidant properties, chemical composition, and basic characteristics of selected wild edible fruits from Dera Ismail Khan, specifically *Cordia myxa* and *Cordia dichotoma*. The chosen wild edible fruits were utilized to determine their inorganic content through spectroscopy, assess their antioxidant potential using the DPPH assay, and analyze their proximate components such as crude fats via the soxhlet extraction method, proteins using the Kjeldahl technique, and ash content through muffle burning. Standard AOAC techniques were employed to ensure accurate measurements. The results of the proximate analysis revealed that *C. dichotoma* had a carbohydrate content of 88.35%, while *C. myxa* had 53.79%. Furthermore, the study found that the copper concentrations in *C. myxa* and *C. dichotoma* were 525.00 mg/kg and 477.70 mg/kg of dry weight, respectively. Notably, the highest levels of total phenols and their derivatives were detected in *C. myxa* (33.41 mg GAE/g) and *C. dichotoma* (19.59 mg GAE/g), with *C. myxa* exhibiting significant antioxidant activity (IC₅₀ 46.75 g/mL). Additionally, both fruits displayed a total flavonoid content of 0.463 mg QE/g. Antibacterial activity was performed by microdilution method of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) whereas, *Cordia myxa* (L.) showed greatest activity of inhibition against *Pseudomonas aeruginosa* and *Cordia dichotoma* inhibited *Klebsiella pneumonia* effectively. *Cordia dichotoma* proved to be the good anti-diabetic while *Cordia myxa* proved itself for better anti-inflammatory activity in defined laboratory environment, both activities were confirmed by performing enzyme inhibition assays. With high quantities of macronutrients, trace elements, antioxidants, and possible health advantages, these neglected food sources become more important in both conventional and contemporary diets.


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Introduction

Medicinal plants hold immense importance in healthcare and pharmacology (Jamshidi et al., 2017). They have been a fundamental source of remedies for human ailments since ancient times, offering a rich reservoir of bioactive compounds with therapeutic properties. Medicinal plants not only provide accessible and affordable treatment options, especially in regions with limited access to modern medicine, but they also serve as the basis for the development of many pharmaceutical drugs. Additionally, these plants play a crucial role in traditional medicine systems worldwide, preserving cultural knowledge and practices passed down through generations (Gurib-Fakim, A. 2006). Their significance extends beyond healing; they contribute to biodiversity conservation and ecological balance. Recognizing and harnessing the potential of medicinal plants is vital for sustainable healthcare, drug discovery, and the preservation of indigenous knowledge (Jacob et al., 2023).

Wild edible fruit plants hold significant importance in our ecosystem and human nutrition (Bvenura et al., 2017). These plants contribute to biodiversity by providing habitat and sustenance for various wildlife species. They are a valuable source of nutrition, offering a diverse array of vitamins, minerals, and antioxidants to human diets. For many indigenous communities and traditional cultures, wild edible fruits have been a staple food source for generations, ensuring food security in challenging environments. Furthermore, these fruits often thrive in natural landscapes, requiring minimal cultivation and maintenance, making them a sustainable food resource (Shelef et al., 2017). As we face increasing challenges related to food security and climate change, recognizing and preserving the importance of wild edible fruit plants is crucial for both environmental conservation and human well-being (Feysa et al., 2011).

Proximate analysis is of paramount importance in the field of food science and nutrition (Fouad et al., 2015). This analytical approach provides essential information about the basic composition of foods, including their content of macronutrients such as carbohydrates, proteins, and fats, as well as moisture, ash, and fiber (Kim et al., 2007).

Understanding the proximate composition of food items is crucial for dietary planning, quality control in food production, and nutritional labeling (Ahmed et al., 2022). It helps consumers make informed choices about their diets, assists in the development of balanced and healthy food products, and supports food manufacturers in ensuring product consistency and safety. Additionally, proximate analysis plays a critical role in research related to food processing, preservation, and the development of new food products, ultimately contributing to advancements in food science and the improvement of public health (Augustin et al., 2016).

