



Phytochemical Estimation Of Ethno- Medicinal Plant Of *Balanites Aegyptiaca* (L.) Of Dang Area Of Dholpur District, Rajasthan (India)

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ABSTRACT-

The present work was undertaken to analysis of the phytochemical compounds present in the root, fruit and bark of ethnomedicinal plant of *Balanites aegyptiaca* (L.) belonging to Zygophyllaceae family in dang area of Dholpur district of Rajasthan. Ethnomedicinal plants have bioactive compounds such as alkaloids, flavonoids, steroids, phenols and tannins which are used to curative various human ailments and also play an important role in healing.

Keywords- Ethnobotany, Phytochemicals, Bioactive, Alkaloids, Compounds.

INTRODUCTION-

The ethnomedicinal plants are useful for therapeutic as well as for curing of human diseases because of the existence of phytochemical compounds. Phytochemicals are naturally stirring in the medicinal plants, leaves, vegetables and roots that have protection mechanism and protect from various diseases. Mainly phytochemicals are two types - primary and secondary compounds. Chlorophyll, proteins, carbohydrates and common sugars are incorporated in primary constituents and secondary compounds have flavonoids, alkaloids and phenolic compounds. These compounds show confirmation of various vital pharmacological activities i.e. anti-inflammatory, anticancer, anti-malarial, inhibition of cholesterol synthesis, anti-viral and anti-bacterial activities. Alkaloids used as anesthetic agents are found in medicinal plants. Plant chemicals are regarded as secondary metabolites because the plants that manufacture them may have little need for them. They are synthesized in all parts of the plant body like bark, leaves, stem, root, flower, fruits, seeds etc. Currently, the global demand of herbal medicines is increasing rapidly because of their higher safety margin and low cost.

The current study exposed the qualitative phytochemistry of medicinal plant used by the people of Dholpur district, Rajasthan in curing dreadful ailments of human on one hand and cattle on the other hand.

Study Area –

Dang area is one of the most resource dispossessed and arid region of Rajasthan state marked with degraded ravines, barren land and severe water shortage. Dholpur district with an area of 3034 square kilometers is located in eastern most extremity of the state of Rajasthan and lies between latitudes 22o21’19” and 26o57’33” North and longitude 77o13’06” and 78o16’45” East.



Fig. Map of Rajasthan state showing study area (source: Atlas of Rajasthan)



