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Original Article

Exploring the Phytochemical and Antioxidant Capacity of Selected Dracaena Leaves

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ABSTRACT

The research studies the phytochemical analysis and antioxidant potential of the leaves of Dracaena fragrans, Dracaena reflexa, Cordyline terminalis and Cordyline fruticosa, exhibiting data about their various secondary metabolites and free scavenging capacities. Using methanol and acetone solvents for cold extraction, we explored the phytochemical analysis of these cultivars, revealing an array of chemical compounds including alkaloids, proteins, glycosides, carbohydrates, phenols, and saponins. This study examines the total phenolic content, total flavonoid content, total tannin content, and antioxidant capacity of four different leaves. Dracaena fragrans exhibited the highest TPC in methanol extract 28.42±0.1 mg GAE/g and lowest in acetone 39.22±0.002 mg GAE/g. Dracaena reflexa has highest TFC was in methanol 106.3333±0.05 mg QE/g. Dracaena reflexa has highest TTC was in acetone 465.8571±0.07 mg TAE/g. These findings show high solvent efficiency in extracting bioactive compounds as evidence by lower IC50 Values indicating higher efficiency in neutralizing free radicals.

Keywords: Dracaena, Qualitative, Quantitative, Antioxidant assay

INTRODUCTION

Dracaena is among the most representative genera of the Asparagaceae, endemic in Africa, southern Asia, northern Australia, and tropical Central America, with approximately 120 species. Different species of *Dracaena* are used as ornamentals and medicinal plants, as well as colorants, etc. dracaena species are grown and sold as ornamentals in Europe and Canada owing to its richly colored evergreen leaves and thick irregular stems. (Ghalloo, B.A.,el al.,2022). *Dracaena* is one of the top ten important crops in floriculture around the world, and in the Netherlands, it is in the top five most exported pot plants, with an annual turnover of approximately 33 million euro. It is remarkable that, despite its importance, the taxonomy of various species remains unstable, while new species discovered on a regular basis. (Damen,T.H., *et al.*, 2018). *Dracaeana* species are among the most significant ornamental foliage plants in Europe, North America, Asia, and Africa. The most frequently cultivated species are *D. fragrans* (L) Ker Gawler, *D. marginata* Lam. Hort., *D.deremensis* Engl., *D. reflexa* Lam., and *D. sanderiana* Sander. (Klimko,M., and Wiland-Szymanska, J., 2008).

MATERIAL AND METHOD

Plant collection

The *Dracaena* varieties like *Dracaena reflexa, Dracaena fragrans, Cordyline terminalis* and *Cordyline fruticosa* collected from Gujarat University in January, 2025. Upon procurement careful selection of leaves were conducted to ensure superior Quality. Selected four types of leaves were dried in hot air oven at 50ºC for 2-3 days to remove moisture. The dried materials were grind to fine powder for extract preparation.

Extract preparation: 10g leaf powder was weighed and put to separate flasks followed by add 10ml methanol and acetone respectively. The flask was sealed with Aluminum foil and placed at room temperature for 24 hours. Following incubation, the extracts were filtered using whatman filter paper No.1 in pre-weighed petri dishes. The solvent was allowed to evaporate and the petri dishes were weighed again to calculate the extract yield. Extract`s yield was calculate using following formula. (EI Mannoubi, I.,

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2023). Yield (%) = A Mass of extract after solvent Evaporation/ Total mass of plant material*100.

Qualitative Phytochemical Analysis

Test for Alkaloid

A little portion of the crude extract was diluted in diluted hydrochloric acid and filtered.

Mayer's Test: Take 2ml of extract add 1ml of Mayer's reagent side by side; white creamy precipitate indicates the presence of alkaloids.

Wager's Test: Take 2ml of extract and add 2ml of wager's reagent side by side. Reddish Brown precipitate indicates the presence of Alkaloids.

Test for Phenols

Ferric Chloride Test: Mix 2ml extract with 1-2 Drops of 5% Ferric chloride, the bluish black colour indicates the presence of Phenols.

