

## Phytochemical Analysis, Anti-Oxidant And Anti-Inflammatory Activity of *Crinum Brachynema* Leaves, Flowers And Fruits

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### Abstract

*Crinum brachynema* is a herbal and very plant. There is no report in literature about the phytochemical analysis, antioxidant and anti-inflammatory activity of *Crinum brachynema* plant. In this present study, leaves, flowers and fruits extract were used for phytochemical analysis and their antioxidant and anti-inflammatory properties determined using a known protocol. The leaves, fruits and flowers extract have shown the presence of various important active constituents as well as demonstrated effective activity against the free radicals or antioxidant activity. The water and ethanol extract of the leaves and flowers showed excellent anti-inflammatory activity than the fruits extract of *Crinum brachynema* plant.

**Keywords:** *Crinum brachynema*, Anti-inflammatory, Antioxidants, Phytochemicals, Radicals, Scavenging.

### Introduction

Plants produce a significant provenance of effective natural products which fluctuate enormously in mechanism of actions, genetic properties as well as chemical structures. For healing various diseases, plants have been extensively used since lots of centuries<sup>1</sup>. Plant extracts for traditional medicine has proved to be clinically excellent and relatively fewer toxicity than the existing drugs. The abundant of primary and secondary metabolites in stems, roots, flowers, leaves as well as roots with unidentified biological activity. Hence searching for and identifying novel phytochemicals is a massive field of research<sup>2</sup>. Lots of free radicals accountable for oxidative stress, thus they able to induce deterioration of lipids, DNA molecules and proteins in biological systems, causing several diseases such as rheumatism and coronary vein diseases.<sup>3</sup> Antioxidants are extremely able to impede or avoid oxidation of leading substances through free radical scavenging. Free radicals causes oxidative stress<sup>4</sup>. It leads to diseases like cancer, diabetes, heart disease if free radical level in body become high. Thus antioxidants are necessary for normal physiological function in body. Antioxidants counteract oxidative stress and keep free radicals in control. They works as a preservatives as well as increase shelf life of natural and processed food. Inflammation is biological response of immune system of living organism to defend body from injury, infection, irritation. Sign of inflammation like headache, swelling, redness, pain can be reduce using anti inflammatory compounds<sup>5</sup>. Phytochemicals in plants shows health benefit as they useful for anti oxidants and anti-inflammatory properties.

The herbal *Crinum brachynema* plant found in western ghats of Maharashtra, India. It is a bulbous herb having 30-60 cm in height. The bright to dark green colored leaves are develops after the flowers. The fruits of *Crinum brachynema* plant has spherical shape. The leaves are straight, folded with slight curve at upper side. The Stalk of the flower is almost rounded at cross section. The flowers are develops in an umbel. The petals and sepals are collectively funnel shaped. The flowering starts in month of May and June<sup>6</sup>. It will be used commercially in pharmaceutical and perfume industries<sup>7</sup>. Till now, there is no material available on antioxidant as well as anti inflammatory activities and phytochemical analysis of *Crinum brachynema* in literature. The present study, first effort aimed to explore the phytochemical, anti-inflammatory activities as well as antioxidant study of flowers, leaves and fruits of plant *Crinum brachynema*.

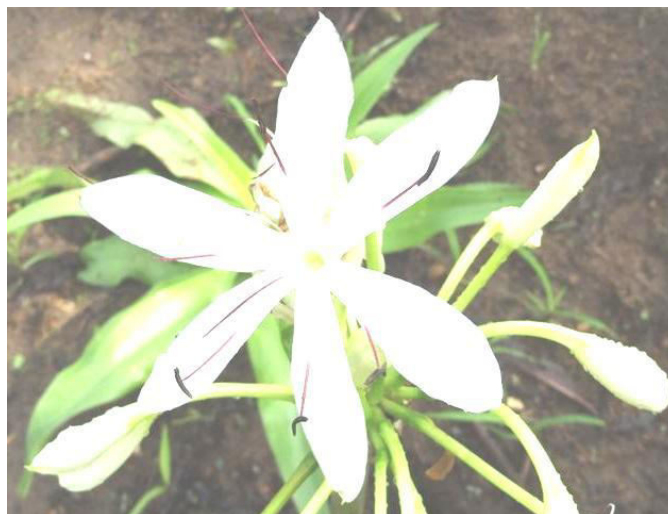


Figure.1.Crinum brachynema plant

## Materials and Methods

### Chemicals

All chemicals used were of analytical grades and purchased from the Loba chemicals, Mumbai, India