Phytochemical and inorganic analyses are vital aspects of scientific research with far-reaching implications (Ochieno et al., 2021). Phytochemical analysis delves into the bioactive compounds present in plants, revealing their potential therapeutic properties (Kumar et al., 2023). These compounds, such as antioxidants and phytonutrients, have been linked to various health benefits and hold promise for the development of new drugs and functional foods. Inorganic analysis, on the other hand, assesses the mineral content in substances, shedding light on their nutritional value and safety. This information is crucial for understanding the dietary intake of essential minerals and identifying potential contaminants or harmful elements in foods and environmental samples (Soetan et al., 2010). Together, these analyses contribute to a deeper understanding of the nutritional, medicinal, and safety aspects of natural products, fostering advancements in healthcare, nutrition, and environmental science (Mabry et al., 2008).

Materials and Method

Test sample

Dried flower bud of clove plant was purchased from Wukari market.

Collection of samples

Around the middle of the year 2020, the plant materials (fruit) of *Cordia dichotoma* Forst and *Cordia myxa* L. were taken in D.I.Khan, KPK. The specimens were identified in the Quaid-i-Azam University's Department of Botany in Islamabad. The plant specimen was stored in the relevant division, the Drugs Control and Traditional Medicines Division, at the National Institutes of Health in Islamabad. The fruits were dried in the space and ground into a powder with a grain size of fewer than 90 mesh.

Preparation of extract

In order to isolate the phytochemical components, the modified and recommended process devised by the (Zhang et al., 2006). The 100 g sample will undergo three days of continuous, 0.5 L of methyl alcohol at 25 CC, vigorous vortex shaking. Whatman filter paper was used to filter the solution. With rotavap, the solution was made thicker at a low temperature and close to 40CC. The dried sample was kept at 40 CC for any future investigation.

Experimental design

Quantitative determination of the secondary phytochemical

Alkaloid

Utilizing the established methodology described by Kaur et al. (2009), quantitative estimations of alkaloid content was performed. A 0.5-gram sample was introduced into a 0.2-liter solution composed of a 1:9 ratio of ethanol and ethanoic acid, where it will reside for 240 minutes. The utilization of a water bath will enhance the solubility of the solvent, after which the solution was filtered using Whatman filter paper, retaining 25% of its original volume. The addition of ammonium hydroxide high-power solution, drop by drop, will continue until precipitation is complete. Following this, the solution was allowed to settle, and the precipitate was separated through filtration, followed by rinsing with a diluted ammonium hydroxide solution. These remnants will undergo drying, shaping into a solid mass, and was subsequently referred to as such.

Polyphenol

In accordance with the guidelines of the International Union for the Conservation of Nature, the determination of total phenolic or phenyl alcohol concentration in fruit extracts was conducted, as documented in Algeria (2016). To prepare the Folin-Ciocalteu and Na₂CO₃ aqueous solution, 1.25 mL of a 20% solution (comprising 20 g of Na₂CO₃ dissolved in 80 mL of Folin-Ciocalteu reagent) was combined with 0.5 mL of the diluted methanolic extract. Subsequently, this mixture was allowed to incubate at a constant room temperature (within the range of 20-25°C) in darkness for one hour. The absorbance at 725 nm will then be determined using a spectrophotometer and compared against a negative control, consisting of 0.5 mL of methanol used as the extraction solvent. For comparative analysis, we will refer to gallic acid, a well-known polyphenolic compound.

Flavonoids

Through meticulous adherence to the adapted standard procedure, the quantification of flavonoid content was conducted, as outlined by Kaur et al. (2009). The powdered samples from each plant fraction (10 grams) will undergo filtration and subsequent concentration to dryness using a water bath. As the filtrate dries, its moisture content will diminish, and its weight will steadily decrease until it stabilizes at a consistent level, representing the flavonoid content.

Cardiac glycosides

To isolate cardiac glycosides, 1 gram of powdered plant material from the experiment was mixed with a 10 mL solution of Pb(OAc)₂ and water in a 1:10 ratio, along with 5 mL of a 1:1 mixture of methyl alcohol and water, all preheated to 40°C for 12 minutes. Subsequently, the remaining filtrate (E) was subjected to two extractions using 10 mL of isopropanol:dichloromethane (in a 2:3 ratio) each time, following a cooling period to reach room temperature at 26°C (D). The combined lower layer will then undergo concentration to dryness, its weight recorded, and it was designated as "cardiac glycosides." Finally, it was desiccated using anhydrous magnesium sulfate (F) in accordance with the procedure outlined by Kaur et al. (2009).