Lead Acetate Test: Mix 2ml extract with 0.5ml lead acetate, white precipitates indicate the presence of phenols.

Test for Flavonoids

Alkaline Test: 1ml extract with 10% sodium hydroxide; yellow colour was seen then add dilute Hydrochloric acid; yellow colour disappears that indicates presence of flavonoids.

Zinc-HCL Test: Take 1ml extract mix with Zinc dust and add Conc. HCL, Magenta colour Show the presence of Flavonoids.

Test for Tannins

Lead acetate Test: 1ml extract was treated with 10%lead acetate solution, resulting in white precipitates indicating tannins.

Ferric Chloride: 1ml extract was treated with 1ml 5% ferric chloride solution. The presence of tannin is indicated by the green hue.

Test for Lignin

Labat Test: 1ml extract and 1ml Gallic acid was taken, olive green precipitates show the presence of lignin.

Test for Steroid

Liberman Burchard's Test: In 1ml extract add 1ml chloroform with 2ml Acetic Anhydride and 1-2 drops H2SO4, Array of colour change Blue- green- Red (ring at junction) is seen.

Test for Terpenoids

Salkoski Test: Take 1ml extract treated with 1ml chloroform, filter it and add 1ml conc. H2SO4, yellow precipitates show that terpenoid is present. (Banu, K. S. and Cathrine, L., 2015)

Quantitative Analysis:

Total Phenolic Content: Leaf of selected four *Dracaena* Varieties Total Phenolic content were determined by folin-ciocalteu reagent method. 1ml extract of four selected leaf standard Gallic acid (10-100 µg/ml) were taken and 1.5ml 1N folin-ciocalteu reagent added. 10ml distilled water and 4ml 20% sodium carbonate added. Make final volume upto 25ml with distilled water. After 30 minutes of incubation, the absorbance at 765nm was measured using UV visible spectrophotometer. A result of total phenolic content of leaves was representing as a milligram Gallic acid equivalent per gram (mg GAE/g). (Sembiring *et al*., 2018).

Total Flavonoid Content: Leaf of selected four *Dracaena* varieties total Flavonoid Content were determined by Aluminum Chloride method. 1ml extract of four selected leaf and standard Quercetin (100-1000 µg/ml) were taken and 0.3 ml 5% sodium nitrate added. Followed by 0.3 ml 10% Aluminium Chloride added. 2ml 1M sodium hydrocside were added. Make final volume upto 10ml with distilled water. Absorbance at 510nm was measured using UV visible spectrophotometer (Shimadzu UV-1800, Shimadzu corporation Kyoto, Japan). A result of total flavonoid content of leaves was reported as a milligram Quercetin equivalent per gram (mg QE/g). (Quettier-deleu *et al.*, 2000).

Total Tannin Content: Total Tannin Content of selected four Dracaena varieties leaves were determined by Folin-Denis method. 1ml extract of four selected leaf and standard tannic acid (100-1000 µg/ml) were taken and 0.1 ml 1N folin-Denis reagent added. Followed by 1 ml 7.5% sodium carbonate

added. Make final volume upto 10ml with distilled water. Absorbance at 510nm was measured using UV visible spectrophotometer (Shimadzu UV-1800, Shimadzu corporation Kyoto, Japan). A result of total tannin content of leaves was reported as a milligram tannin equivalent per gram (mg TE/g). (Vala, M, and Maitreya,B., 2022).

Antioxidant Activity

DPPH Radicle Scavenging Activity

The DPPH (2, 2 -diphenyl-1-picryhydrazyl) method was used to determine the antioxidant activity (DPPH scavenging activity) of selected four Dracaena varieties leaves. Take 200-1000 extract and 100-1000 mg/ml Ascorbic acid standard and make final volume 1ml using methanol and acetone solvent and 3ml DPPH solution was added followed by, incubate for 30min in dark condition and the absorbance at 517nm was measured using UV-visible spectrophotometer (Shimadzu UV-1800, Shimadzu corporation Kyoto, Japan). Check the inhibition using following formula.