Fig. Dang area of study in Dholpur District, Rajasthan

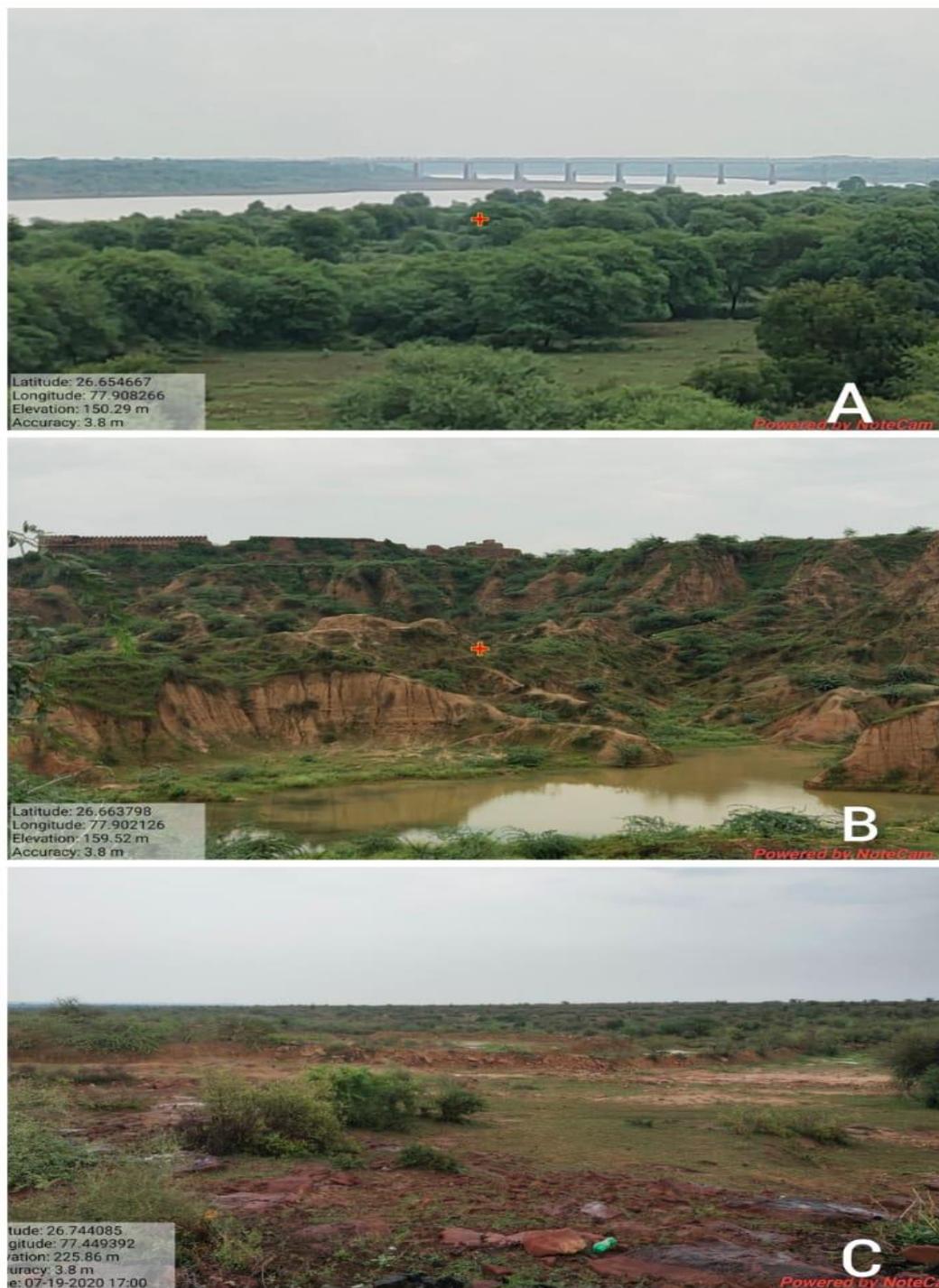


Fig. Habitat of rich biodiversity in the Dang region of Dholpur District

(A)Vegetation near Chambal River (B) Chambal ravines near Dholpur (C) Hilly or Dang region near Baseri tehsil

MATERIAL AND METHODS-

(A) Gathering of Plant Materials

Plant materials Seeds and Fruits were collected from Dang area of Dholpur, District, Rajasthan, India.

(a) The plant life was identified by villagers of tribal local communities about various aspects.

(b) Interviewing with regular people to know about ethno medicine and plants used for treating diseases in cattle.

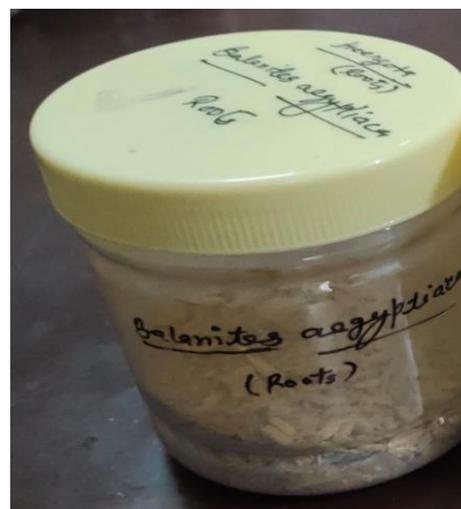
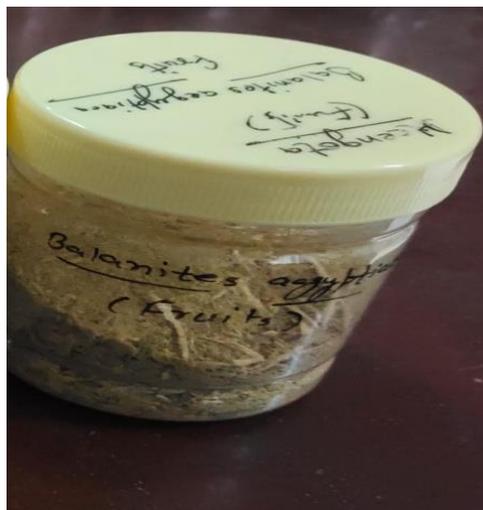


Fig. Samples of (A) *B. aegyptiaca* Roots

(B) *B. aegyptiaca* Fruits



Fig. Interactions with different tribal communities of Dang area of Dholpur (Raj.)