### Collection of Plant

The *Crinum brachynema* plant was collected from the Rajapur tehsil of Maharashtra state of India. The plants flowers, fruits and leaves of *Crinum brachynema* plants were dried in shade for 21 days, then dried in an oven at 313 K for five hrs. Afterwards, crushed leaves, flowers and fruits specimens into a fine powder. The powder of all specimens were kept in glass bottles under an isolated atmosphere. Phytochemical analysis carried out by given protocol and then antioxidant and anti-inflammatory biological activity were carried using suitable protocol. The leaves, flowers and fruits extract of *Crinum brachynema* plant were named as CB-L, CB -F and CB -Fr respectively.

### Phytochemical Analysis

The phytochemical testing was carried for the CB-L, CB -F and CB -Fr extracts for saponins, terpenoids, flavonoids, cardio glycosides, steroid, alkaloids, anthraquinones, tannins, and phenolic compounds using the fixed protocols. The results obtained are tabulated in table 2.

Table 1. Qualitative analysis of phytochemicals of CB-L, CB-F and CB-Fr

Phytochemical Tested	Test Performed	CB-L	CB-F	CB-Fr
Tanins	Ferric chloride test <sup>8</sup>	+	+	+
Saponnins	Frothing test <sup>9</sup>	+	+	+
Steroid	Liebermann- Burchard test <sup>10</sup>	+	+	+
Alkaloids	Wagner's test <sup>11</sup>	+	+	+
Flavonoids	Alkaline reagent test <sup>11</sup>	+	+	+
Terpenoids	Salkowski's test <sup>12</sup>	+	+	+
Cardio glycosides	Keller Kaliani's test <sup>13</sup>	+	-	-
Anthraquinones	Bortrager's test <sup>14</sup>	+	+	+
Phenolic compounds	Ferric chloride test <sup>14</sup>	+	+	+

\*+ = present , - = absent

#### Determination of antioxidant activity of *Crinum brachynema* plant

Antioxidant activity was studied for the CB-L, CB-F and CB-Fr by using DPPH radical assays.

#### DPPH radical assay

$$\text{percentage inhibition} = \left[ \frac{\text{Abs}_{\text{control}} - \text{Abs}_{\text{sample}}}{\text{Abs}_{\text{control}}} \right] \times 100 \quad (1)$$

Where,  $\text{Abs}_{\text{control}}$  is the absorbance of the control reaction

$\text{Abs}_{\text{sample}}$  is the absorbance of CB-L, CB-F and CB-Fr.

The scavenging potency of DPPH radical of CB-L, CB-F and CB-Fr was confirmed<sup>15</sup>. The absorbance at 510 nm was measured to evaluate of DPPH remaining amount. Butylated hydroxytoluene (BHT) was employed as a standard. DPPH activity studied at various concentrations as from 0.05, 0.1, 0.2 and 0.3 mg/ml. Calculation of the ability to scavenge DPPH radicals was using the equation 1.

#### In-Vitro anti-inflammatory activity

The albumin denaturation method by Mizushima and Kobayashi in 1968 is followed by modification<sup>16</sup>. This reaction consists of the test extract with the 1 % aqueous solution bovine as an albumin fraction. The pH of this reaction mixture was adjusted at 310 K. These are incubated at 310 K for 1200 seconds, and heated above 312 K for 1200 seconds. Then cooled, the turbidity formed in the solution was measured using the spectrophotometer at 660 nm. The percentage inhibition of protein as denaturation was calculated by using equation 2.

$$\text{percentage inhibition} = \left[ \frac{\text{Abs}_{\text{control}} - \text{Abs}_{\text{sample}}}{\text{Abs}_{\text{control}}} \right] \times 100 \quad (2)$$