Inhibition (%) = Control – Test/Control×100

Where, Control is the absorbance of the control (DPPH solution without the addition of Leaf extract) and Test is the absorbance of reaction mixture samples (in the presence of Leaf extract). IC_{50} value obtained from the results of DPPH method, indicates the sample quantity was derived from a correlating the discoloration of the sample with its concentration. (Stankovic, M. S. 2011)

RESULTS

Yield of extract

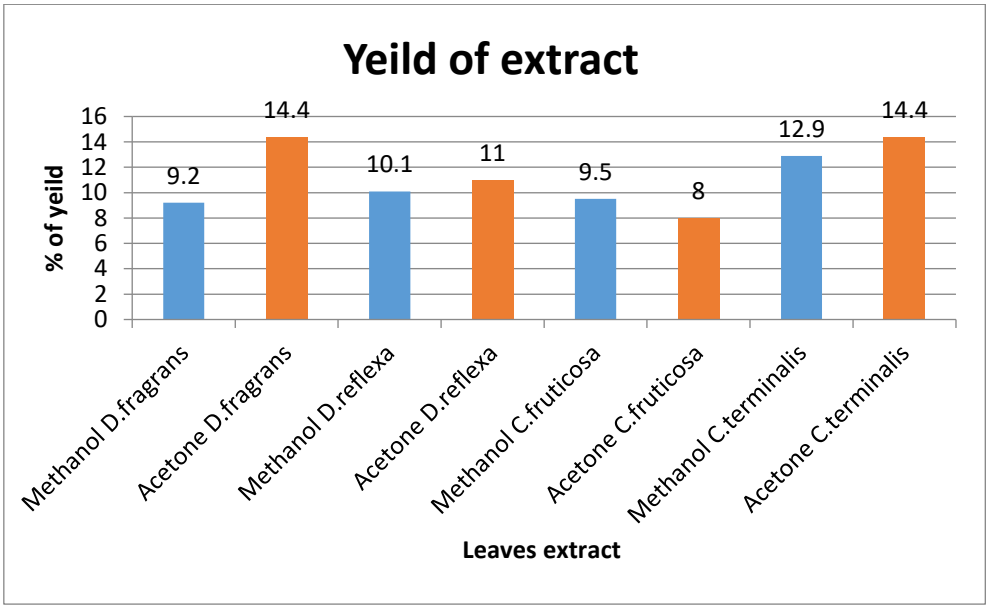

Figure: 1 yield of selected four Varieties of *Dracaena* Leaf Extract.

Figure 1 shows 9.2 and 14.4 percentage yield in methanol and acetone extract of *Dracaena fragrans* leaves respectively. *Dracaena reflexa* leaves shows 10.1 percentage in methanol and 11 percentages in acetone solvent`s extract. *Cordyline fruticosa* leaves shows 9.5%, and 8 percentages respectively in methanol and acetone solvent`s extract respectively. *Cordyline terminalis* leaf methanol and acetone extract shows the 12.9 and 14.4 percentage yield respectively.

Qualitative Analysis

Table 1: Qualitative Phytochemical Screening of four Dracaena Varieties leaf.

Phytochemical	Test	*D.fragrans*		*D.reflexa*		*C.fruticosa*		*C.terminalis*	
		Methanol	Acetone	Methanol	Acetone	Methanol	Acetone	Methanol	Acetone
Phenol	Ferric Chloride Test	+	-	-	-	+	+	-	+

	Lead Acetate Test	+	+	+	+	+	+	+	+
Flavonoid	Alkaline Test	+	+	+	+	+	+	-	+
	Zinc-HCL	-	+	-	-	-	+	-	+
Tannin	Lead Acetate Test	+	+	+	+	+	+	+	+
	Ferric Chloride Test	+	+	-	+	+	+	-	+
Lignin	Labat Test	-	-	+	-	-	+	-	-
Alkaloids	Mayer`s test	-	+	-	-	+	+	-	-
	Wagner`s test	+	-	-	-	-	-	-	+
Terpenoids	Salkoski`I Test	-	+	-	+	-	-	+	-
Steroids	Liberman Burchard`s Test	-	-	-	-	+	-	+	-