(B) Preparation of plant extract

Collected plant materials like root and fruits were washed with distilled water and shade dried for a week. The dried sample were manually ground to fine powder using pulverizer and passed through 40 mesh sieve and stored in air tight containers. The plant powder was taken in a test tube and distilled water was added to it such that plant powder saturated in it and shaken well. The solution was then filtered with the help of filter paper and filtered extract of the plant samples were taken and used for further phytochemical analysis.

Flavonoids Shinoda's test: 1ml of herbal extract was treated with few Mg turnings and a few drops of conc. HCl. Formation of pink / green color indicated the presence of flavonoids.

Dragendroff's test for Alkaloids: 2 ml of HCl was added to 0.5 ml of herbal extract followed by 1 ml of reagent. An orange red precipitate formation indicates the presence of alkaloids.

FeCl₃ test for Tannins: Few drops of FeCl₃ solution were added to 1ml of herbal extract. configuration of blue or green color indicated the presence of tannins.

RESULT AND DISCUSSION –

Fig. *Balanites aegyptiaca* (L.) plant parts

Medicinal Properties –

The bark of *Balanites aegyptiaca* is used in treatment of round worm infection and syphilis. The infusion of root bark has been used by local people in haemorrhoid and diarrhoea. Bark is useful in treatment of jaundice, syphilis, epilepsy, mental diseases, wounds, yellow fever and anthrax. The infusion of root acts as an antidote to snake bite. Skin diseases especially leucoderma, mouth ulcer, sleeping sickness, whooping cough can be cured by using its fruit part as a medicine. Kernel of fruit is used as laxative, also acts as a vermifuge and an antidote to arrow poison. Kernel oil helps in curing skin disease. Seed part can be utilized as ointment, anti-microbial agent, laxatives, expectorant, magico-religious activity, anti-helminthic and febrifuge. Local people also informed that its seeds are effective to treat colic pain and cough. Several diseases such as tumors, epilepsy, skin boils, hemorrhoid, syphilis, aches, wounds, jaundice, spleen disorder, yellow fever, malaria and cold can also be prevented by using *Balanites aegyptiaca* seed oil. Shoot part is used to heal wounds and can be utilized as tooth brushes.

Phytochemical analysis -

phytochemical compounds such as flavonoids, alkaloids, steroids, tannins, carbohydrate and phenol were analyzed from *Balanites aegyptiaca* root and fruit.

Table- Chromatographic and physico-chemical characteristics of isolated flavonoids from fruits of *Balanites aegyptiaca*

Isolated compounds	R _f value	Physical appearance			Color after spray
	S ₁	Daylight	Ammonia	I ₂ Vapor	R ₁
					Visible
Luteolin	0.49	Green-Yellow	Yellow	Yellow- Brown	Brown
Kaempferol	0.86	Green-Yellow	Bright-Yellow	Yellow- Brown	Brown

Abbreviations: S₁ – Benzene: acetic acid: water (125: 72: 3), R₁ – 5% FeCl₃ solution.

Table- Chromatographic and physico-chemical characteristics of isolated flavonoids from roots of *Balanites aegyptiaca*

Isolated compounds	R _f value	Physical appearance			Color after spray
	S ₁	Daylight	Ammonia	I ₂ Vapor	R ₁
					Visible
Kaempferol	0.91	Green-Yellow	Bright-Yellow	Yellow- Brown	Brown

Abbreviations: S₁ – Benzene: acetic acid: water (125: 72: 3), R₁ – 5% FeCl₃ solution.

