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**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1323263>Available online at: <http://www.iajps.com>**Research Article****COMPARATIVE CARDIOTONIC-ACTIVITY OF ALOE VERA
(ALOE BARBADENSIS MILLER) WITH DIGOXIN ON
ISOLATED FROG'S HEART****Shravan Kumar Dholi***, **Kiran Kumar Donthula¹**, **G.Koteshwarrao²**.

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¹Graduate student, Ph.D in computational science, Middle Tennessee state University, Murfreesboro, Tennessee, USA.²Assistant Professor, Department of Pharmaceutics, Vaageswari College of Pharmacy, Karimnagar, Telangana, India.**Abstract:**

Aloe vera has been used medicinally throughout history by many different cultures. Many compounds have been found in the exudates of the Aloe vera that have been used medically by humans. Present study was carried out to determine the cardiotoxic activity by using infusion of Aloe vera extract with different dilutions & compared with cardiotoxic activity of digoxin-the life saving cardiotoxic. The activity was tested by using isolated frog heart assembly. The present preliminary studies confirm the better cardiotoxic activity of Aloe vera extract than digoxin. Further studies can confirm the reduced toxicity & this will be the advantage of Aloe vera extract over digitalis. Thus, in future it will be interesting to isolate the active chemical constituents responsible for the cardiotoxic activity.

Keywords: *Cardiotoxic activity, Digoxin, Aloe vera extract, Isolated frog's heart.**** Corresponding author:****Shravan Kumar Dholi,**

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INTRODUCTION:

Aloe vera (*Aloe barbadensis* Miller) is a member of the lilacae family. It is native to tropical and southern Africa. It has been cultivated for its thick exudates that contain many active compounds with known therapeutic properties. The extracts have been found to reduce oxygenase activity and relieve inflammation [1]. In other aloe species of Aloe the active phenolic compounds were most concentrated in the peripheral regions of the plant leaves [2]. The top third of the leaf and the leaf edges have the highest concentration because those parts are most susceptible to consumption by herbivores [3].

As a drink it protects the mucous membrane of the stomach especially when irritated or damaged. Aloe vera juice is considered helpful for relieving many types of gastrointestinal irritation and juice products are widely available. In Germany, concentrated extracts of dried Aloe leaves are used as laxative preceding rectal surgery and as a hemorrhoid treatment. Aloe gel is perhaps the most widely recognized herbal remedy in the United State today; it is used to relieve thermal burn, sunburn and promote wound healing. In addition, research suggests that Aloe gel can help stimulate the body's immune system [4].

Although a lot of works have been carried out on the medicinal uses of *A. vera* gel, there is still little information on the uses of the leaf. The Neem leaf extract was claimed to have general cardiotoxic activity and we decided to determine the same with the help of isolated frog heart assembly.

MATERIALS AND METHODS [5]

Drug: Infusion of Neem leaf extract

Chemicals: Digoxin, Ringer Solution

Animal: Frog of Rana

Tigrigna species were used for the study and those were maintained as per CPCSEA guidelines.

Instruments:

Sherington Rotating Drum, Sterling's heart lever

Preparation of infusion

Purified *A. vera* gel and extracts of *A. vera* leaves were obtained from local nursery. The gel were gotten from the leaves into a clean container and used as such. While the leaves from which the gel have been drained were air dried, ground and soaked in ethanol for 4 days. This was later filtered and the filtrates evaporated to dryness using a rotary evaporator. The extracts were dissolved in sterile water and used for the antimicrobial susceptibility testing.

The material was filtered through Whatman Filter paper no.40 and filtrate was collected.

The prepared infusion was diluted with the Help of distilled water in varying proportion and labeled as follows,

AV1-Undiluted filtrate

AV2-1:1 (filtrate: distilled water)

AV3-1:2 (filtrate: distilled water)

AV4-1:4 (filtrate: distilled water)

All the preparations were evaluated for their cardiotoxic activity by using isolated frog heart Assembly.

The rate and force of heart contraction was determined.