Phytochemical constituents include Alkaloids, Flavonoids, Tannin, Phenols, and Lignin. According to table 1, the preliminary phytochemical screening of selected leaf reveals the presence of phytochemical in methanol and acetone extract. Certain test for flavonoids reveals the existence of phytochemical in selected leaf in both Methanol and Acetone extract. Additionally, testing for phenol have shown that these phytochemicals are present in *Dracaena fragrans*, *Dracaena reflexa*, *Cordyline terminalis*, *Cordyline fruticosa* in methanolic extract. Similar to this, testing of phenol, alkaloids have shown that *Dracaena fragrans*, *Dracarna reflexa* and *Cordyline fruticosa* contain these phytochemicals in acetone extract. Lignin indicating their presence in *Dracaena reflexa* and *Dracaena fruticosa* leaves.

Quantitative Analysis:

Table 2: Total Phenol, Flavonoid and Tannin Content of four selected Dracaena Varieties leaf.

Plant Name	solvent	TPC	TFC	TTC
Dracaena fragrans	Methanol	28.42 ± 0.1	869.66±0.01	0.194±0.009
	Acetone	39.22±0.002	1794.75±0.07	0.413±0.03
Dracaena reflexa	Methanol	7.62±0.01	106±0.05	0.157±0.007
	Acetone	40.62±0.07	1579.75±0.02	0.424±0.07
Cordyline terminalis	Methanol	29.62±0.05	616.33±0.02	0.336±0.04
	Acetone	36.82±0.01	1366±0.003	0.42±0.05
cordyline fruticosa	Methanol	36.12±0.06	444.66±0.006	0.186±0.01
	Acetone	49.32±0.02	1119.75±0.2	0.346±0.01

Result shows as Mean ± Standard deviation. In this result TPC means Total Phenolic Content, TFC means Total Flavonoid Content, TTC means Total Tannin Content.

Total Phenolic Content:

Table 2 shows the Total Phenolic Content of selected four-leaf extract. *Dracaena fragrans* shows 28.42±0.1 mg GAE/g Phenol in methanolic extract and 39.22±0.002mg GAE/g in acetone extract. *Dracaena reflexa* methanol extract shows 7.62±0.01mg GAE/g phenolic content and acetone extract shows the phenol content 40.62±0.01mg GAE/g. *Cordyline terminalis* shows 29.62±0.05mg GAE/g phenolic content methanol extract and 36.82±0.01mg GAE/g phenolic content acetone extract. *Cordyline fruticosa* shows 36.12±0.06mg GAE/g phenolic content in methanol extract and 49.32±0.02mg GAE/g phenolic content in acetone extract.

Total Flavonoid Content:

Table 2 also shows the Total Flavonoid content of selected four leaf extract. *Dracaena fragrans* has 869.6667±0.01mg QE/g TFC in methanolic extract and 1794.75±0.07mg QE/g in acetone extract. *Dracaena reflexa* has 106.33±0.05mg QE/g TFC in methanolic extract and 1579.75±0.02mg QE/g TFC in acetone extract. *Cordyline terminalis* show 616.3333±0.02mg QE/g TFC in methanolic extract and 1119.7567±0.2mg QE/g TFC in acetone extract. *Cordyline fruticosa* show 444.6667±0.006mg QE/g TFC in methanolic extract extract and 1366±0.003mg QE/g in acetone extract.