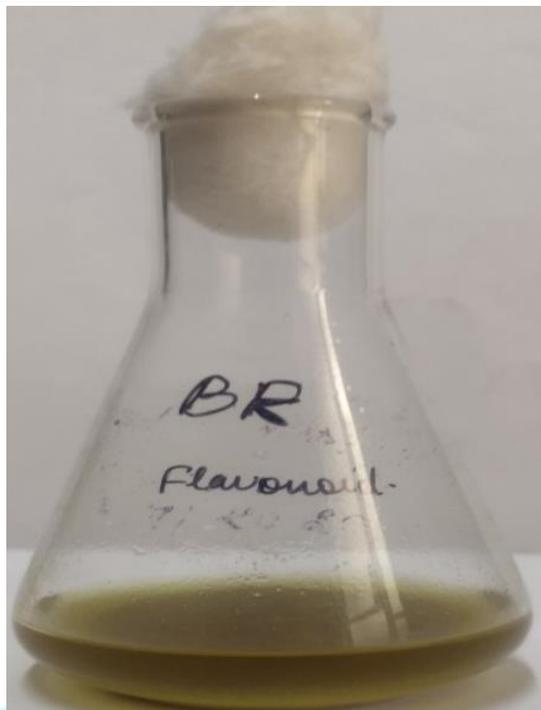


Fig.: Images of flavonoid extraction from plants screened for phytochemical analysis from *B.aegyptiaca*: root.

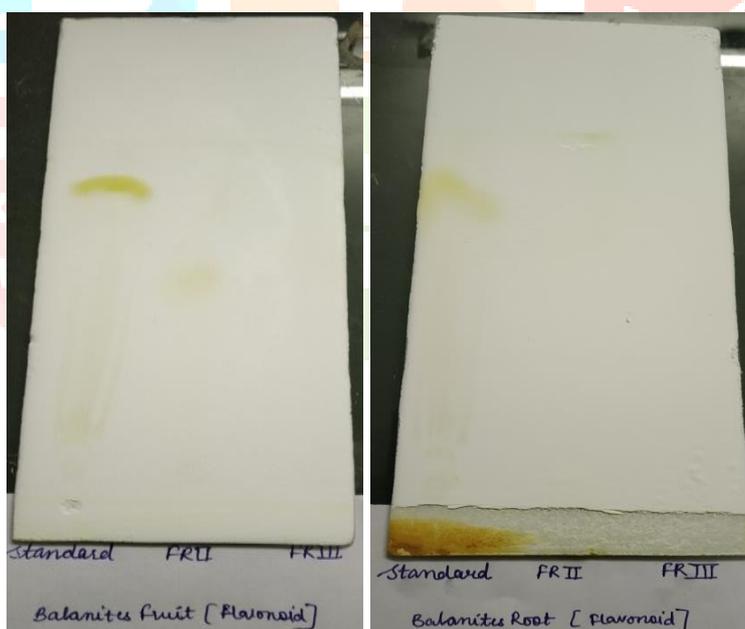


Fig. Chromatographic and physico-chemical characteristics of isolated flavonoids from *A. Balanites aegyptiaca*: fruit (B) *B .aegyptiaca*: root

Alkaloids- In the present study, alkaloids extracts was applied on TLC plates separately and compared their color and R_f values with standards. Alkaloid estimation showed one spot of brick red color in FR II and FR III fractions and found that they were nearby values to R_f value of trigonelline compound.

Table - Chromatographic and Physico-chemical characteristics of isolated trigonelline

Isolated compounds	R _f value	In UV	Color after spraying and heating
	S ₁	R ₁	R ₂
Trigonelline	0.11	BT-BL	BK-RD

Abbreviations: S - Butanol:Acetone:Water (4:1:5), R₁-In UV, R₂-Dragendroff's reagent, BT - Bright, BL – Blue, BK- Brick, RD- Red.