Preparation of digoxin solution

The marketed digoxin ampoules (Samarth life sciences Pvt Ltd.) Were obtained from local market. Various different dilutions were made with distilled water and labeled as follows,

D1- 25 µg/ml, D2- 50 µg/ml. Above prepared samples were evaluated for their

Cardio tonic activity and treated as standard.

Preparation of hypo dynamic ringer solution [6]

Hypo

dynamic ringer solution was prepared by using standard Method. (Table-1)

Table1: Composition of hypo dynamic ringer solution

Sr.No	Ingredients	Quantity
1	Sodium chloride (NaCl)	6.5 gm
2	Potassium chloride (KCl)	0.14 gm
3	Calcium Chloride (CaCl ₂)	0.03 gm
4	Sodium bicarbonate (NaHCO ₃)	0.2 gm
5	Glucose	2 gm
6	Distilled Water	1000 ml

Evaluation of cardio tonic activity [7]

The frog of species *Ranatrigrina* was pithed and pinned it to the frog board.

A midline incision was given on the abdomen, the pectoral girdle was removed and the heart was exposed.

The pericardium was carefully removed and put a few drops of hypodynamic frog ringer over the heart. The inferior venacava was traced, put a thread around it and given a small cut in order to insert the venous cannula. The cannula was inserted in the vein and the thread was tied to assure the cannula in place which is in turn connected to a saline bottle containing hypodynamic frog ringer solution. A small cut in one of the aorta was given for the ringer to come out.

Heart was isolated and attached to the stand with moderate flow of ringer. A thin pin hook was passed through the tip of the ventricle and with the help of a fine thread to the hook; it was tied to the free limb of the Sterling's heart

attached lever which was fixed to a stand. A proper tension was adjusted by altering the height of the lever.

The normal heart rate was noted. All test samples that are AV1, AV2, AV3, AV4, D1, & D2 were administered in different doses viz. 0.1ml, 0.2ml, 0.3ml respectively. The rate and force of heart contraction

[8] were noted as given in (Table 2-7).

RESULTS AND DISCUSSION:

All the dilutions of *Aloe vera* extract

Restore cardiac activity of Hypodynamic frog heart i.e. it increases rapidity and force of contraction. It was found that undiluted sample showed better response as compared to other samples. It is interesting to know that *Aloe vera* extract has rapid onset of action compared to Digoxin.

These preliminary studies confirm the better cardiogenic activity of *Aloe vera* extract and it can stand as better option for digitalis.

Further studies can confirm the reduced toxicity & this will be the advantage of *Aloe vera* over digitalis.

Table-2

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	----	Normal	38	Normal
2	AV1	0.1	36	Rapid Increase
3	AV1	0.2	31	Increase
4	AV1	0.3	28	Increase

Table-3

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	----	Normal	38	Normal
2	AV2	0.1	31	Slight Increase
3	AV2	0.2	29	Slight Increase
4	AV2	0.3	30	Increase

Table-4

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	----	Normal	38	Normal
2	AV3	0.1	31	Rapid Increase
3	AV3	0.2	29	Increase
4	AV3	0.3	29	Slight Increase

Table-5

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	----	Normal	38	Normal
2	AV4	0.1	31	Slight Increase
3	AV4	0.2	29	Slight Increase
4	AV4	0.3	30	No change

Table-6

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	38	Normal
2	D1	0.1	25	Increase
3	D1	0.2	24	Slight Increase
4	D1	0.3	26	Slight Increase

Table-7

Sr.No.	Drug	Dose(in ml)	Beats/min	Change in Force
1	-----	Normal	38	Normal
2	D2	0.1	28	Increase
3	D2	0.2	25	Slight Increase
4	D2	0.3	22	Sudden Cardiac Block

CONCLUSION:

Aloe vera has been used medicinally throughout history by many different cultures. Many compounds have been found in the exudates of the Aloe vera plant that have been used medically by humans. The Aloe vera extract was claimed to have general cardio tonic activity and we decided to determine the same with the help of isolated frog heart assembly. In conclusion, the leaves of Aloe vera acts as for alternative or complementary medicine as a cardio tonic agent.

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