Total Tannin Content:

Table 2 shows the total tannin contentof selected four leaf extract. *Dracaena fragrans* has 0.194±0.009mg TE/g TTC in methanolic ectract and 0.4135±0.03mg TE/g in acetone extract. *Dracaena reflexa* has 0.1575±0.007mg TE/g TTC in methanolic extract and 0.424±0.07mg TE/g TTC in acetone extract. *Cordyline terminalis* shows 0.3365±0.04mTE/g TTC in methanolic extract and 0.42±0.05mg TE/g TTC in acetone extract. *Cordyline fruticosa* show 0.1865±0.01mg TE/g TTC in methanolic extract and 0.3465±0.01mg TE/g TTC in acetone extract.

Antioxidant activity

DPPH Radical scavenging activity

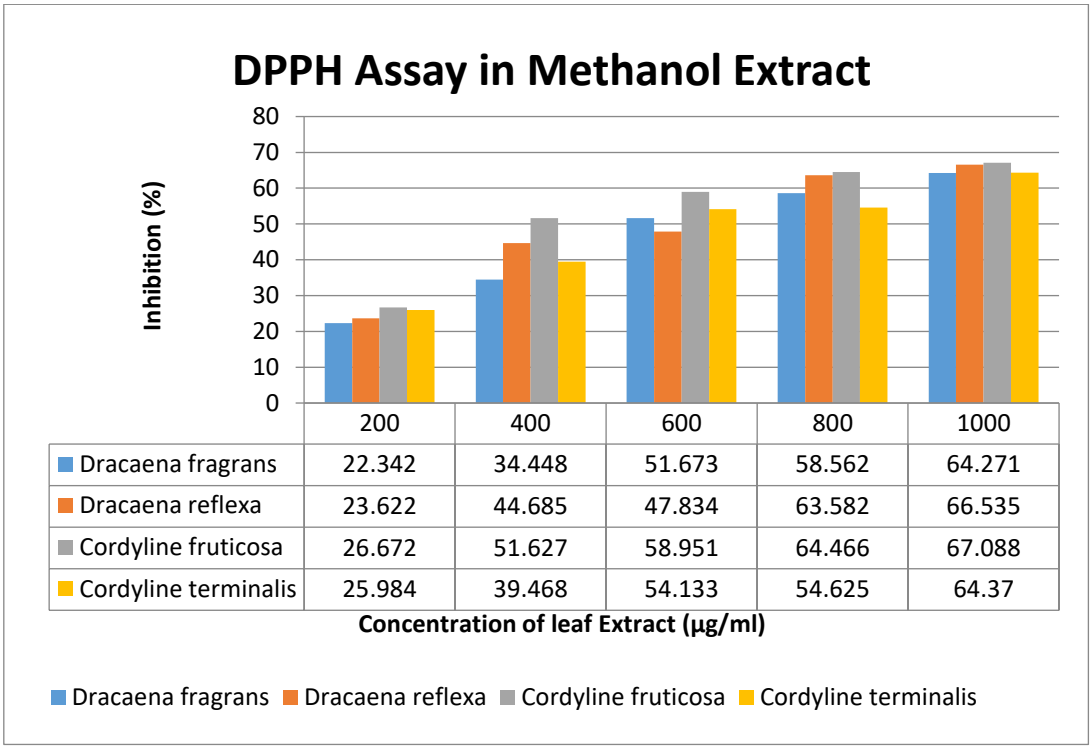

Figure: DPPH scavenging activity of selected leaf in Methanol extract.

Figure 2 shows the DPPH scavenging activity of four of Dracaena varieties in methanol extract. *Dracaena fragrans* shows 64.27 percentage inhibition at 1000 µg/ml concentration, 58.56 percentage inhibition at 800 µg/ml concentration, 51.67 percentage inhibition at 600 µg/ml concentration, 34.44 percentage inhibition at 400 µg/ml concentration, 22.34 percentage inhibition at 200 µg/ml concentration respectively. *Dracaena reflexa* shows 66.53 percentage inhibition at 1000 µg/ml concentration, 63.58 percentage inhibition at 800 µg/ml concentration, 47.83 percentage inhibition at 600 µg/ml concentration, 44.68 percentage inhibition at 400 µg/ml concentration, 23.62 percentage inhibition at 200 µg/ml concentration. *Cordyline fruticosa* shows 67.08 percentage inhibition at 1000 µg/ml concentration, 64.46 percentage inhibition at 800 µg/ml concentration, 58.95 percentage inhibition at 600 µg/ml concentration, 51.62 percentage inhibition at 400 µg/ml concentration, 26.67 percentage inhibition at 200 µg/ml concentration respectively. *Cordyline terminalis* shows 64.37 percentage inhibition at 1000 µg/ml concentration, 54.62 percentage inhibition at 800 µg/ml concentration, 54.13 percentage inhibition at 600 µg/ml concentration, 39.46 percentage inhibition at 400