Fig. Chromatographic and physico-chemical characteristics of isolated alkaloid from (A) *Balanites aegyptiaca* fruit (B) *B. aegyptiaca* root

Steroid-

. Saiyed and Kanga 1936 secluded the substance carpesterol along with a steroid. TLC analysis in *Balanites aegyptiaca* fruit part blue color was detected which is identified as Diosgenin and Tigogenin compound

Table- Chromatographic and Physico-chemical characteristics of isolated Steroid from *Balanites aegyptiaca* roots

Isolated Compound	In UV	R _f Value	Color After Spray
		S ₁	R ₁
Tigogenin	BL	0.51	Orange

Abbreviations: S₁- Chloroform:Hexane:Acetone (23:5:2), R₁- 50% H₂SO₄, GN- Green,BR-Bright, BL- Blue.

Table- Chromatographic and Physico-chemical characteristics of isolated Steroid from fruit of *Balanites aegyptiaca*

Isolated Compound	In UV	R _f Value	Color After Spray
		S ₁	R ₁
Diosgenin	BR-BL	0.56	GN
Tigogenin	BL	0.61	Orange

Abbreviations: S₁- Chloroform:Hexane:Acetone (23: 5:2), R₁- 50% H₂SO₄,BL- Blue, BR-Bright, GN- Green.

Tannin content - The tannin content in *Balanites aegyptiaca* fruit was found 459.08 µg/g.

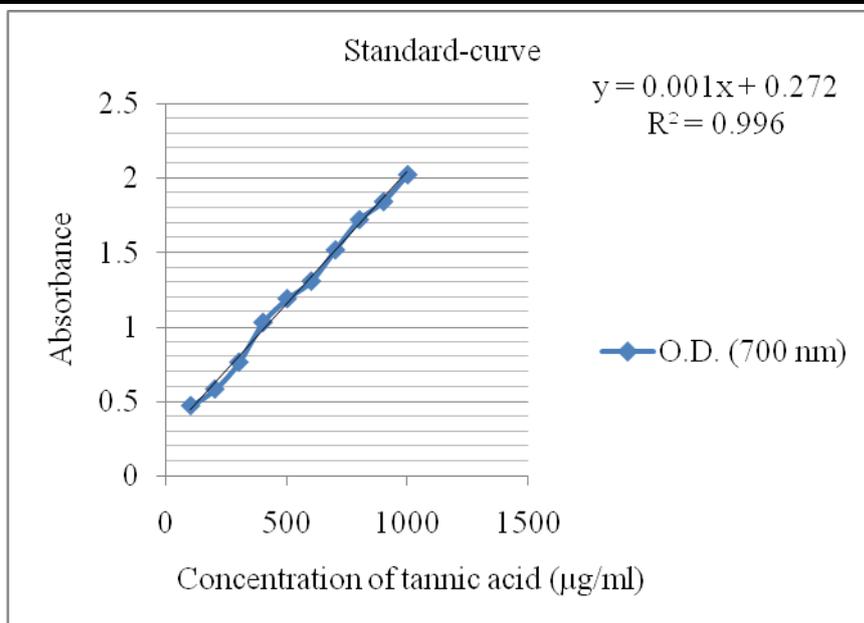


Fig. Standard curve of Tannin

Phenol content-

In *Balanites aegyptiaca* fruit 144.6µg/g phenol content was recognized.