Tannins

To extract tannins, the procedure outlined by Ventura et al. was followed. The resulting filtrate was transferred into an intermediate-sized volumetric flask and water was added until it reaches a volume of 50 milliliters. A 5 mL aliquot of this diluted solution will then be combined with 2 mL of a mixture consisting of 0.008 M potassium ferrocyanide and 0.1 M iron chloride in 0.1 N HCl, which was prepared by dissolving 3.6 grams in 1 liter. The absorbance was measured six times at one-minute intervals at a wavelength of 605 nm. This measurement was compared to tannic acid, used as a standard tannin reference and expressed as "milligram standard" equivalent to the grams of the dried plant extract.

Mineral profile identification in of the plant of my experiment fruits

The selected WEFPs (*Cordia myxa* and *Cordia dichatoma*) were examined for minerals and heavy metal detection and quantification by atomic absorption spectrophotometry.

Collection of plant and postharvest treatment

In July 2020, I obtained fruits from the natural habitat of my experiment in the native district of KPK.

The experiment took place at the Institute of Chemical Sciences, Gomal University, D. I. Khan. The fruits, specifically from the *C. dichotoma* Forst and *C. myxa* L. plants, were first cleaned using non-ionized water. Afterward, they were dehydrated in a controlled environment and then washed with tap water to eliminate any potential germs. Throughout the experimental process, great care was taken to prevent contamination and to avoid any loss of metals from the samples.

Digestion of plant samples in acid

To completely dry a specific amount of powdered sample, it was heated in an oven at a temperature range of 105-115°C using a china dish. Afterward, the sample was subjected to a four-hour heating process at 550 degrees Celsius in a sealed boiler, followed by cooling in a desiccator. To facilitate digestion, 6M HNO₃ solution was incrementally added in 2.5 mL portions. The resulting solution will then be filtered into a 20 mL titration flask and further diluted to reach the desired mark, as outlined in Khan et al.'s 2008 study. The presence of heavy metals was quantified using the Flame Atomic Absorption Spectrophotometer (FAAS), with a preference for the Zeeman Hitachi 2000 for polarization.

Estimate of nutrition (proximate analysis)

Identification of Moisture Content

The moisture content in these plant fruits was determined using the prescribed procedure outlined in the Association of Official Analytical Chemists' (AOAC, 2000) specified protocol No. 44-15A. Once a consistently weighed dry sample is obtained, a 4-gram pre-designated portion of the readily available edible sample was subjected to heating in an electric oven (Memmert, USA) at 70°C continuously for 1.5 days.

Measurement of Ash Content

To assess the presence of ash content, the sample was processed through incineration, following technique number 08-01, as per AOAC 2000 guidelines. Two grams of dried wild fruit was placed in a crucible and heated in a muffle furnace at temperatures up to 550°C until grayish/whitish ash is obtained (Neycraft JFF, 2000). The quantity of collected ash was determined and maintained at a controlled temperature.

Determination of Crude Fat

Methods outlined in AOAC (2000) was employed to determine the crude fat content of the sample. The powdered sample, weighing over 4 grams, was placed in the extraction chamber. Crude lipids was extracted using petroleum ether in a Soxhlet extractor at a temperature of approximately 60 degrees Celsius for approximately one-fourth of a day. The mathematical expression for determining the percentage of total fat content in the dried fruit is provided below.

Determination of Crude Protein

AOAC (2000) method number 46-30 from the Kjeldahl approach was followed to identify unidentified proteins in the sample. The digestion process was conducted at 35°C for approximately 120 minutes, involving the dissolution of 1000 mg of the dried sample in a strong solution of sulfuric acid H₂SO₄ (98%) and a digestion mixture comprising (FeSO₄:CuSO₄:H₂SO₄ 1:2:10). This digested solution was diluted with 0.25L distilled water. Approximately 10 cc of this diluted solution was purified using a Semi-Digital Assembly. It can be rendered ammonia-free by the addition of a 4% solution of diluted boric acid. Ultimately, the ammonia solution was titrated against a 0.1 normal sulfuric acid solution until a purple hue appears. Methyl alcohol was employed as a blank. The proportion of protein in the sample was determined.