µg/ml concentration, 25.98 percentage inhibition at 200 µg/ml concentration.

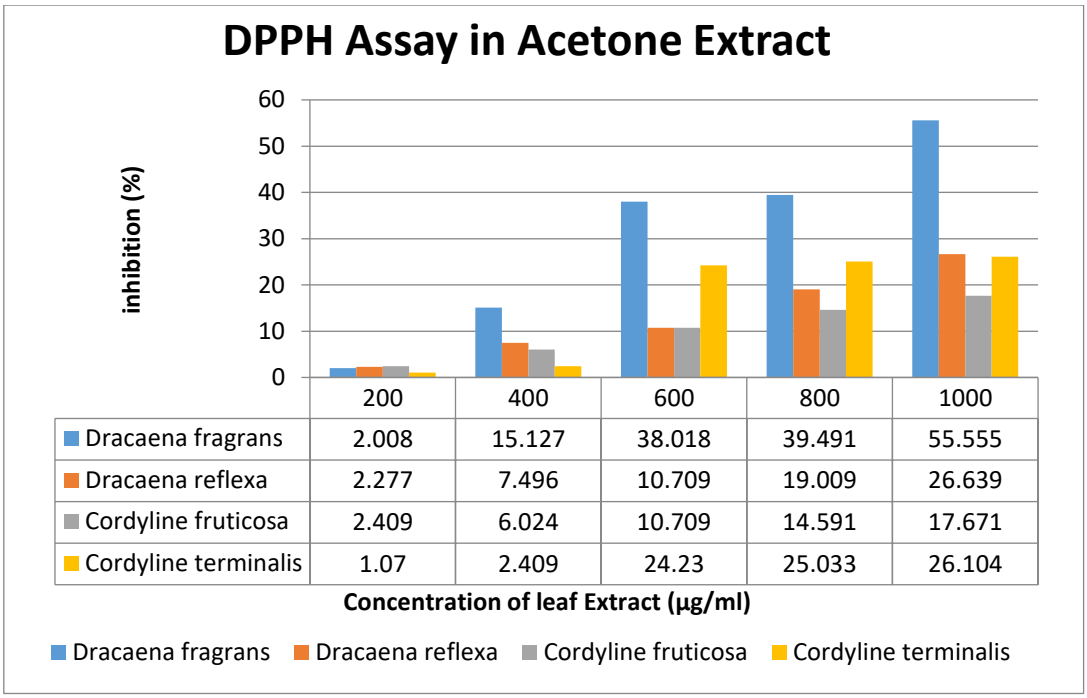

Figure 3: DPPH Scavenging activity of selected leaf in Acetone extract.