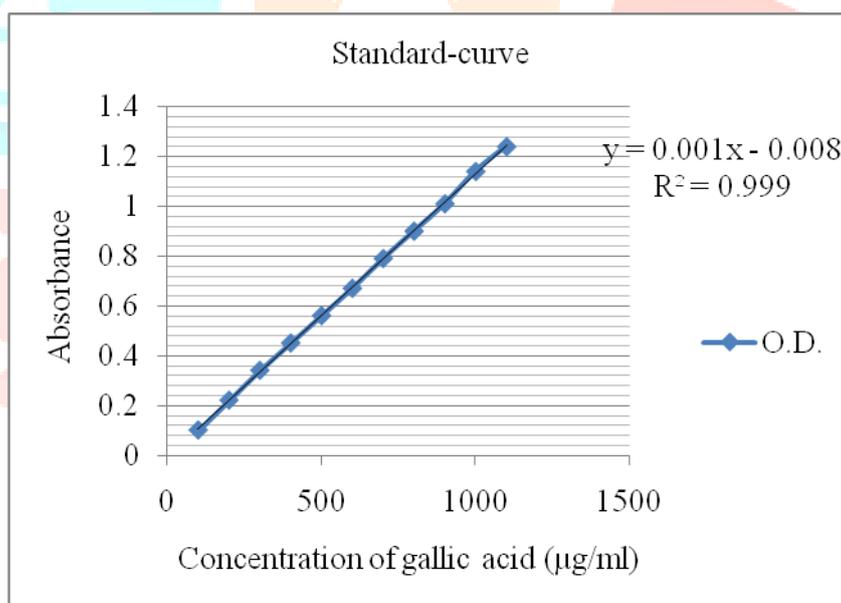


Fig. Standard curve of phenol

Carbohydrate Content- The root parts of *Balanites aegyptiaca* 2192.01 µg/g in fruit and 1499.4 µg/g carbohydrate content in root have been recorded.

Table- Quantitative estimation of Carbohydrate content

Plant Name	Carbohydrate (µg/g)
<i>Balanites aegyptiaca</i> (fruit, BAF)	2192.01±3.50
<i>Balanites aegyptiaca</i> (root, BAR)	1499.4±2.06

Antioxidant activity-

The results from phytochemical screening indicated that *B. aegyptiaca* roots and fruits contain bioactive compounds such as tannin, carbohydrate, phenol and flavonoids all these bioactive compounds are responsible to exhibit medicinal values of plants such as antioxidant activity. Hence the antioxidant activity of these plant species had been determined.

DPPH activity- From the outcome it was evident that the plants showed good antioxidant activity with dose depended manner. Accordingly antioxidant activity was directly proportional to concentration of plant sample. *Balanites aegyptiaca* fruit and root maximum scavenging activity seen was 25.8% and 21.95%, respectively at 100 μ l concentration

Table- DPPH activity of *Balanites aegyptiaca* fruits

Sample Concentration	% DPPH inhibition activity
10 μ l	0.26 \pm 0.31
20 μ l	1.28 \pm 0.40
30 μ l	3.85 \pm 1.05
40 μ l	6.16 \pm 2.08
50 μ l	8.98 \pm 0.53
60 μ l	11.04 \pm 3.86
70 μ l	13.73 \pm 0.23
80 μ l	17.97 \pm 0.79
90 μ l	21.69 \pm 1.87
100 μ l	25.8 \pm 2.66