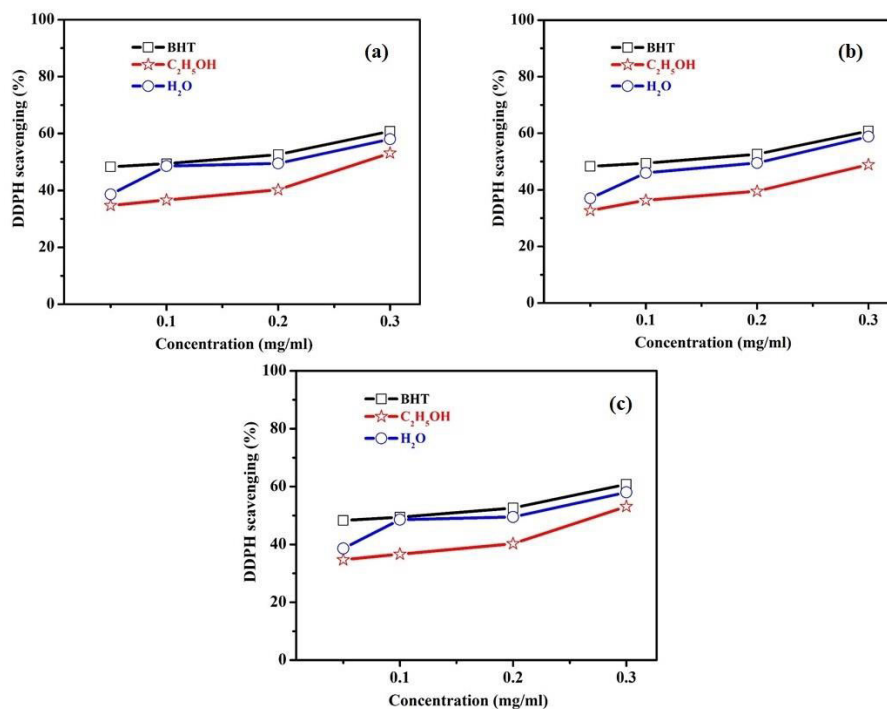
where  $\text{Abs}_{\text{control}}$  is the absorbance of the DPPH radical with ethanol,

$\text{Abs}_{\text{sample}}$  is the absorbance of DPPH radical with sample extract/standard.

#### Result and Discussion

In the current study, the extract of *Crinum brachynema* was revealed to primary phytochemical analysis. The extracts of plant samples shown the existence of different phytochemicals based on their polarity, extracting those plant metabolites of hydrophilic and hydrophobic nature. In this study, the *Crinum brachynema* plant was screened for phytochemistry antioxidant as well as anti-inflammatory activity. The fruits, flowers and leaves extract of *Crinum brachynema* plant were subjected to the various phytochemical tests, the tests were positive for various phytochemical shown in table 1.

### Antioxidant Activity Determination



**Fig.2. Antioxidant activity of a) DPPH radical activity of CB-L b) DPPH radical activity of CB-F c) DPPH radical activity of CB-Fr.**

**DPPH Scavenging Test:** Quantitative measurement of radical scavenging property of CB-L, CB-F, and CB-Fr. Fig. 2 shown the antioxidant activity of CB-L, CB-F, and CB-Fr. The ethanolic and water extract were used for the antioxidant activity by the DPPH assays and showed excellent activity compared with standard drugs. Table 2 and 3 shown tharethanol andwater extract showed a good antioxidant activity.

**Table 2.**Antioxidant activity ofCB-L

Extract conc. mg/ml	BHT	Ethanol	Water
0.05	48.31	34.71	38.59
0.1	49.41	36.65	48.57
0.2	52.61	40.25	49.51
0.3	60.81	53.13	58.01

**Table 3.**Antioxidant activity of CB-F

Extract conc. mg/mL	BHT	Ethanol	Water
0.05	48.31	32.71	37.01
0.1	49.41	36.31	46.01
0.2	52.61	39.51	49.51
0.3	60.81	48.91	58.80

**Table 4.**Antioxidant activity of CB-Fr

Extract conc. mg/mL	BHT	Ethanol	Water
0.05	48.31	27.01	42.79
0.1	49.41	36.30	44.91
0.2	52.61	39.50	50.51
0.3	60.81	48.91	59.80

**Determination of Anti-inflammatory Activity**

anti-inflammatory activity Studies through in-vitro models were carried out on CB-L, CB-F, and CB-Fr by inhibition of the albumin denaturation. This was investigated according to Mizushima and Kobayashi with slight modification at the doses of 200 mg/kg<sup>17</sup>. The results are tabulated in table 5-7.