Determination of Crude Fiber

The presence of crude fiber was determined following the AOAC 2000 standard methodology (Method No. 32-10). Two grams of edible wild fruit powder was digested with 1.25% H₂SO₄ and 1.25% NaOH, followed by dehydration for up to four hours at 95-105°C in an oven. Subsequently, the dry, moisture-free filtrate was subjected to combustion in a muffle furnace for approximately 240 minutes. The erythematic expression devised by Ranganana in 1979 was used to calculate the proportion of crude fiber content in the dried fruit.

Determination of Total Carbohydrates

The calculation of carbohydrate content was carried out using conventional methods (Indrayan et al., 2005). The mathematical formula was employed to determine the total sugar content in the sample.

Determination of Energy Value

The determination of the sample's total energy content will adhere to the technique proposed by Indrayan et al. (2005). A mathematical equation was utilized to ascertain the energy value of the sample.

In vitro biological activities

In vitro biological activities were performed as follows

Antioxidants

DPPH free radical scavenging assay, employing the DPPH technique of (Uddin et al., 2018) with minor modifications, was used to assess the scavenging potential of a number of medicinal plants. A watery solution containing 0.02 grams of DPPH was dissolved in 100 ml of MeOH, and its spectrophotometric absorbance was tuned to 0.8 to 0.9 at 517 nm in comparison to a methanol blank (0.094). Through 1,1-diphenyl-2-picrylhydrazyl (DPPH), various concentrations were assessed. The absorbance at 517 nm of 100 μ L from each concentration was measured after it had been incubated for 30 minutes in the dark at room temperature with 3 ml of DPPH. The same process was used for the ascorbic acid standard control, and all sample tests were carried out in triplicate. Decolorization is closely correlated with the level of free radical scavenging. The same process was used for the ascorbic acid standard control, and all sample tests were carried out in triplicate. Low absorbance value and greatest free radical scavenging are closely correlated with decolorization. Then, using the method developed by Son et al., in 2002, the percentage of inhibition of free radical scavenging was calculated. The results DPPH scavenging activity (%) = $(A_0 - A_1)/A_0 \times 100$ where A_0 is the absorbance of the control and A_1 is the absorbance of the sample.

Antibacterial

The study employs the broth microdilution method to establish the Minimum Inhibitory Concentration (MIC) for antibiotic susceptibility testing. Costar 96-well Polystyrene Cell Culture Cluster plates with flat bottoms are utilized, and results are interpreted using MIC value breakpoints. In each well, 100 μ L of Mueller Hinton Broth (MHB) is added. The antibiotic stock solution, previously stored at -20°C, is thawed and diluted to 1/100 in MHB, resulting in a concentration of 16 μ g/mL. This dilution is added to the first column, followed by double dilution across the plate. Bacterial suspension is added to all columns except the negative control, which contains only MHB, while the positive control contains MHB and bacterial suspension. MIC is determined by comparing bacterial growth with control samples, assessing antibacterial activity (Goltermann et al., 2020).

Anti-diabetic and Anti-inflammatory

α -glucosidase activity assay: A 36 μ L of phosphate buffer solution, 30 μ L sample solution with various concentrations (10, 25, 50, 100 and 150 μ g mL⁻¹) and 17 μ L PNPG substrate at concentration of 5 mM were put in 96 well microplate. This mixture was incubated at 37°C for 5 min. After 5 min, 17 μ L of α -glucosidase solution 0.15 U mL⁻¹ was added in each well to obtain total volume of 100 μ L. The mixture was incubated for 15 min to get the complete hydrolysis reaction. After 15 min, the reaction was stopped by adding 100 μ L of Sodium Carbonate (Na₂CO₃) 200 mM. Absorbance was measured at 405 nm using a microplate reader. Each test was repeated twice (Sigma-Aldrich, 1995; Dewi et al., 2007).

The experiment was performed in triplicates using Cayman's LOX inhibitor screening assay kit (Cayman test kit-760700, Cayman Chemical, Ann Arbor, MI) according to the manufacturer's protocol. DMSO was used as 100% initial activity and Quercetin was used as the positive control. Briefly, in a 96-well plate, 10 μ L of each test compound (dissolved in DMSO) or vehicle were pre-incubated with 90 μ L of 15-LOX enzyme. The reaction was started by addition of 10 μ L of substrate (AA) and the plate was shaken for at least 5 min. Then, 100 μ L of chromogen supplied with the kit was added to each well to stop the enzymatic reaction and develop the colour. The absorbance was measured at 490 nm using microplate reader (Rania H et al., 2021)

Result and Discussion

Quantification of secondary phytochemical

The identification and quantification of alkaloids, phenolic compounds, flavonoids, cardiac glycosides, and tannins follow the guidelines outlined in the provided materials and methods.