Figure 3 shows the DPPH scavenging activity of four *Dracaena* varieties in Acetone extract. *Dracaena fragrans* shows 55.55 percentage inhibition at 1000 µg/ml, 39.49 percentage inhibition at 800µg/ml concentration, 38.02 percentage inhibition at 600 µg/ml concentration, 15.12 percentage inhibition at 400 µg/ml concentration, 2 percentage inhibition at 200 µg/ml concentration. *Dracaena reflexa* shows 26.63 percentage inhibition at 1000 µg/ml, 19 percentage inhibition at 800µg/ml concentration, 10.7 percentage inhibition at 600 µg/ml concentration, 7.4 percentage inhibition at 400 µg/ml concentration, 2.2 percentage inhibition at 200 µg/ml concentration. *Cordyline terminalis* shows 17.67 percentage inhibition at 1000 µg/ml, 14.59 percentage inhibition at 800µg/ml concentration, 10.7percentage inhibition at 600 µg/ml concentration, 6.02 percentage inhibition at 400 µg/ml concentration, 2.4 percentage inhibition at 200 µg/ml concentration. *Cordyline fruticosa* shows 26.1 percentage inhibition at 1000 µg/ml, 25.03 percentage inhibition at 800µg/ml concentration, 24.23 percentage inhibition at 600 µg/ml concentration, 2.4 percentage inhibition at 400 µg/ml concentration, 1.07 percentage inhibition at 200 µg/ml concentration.

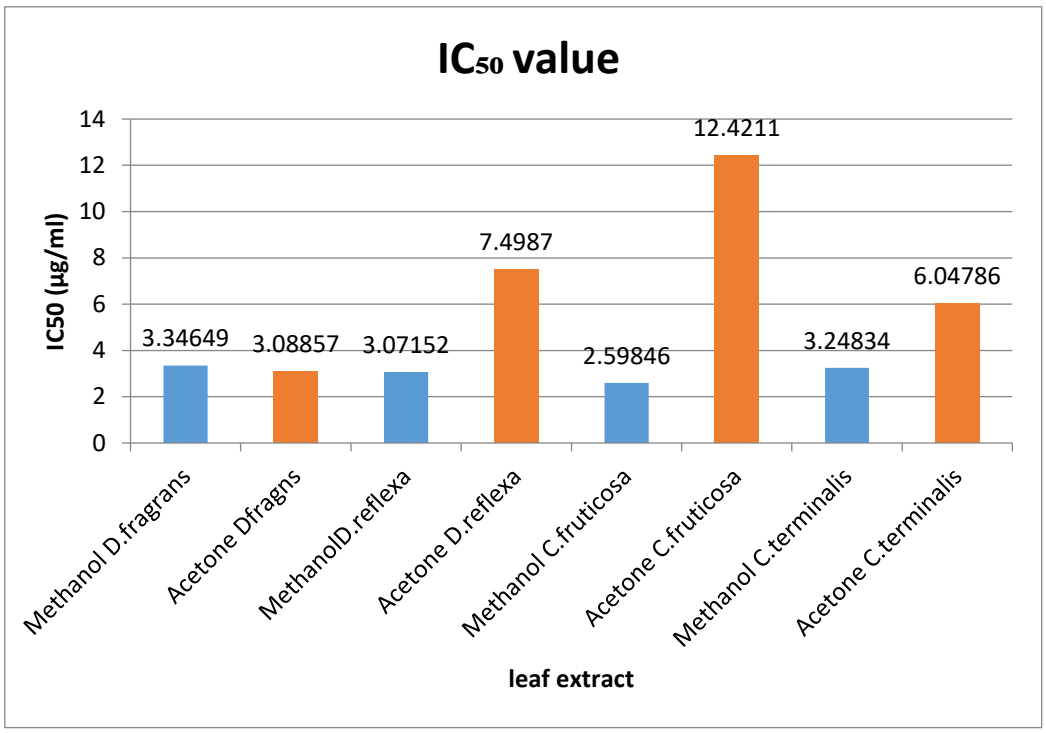

Figure 4: IC_{50} Values of antioxidant activity (DPPH) of selected Dracaena varieties leaves.

The results in above data in figure 4 shows the IC_{50} value of antioxidant activity (DPPH) for extracts in methanolic solvent the *D.fragrans* shows minimum 3.08857 in Acetone solvent and maximum 3.34649 in Methanol solvent. *D.reflexa* shows minimum 3.07152 and maximum 7.4987 in Acetone solvent. *C.terminalis* shows minimum 3.24834 in Methanol solvent and maximum 6.04786 in acetone solvent. *C.fruticosa* shows minimum 2.59846 in Methanol solvent and maximum 12.4211 in Acetone solvent.