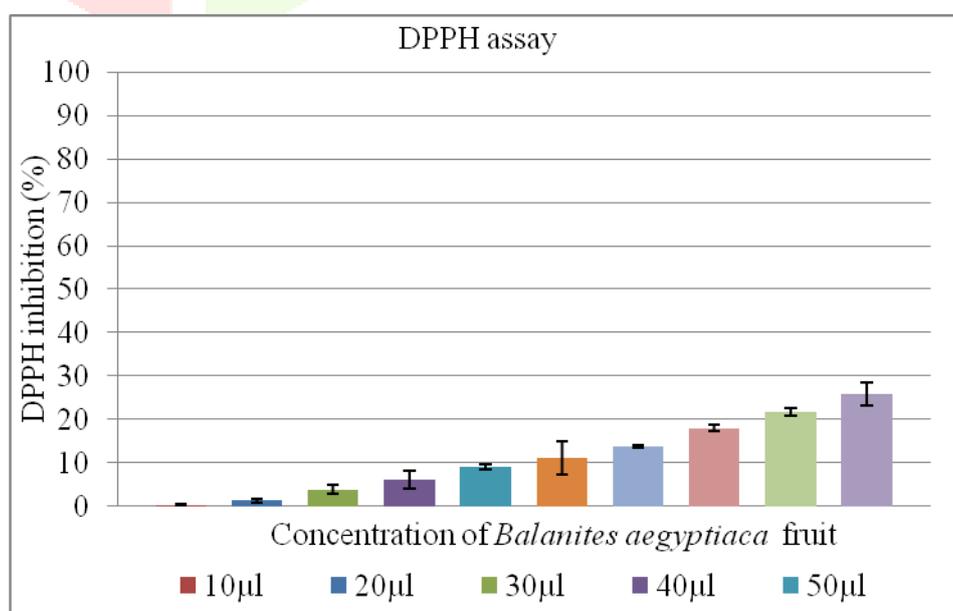
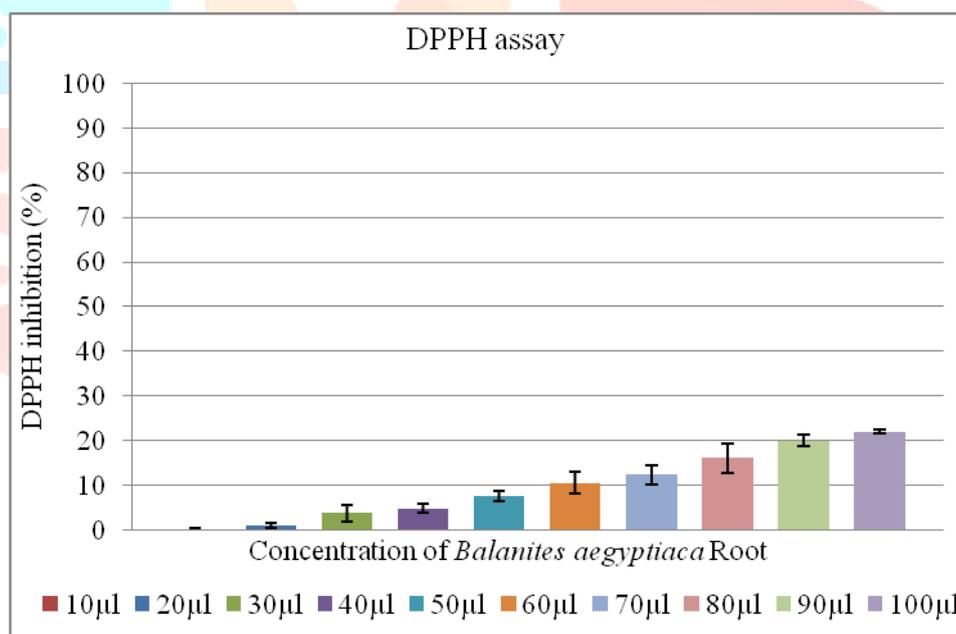


Fig. DPPH activity of *Balanites aegyptiaca* fruits

Table- DPPH activity of *Balanites aegyptiaca* roots

Sample Concentration	% DPPH inhibition activity
10 μ l	0.13 \pm 0.38
20 μ l	1.03 \pm 0.52
30 μ l	3.72 \pm 1.76
40 μ l	4.75 \pm 1.04
50 μ l	7.44 \pm 1.35
60 μ l	10.53 \pm 2.36
70 μ l	12.32 \pm 2.07
80 μ l	16.05 \pm 3.33
90 μ l	20.02 \pm 1.28
100 μ l	21.95 \pm 0.46

**Fig. DPPH activity of *Balanites aegyptiaca* roots**

The current work was undertaken to estimate the phytochemical compounds present in the leaf, stem and roots of medicinal plant of *Balanites aegyptiaca* in Dang area of Dholpur district. Following investigations of extracts from *Balanites aegyptiaca* showed the occurrence of diosgenin and β -sitosterol. In the study Diosgenin and Tigogenin with green and orange color spots were found from *Balanites aegyptiaca*. Extracts were organized as of aqueous and organic solvent like Petroleum ether, Chloroform, Ethyl acetate and Ethanol. Remedial plants have bioactive compounds which are used for remedial various human ailments and also play a vital role in healing. Analysis of the plants was performed using customary methods and resulted in the exposure of the presence of tannins, flavonoids, phenolics, saponins, steroids, and alkaloids. It is expected that the important phytochemical properties acknowledged in the present study in the

indigenous medicinal plants of dang area of Dholpur will be positively helpful in the curing of different diseases of the region.

CONCLUSION - Plants also have bioactive components which have medicinal properties (Shakya, 2016). The phytochemical study of *Balanites aegyptiaca* revealed valuable information about the chemicals present in the fruit parts of the plant. The various chemical tests showed the presence of Flavonoids, alkaloids, steroids, tannins, phenols and carbohydrates.

CONFLICTS OF INTEREST- There are no conflict of interest.

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