**Table 5.**Anti-inflammatory activity of CB-L

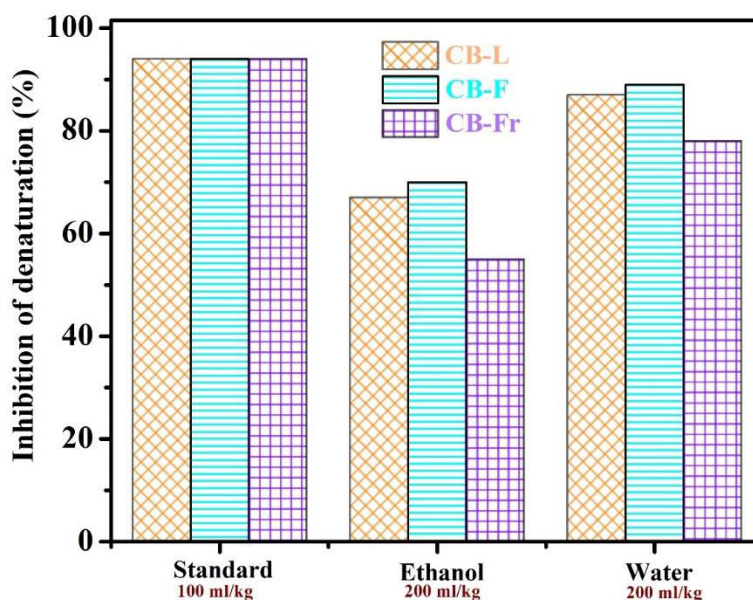
In-vitro Anti-inflammatory activity	Dose (mg / kg)	Absorbance value (Mean + SE )	Inhibition of denaturation (%)
Control	5mg/ kg	0.096	----
Standard (Ibuprofen)	100mg/kg	0.20	94
Ethanol extract	200mg/kg	0.18	67
Water extract	200mg/kg	0.16	87

**Table 6.**Anti-inflammatory activity of CB-F

In-vitro Anti-inflammatory activity	Dose (mg / kg)	Absorbance value (Mean + SE )	Inhibition of denaturation (%)
Control	100 mg/Kg	0.096	----
Standard (Ibuprofen)	100mg/kg	0.20	94
Ethanol extract	200mg/kg	0.14	70
Water extract	200mg/kg	0.12	89

**Table 7.** Anti-inflammatory activity of CB-Fr

In-vitro Anti-inflammatory activity	Dose (mg / kg)	Absorbance value (Mean + SE )	Inhibition of denaturation (%)
Control	5mg/ kg	0.096	----
Standard (Ibuprofen)	100mg/kg	0.20	94
Ethanol extract	200mg/kg	0.18	55
Water extract	200mg/kg	0.16	78

**Fig.3.** % inhibition of CB-L, CB-F and Cb-Fr for standard, Ethanol and water

The result of the anti-inflammatory study showed the inhibition of albumin denaturation by the flowers, fruits and leaves of the *Crinum brachynema* plant. Fig. 3 displayed the water and ethanol extract of the leaves and flowers showed excellent anti-inflammatory activity than the fruits extract of *Crinum brachynema* plant.

### Conclusion

In this present study, First time reported the phytochemical analysis, anti-inflammatory and antioxidant activity for herbal *Crinum brachynema* plant. Various phytochemicals presence in the leaves, flowers and fruit extract of the *Crinum brachynema* plant. The leaves and flowers revealed an excellent antioxidant and anti-inflammatory activity than the fruits of the *Crinum brachynema* plant. The extract of leaves, fruits and flowers extract a natural antioxidant and anti-inflammatory agent.

### Conflict of interest

Authors do not have any conflict of interests to declare.

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