Figure 1. Identifying and measuring the quantity of alkaloids chemical

Table 1. Quantitative secondary phytochemicals of plant of my experiment.

Plant	Phyto-chemical compound, its variety and Quantity				
	Alkaloid (mgG AE/g)	Polyphenols (mgG AE/g)	Flavonoids (mg QE /g)	Cardiac glycosides (mgG AE/g)	Tannins (mgG AE/g)
<i>Cordia dichotoma</i>	20.14±.01	19.60±.01	0.463±.01	17.16±.01	15.21±.01
<i>Cordia myxa</i> L	30.20±.01	33.40±.01	0.462±.01	25.77±.01	16.12±.01

Table 2. Metals concentration in selected edible fruits.

Metals	<i>C. myxa</i>	<i>C. dichatoma</i>
Cu	538.00±10.55	481.67±3.72
Cd	125.33±4.03	489.73±7.01
Zn	532.33±5.47	359.23±12.85
Mg	34.85±4.04	9.97±1.91
Fe	2.45±1.01	5.52±1.81
Cr	101.47±24.11	146.15±4.89
Na	10.98±2.14	6.60±1.26
Ni	0.56±0.53	2.27±0.96
Mn	0.30±0.16	0.07±0.02
K	22.93±1.34	5.31±1.48
Co	0.15±0.09	0.12±0.07
Pb	10.37±0.90	4.63±2.28

Table 3. Nutrition estimation in our test sample.

S. N	Type of food constituent	Among the <i>cordia spp</i> test plant	
		<i>Cordia dichotoma</i>	<i>Cordia myxa</i> L
1	Moisture	1.3±.01%	2.6±.01%
2	Ash	3.75±.01%	5.90±.01%
3	Fat	2.22±.01%	2.81±.01%
4	Protein	2.25±.01%	11.30±.01%
5	Crude fiber	20%	23.43%
6	Carbohydrate	88.34±.01%	53.80±.01%
7	Calorific value	382.5 Kcal/g	285.7 Kcal/g

Table 4. Quantitative analysis of the antioxidant profile.

Sample	DPPH IC ₅₀ (mg/mL)	Percentage of inhibition
<i>Cordia dichotoma</i>	46.75 g/mL	(80.2%)
<i>Cordia myxa</i> L	46.75 g/mL	(64.5%)
Ascorbic acid	1 mg/ml	(95.6%)

Table 5. MIC (minimum concentration of the sample required to stop the growth bacteria) of cordia spp towards gram positive and gram-negative bacteria.

Sample	<i>Staphylococcus aureus</i> MIC(µg/ml)	<i>Pseudomonas aureginosa</i> MIC(µg/ml)	<i>Klebsiella pneumoniae</i> MIC(µg/ml)	<i>Escherichia coli</i> MIC (µg/ml)	Solubility (DMSO)
<i>Cordia dichotoma</i>	>2500±0.01	6250±0.01	1250±0.01	1560±0.01	Soluble
<i>Cordia myxa</i> L	>2500±0.01	2500±0.01	>2500±0.01	1560±0.01	Soluble