DISCUSSION

Phytochemicals like, phenol, Flavonoid, Tannin, alkaloids, and lignin are found present in the selected dracaena varieties leaves. *Cordyline fruticosa* shows the highest phenolic content in acetone extract than methanol extract over four selected varieties and *Dracaena fragrans* shows the slight less TPC than *Cordyline fruticosa* in both the extract. Total Flavonoid content found in Methanol and Acetone both the extract in four selected varieties and highest amount of TFC was found in *Dracaena fragrans* leaf extract. Methanol extract of four selected leaf shows the more percentage inhibition than acetone extract. Methanol extract also shows low IC_{50} value which indicates the methanol extract has more DPPH scavenging activity than acetone extract. *Cordyline fruticosa* has high percentage inhibition and less IC_{50} value than four selected leaf, demonstrate the more DPPH scavenging activity.

CONCLUSION

This study demonstrates the selected four *Dracaena* leaves contain a varied range of secondary metabolites with considerable antioxidant capabilities, particularly when extracted with methanol. Phytochemical tests reveal that these extracts are high in alkaloids, phenol, flavonoid, Tannin and lignin with methanol extract containing more Total phenolic content and acetone extract including more Total flavonoid content methanol extract also shows greater DPPH scavenging activity, as evidenced by lower IC_{50} values. Further study should look at these phytochemicals' bioavailability and therapeutic potential in clinical settings, as well as their mechanisms of action and the development of optimal extraction procedures to improve their antioxidant efficiency for pharmaceutical applications

REFERENCE

1. Banu, K. S., & Cathrine, L. (2015). General techniques involved in phytochemical analysis. International journal of advanced research in chemical science, 2(4), 25-32.
2. Damen, T. H., Van der Burg, W. J., Wiland-Szymańska, J., & Sosef, M. S. M. (2018). Taxonomic novelties in African Dracaena

(Dracaenaceae). Blumea-Biodiversity, Evolution and Biogeography of Plants, 63(1), 31-53.

3. E1 Mannoubi, I. (2023). Impact of different solvents on extraction yield, phenolic composition, in vitro antioxidant and antibacterial activities of deseeded Opuntia stricta fruit. Journal of Umm Al-Qura University for Applied Sciences, 1-9.
4. Ghalloo, B. A., Khan, K. U. R., Ahmad, S., Aati, H. Y., Al-Qahtani, J. H., Ali, B., ... & Ahmed, I. (2022). Phytochemical profiling, in vitro biological activities, and in silico molecular docking studies of Dracaena reflexa. Molecules, 27(3), 913.
5. Klimko, M., & Wiland-Szymanska, J. (2008). Scanning electron microscopic studies of leaf surface in taxa of genus Dracaena L. (Dracaenaceae). Roczniki Akademii Rolniczej w Poznaniu. Botanika-Steciana, (12).
6. Quettier-Deleu, C., Gressier, B., Vasseur, J., Dine, T., Brunet C., Luyckx, M., …& Trotin, F. (2000). Phenolic compounds and antioxidant activity of buckwheat (Fagopyrum esculentum Moench) hulls and flour. Journal of ethnopharmacology, 72(1-2), 35-42.
7. Sembiring, E. N., Elya, B., & Sauriasari, R. (2018). Phytochemical sceening, total flavonoid and total phenolic content and antioxidant activity of different parts of Caesalpinia bonduc (L.) Roxb. Pharmacognosy journal, 10(1).
8. Stankovic, M. S. (2011). Total phenolic content, flavonoid concentration and antioxidant activity of Marrubium peregrinum L. extracts. Kragujevac J Sci, 33(2011), 63-72.
9. Vala, M., & Maitreya, B. (2022). Phytochemical analysis and total tannin content (TTC) of Delonix regia (Bojer ex. Hook) Raf. Bark by using different solvents collected from Saurashtra region. Int Assoc Biol Comput Dig, 1(2), 144-148.

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