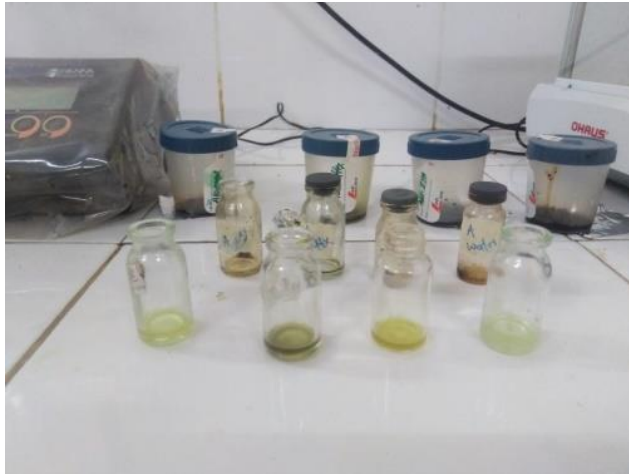


Figure 2. Identifying and measuring the quantity of flavonoids

Antioxidants

The fractions from *Cordia dichotoma* Forst and *Cordia myxa* L showed a significant presence of flavonoids on their surfaces, as indicated by a previous phytochemical analysis (refer to Table 1). In this study, we conducted antioxidant assessments using two well-established methods, DPPH and FRAP, despite prior data suggesting that flavonoids play a primary role in antioxidant activity (Arunachalam et al., 2014) (see Table). The DPPH experiment revealed that both samples exhibited the highest level of antioxidant activity, with an Inhibition Constant IC₅₀ of 46.75 g/mL. This suggests that the presence of flavonoids and phenolic compounds in both samples collectively contributes to their observed antioxidant potential.

Table 6. MBC (minimum concentration of the sample required to kill bacteria) of *Cordia* spp towards gram positive and gram-negative bacteria.

Sample	<i>Staphylococcus aureus</i> MIC(µg/ml)	<i>Pseudomonas aureginosa</i> MIC(µg/ml)	<i>Klebsiella pneumoniae</i> MIC(µg/ml)	<i>Escherichia coli</i> MIC (µg/ml)	Solubility (DMSO)
<i>Cordia dichotoma</i>	>2500±0.01	6250±0.01	1250±0.01	1560±0.01	Soluble
<i>Cordia myxa</i> L	>2500±0.01	2500±0.01	>2500±0.01	1560±0.01	Soluble

Table 7. Antidiabetic and anti-inflammatory activity of experimental plant.

Plant Fraction	α-glucosidase IC ₅₀ (mg/ml)	15-Lox % inhibition
<i>Cordia dichotoma</i>	0.28	46%
<i>Cordia myxa</i> L	0.84	42%

Cordia myxa showed significantly higher levels of Cu, Cd, and Zn compared to *Cordia dichotoma*. In *Cordia myxa*, the overall metal concentration ranked as Cu>Zn>Cd>Cr>Mg>K>Na>Pb>Fe>Ni>K>Co (refer to Table 2). Conversely, *Cordia dichotoma* exhibited elevated concentrations of Cr, Fe, and Ni compared to *Cordia myxa*. The overall metal concentration ranking in *Cordia dichotoma* was Cd>Cu>Zn>Cr>Na>Mg>Fe>K>Pb>Ni>Co>Mn.

Estimate of nutrition (proximate analysis)

In accordance with the procedures described in the materials and methods, the analysis of food components such as moisture, ash, crude fat, protein, crude fiber, carbohydrates, and caloric content is conducted. Below, you will find the presentation of the data and the results.

In vitro biological activities

Antibacterial

The *Cordia* genus plants mentioned earlier were assessed for their antibacterial effectiveness against both Gram-positive (G+) and Gram-negative (G-) bacteria using a 96-well plate assay (refer to Tables 5 and 6). The results indicated that the activity against *E. coli* was notably higher in the ethyl acetate and methanolic fractions, with MIC/MBC values of 0.019/0.078 mg/mL and 0.078/0.156 mg/mL, respectively, as shown in Tables. This could be attributed to the polar distribution of flavonoids, as suggested by Zhang et al. (2012). It is widely recognized that the bioactive compounds found in *Cordia dichotoma* and *Cordia myxa* affect bacteria through three distinct mechanisms: firstly, by inhibiting bacterial attachment; secondly, by inhibiting bacterial enzymes; and thirdly, by altering the structure of bacterial cell surface proteins, as described by Cowan (1999). Similarly, the proportion of *Pseudomonas aeruginosa* displayed high activity, with MIC/MBC values of 0.625/1.25 mg/mL.

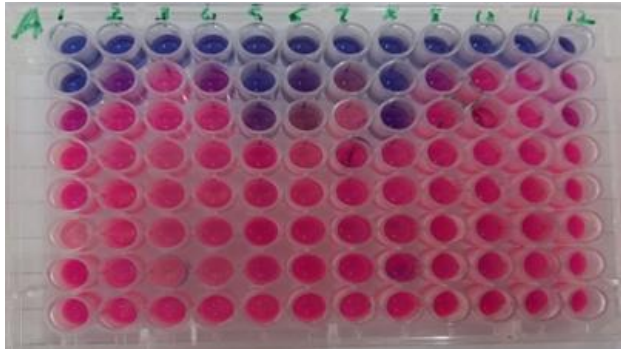


Figure 3. The 96-microplate assay of extract against *Pseudomonas aureginosa* and *Klebsiella pneumonia*.

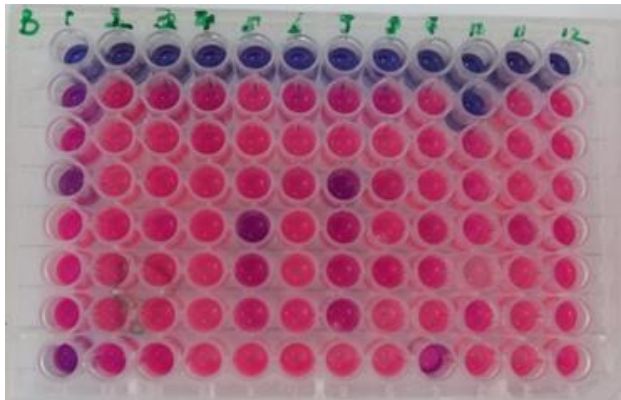


Figure 4. The 96 microwell plate assay of extract against *Staphylococcus aureus* and *E. Coli*.

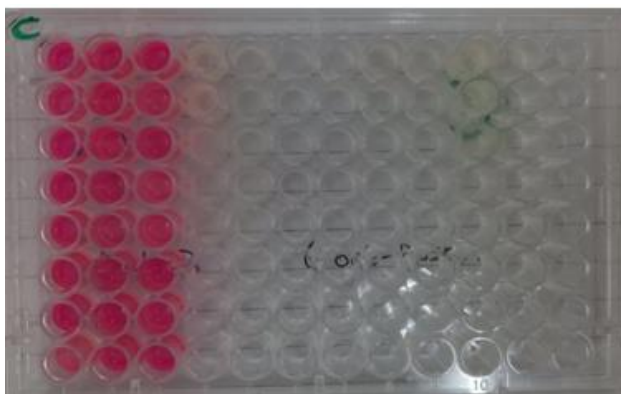


Figure 5. 96 microplate assays with controls *Staphylococcus aureus*; *Pseudomonas aeruginosa* and *Klebsiella pneumoniae*.

Anti-diabetic and Anti-inflammatory

The assessed fractions were subjected to an anti-diabetic assessment using the alpha-glucosidase inhibition assay. However, it was observed that the methanolic and ethyl acetate fractions exhibited greater effectiveness against alpha-glucosidase, with IC₅₀ values of 0.28 mg/mL for both fractions. In summary, all the samples investigated displayed activity in this regard (see Table). These findings are significant as there is no prior evidence suggesting that this plant has inhibitory effects on alpha-glucosidase. Lastly, the tested concentrations of *Cordia dichotoma* (46%) and *Cordia myxa* (42%)

displayed a mild to moderate inhibitory effect (15-lox inhibition).

Conclusion

As far as the result of phytochemicals is concerned, the results obtained from *Cordia dichotoma* and *Cordia myxa* are in accordance with the investigations revealed by Madhubala et al., 2019. Moreover, talking about the minerals possessed by these two species of the *Cordia* genus are already endorsed by Singh et al., 2024 which is similar to the previous findings. Measuring the oxidati, talkingnhibiting potency of *Cordia dichotoma* and *Cordia myxa* are discussed by Arunachalam et al., 2014 and hence the results are genuine. *Cordia dichotoma* and *Cordia myxa* can safely be used for infection because of having enormous antibacterial activity already discussed by Cowan (1999). Moreover isolation, characterization and classification of antibacterials are required in this regard. The power of *Cordia dichotoma* and *Cordia myxa* to keep the blood sugar at optimum level is another plus point of *Cordia* family. As results revealed and by already discussed by Abdel-Aleem et al., 2019. The results are significant achievement of uncovering the hidden mysteries of *Cordia dichotoma* and *Cordia myxa*. The power of *Cordia dichotoma* and *Cordia myxa* to control inflammation is another good habit of *Cordia* family. As results describe that are already discussed by Gupta et al., 2015. The results are significant achievement of uncovering the hidden potencies of these plants.

Contribution of authors

KZ designed the theme of the research and performed lab experiments. ASK helped in lab experiments and prepared the draft of the manuscript. AS helped in preparing the results and HG helped in analysis of the results.

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Conflict of Interest

No conflict of interest is found

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