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PHARMACY

CARDIOTONIC ACTIVITY OF COCONUT WATER (*COCOS NUCIFERA*)

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Abstract

The coconut (*Cocos nucifera*) is a member of the family Arecaceae (Palm family). Various parts of this tree is used in the treatment of, cancer (due to hexane fraction of coconut peel), indomethacin-induced ulceration (coconut milk).Coconut water consumption reduces diastolic blood pressure (due to the presence of potassium).In the present work fresh coconut water, dilution 1:1(coconut water: distilled water), are used to evaluate cardiac activity on the isolated frog heart and are labeled as T_1, & T_2 respectively and compared with Digoxin (S_1) as standard solution. It was found that sample T_1(Undiluted coconut water) showed better response as compared to the diluted coconut water(T_2).These preliminary studies confirm the cardiotonic activity of the coconut water(*Cocos nucifera*).

Keywords: Physical properties, Jakekur, Water, Quality

Introduction

The cardiovascular system includes the heart, blood vessels, spleen, and lymphatic system. The main function of this system is to maintain homeostasis by acting as a transportation system that carries needed materials to cells and removes waste materials from cells.[1,2] The conduction system functions by Initiating the heart beat, Conducting messages around the heart, Coordinating beats between the atria and ventricles. Various diseases related to cardiovascular system are aneurysm, arthrosclerosis, cardiac arrhythmia, congestive heart failure, hypertension, myocardial infraction (heart attack), phlebitis, rheumatic heart disease, varicose veins, angina pectoris etc [3,4, 5]

The coconut (*Cocos nucifera*) is a member of the family Arecaceae (Palm family). It is the only accepted species in the genus *cocos*,and is a large palm growing upto 30m tall, with pinnate leaves 4-6m long, and pinnae 60-90cm long; old leaves break away cleanly, leaving the trunk smooth. The coconut palm is grown through the tropics for decoration, as well as for its many culinary and non-culinary uses; virtually every part of the coconut palm can be utilized by humans in some manner.[6]

The cavity of the coconut fruit is filled with coconut water,which is sterile until opened.It mixes easily with blood,so for this reason it was used during World war-2 in emergency transfusions.[6]

Coconut water contains sugar, fiber, proteins, antioxidants, vitamins & minerals, & provides an isotonic electrolyte balance, making it a nutritious food source. It is used as a refreshing drink throught the humid tropics, & is used in isotonic sports drinks.it can also be used to make the gelatinous dessert nata de coco. Mature fruits have significantly less liquid (coconut water) than young immature coconuts.[6]

Coconut water has been used as an emergency short-term intravenous hydration fluid.This is possible because the coconut water has a high level of sugar & other salts that make it possible to be used in the blood stream. Coconut water is traditionally used as a growth supplement in plant tissue culture/micropropagation.[6]

Scientific classification of *Cocos nucifera*

KINGDOM	Plantae (unranked), Angiosperms (unranked), Monocots (unranked)
COMMELINIDS ORDER	Arecales
FAMILY	Arecaceae
SUB FAMILY	Arecoideae
TRIBE	Cocoeae
GENUS	Cocos
SPECIES	C. nucifera
BIONOMIAL NAME	*Cocos nucifera*

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Material and Method

Drug : Coconut weater(*Cocos nucifera*)
Chemical : Digoxine, Ringer Solution
Animal : Frog
Instruments: Sherington Rotating Drum

Collection of coconut water[7,8]

The fresh fruit of coconut (*Cocos nucifera*) of Family Arecaceae was collected from local market and identified in department of Pharmacognosy at our Institute. The fruits were washed thoroughly to remove adhered material. Then make a hole to that fruits & collect the coconut water into a clean & dry dish. Then that water was filtered with the help of filtration set and filtrate was collected. The filtered coconut water was diluted with the help of distilled water in the proportion and labeled as follows,

T_1-Undiluted coconut water

T_2-1:1(coconut water:distilled water)

All the preparations were evaluated for their cardiotonic activity by using perfused frog heart assembly. The rate, cardiac output and force of heart contraction was determined.

Preparation of Reference solution (Digoxine solution)

The marketed digoxin ampoules were obtained from local market and labeled as

S1- 25 µg/ml.

Preparation of frog's Ringer solution[8]

Ringer solution was prepared by using standard method.

Procedure: Required quantity of ringer's solution was prepared by dissolving all the required electrolytes and nutrients in distilled water.

Standard composition of frog's ringer solution:

Nacl-6g,Kcl-0.14g,$Cacl_2$-0.12g,$NaHCO_3$-0.2g,Glucose-2g,Distilled water-1000ml

Evaluation of Cardiotonic activity [7]

Perfused frog heart assembly was set up by using frog's Ringer solution. The normal heart rate was noted. Both the test samples that is T_1&T_2, were administered in different doses viz. 0.1ml, 0.2ml, 0.3ml. The rate, cardiac output and force of heart contraction were noted and is given in Tables 1,2,3.

Table 1.Undiluted coconut water-T1

S.NO.	DRUG	DOSE(ml)	BEATS/MIN.	CARDIAC OUTPUT(ml)	CHANGE IN FORCE
1.	-	Normal	28	21	Normal
2.	T1	0.1	22	20	No change
3.	T1	0.2	18	18	Slight increase
4.	T1	0.3	17	18.7	Cardiac arrest

Table 2. Diluted coconut water(1:1)-T2

S.NO.	DRUG	DOSE(ml)	BEATS/MIN.	CARDIAC OUTPUT(ml)	CHANGE IN FORCE
1.	-	Normal	24	16	Normal
2.	T2	0.1	18	18.7	Slight increase
3.	T2	0.2	17	15	Slight increase No change
4.	T2	0.3	15	16	

Table 3. Digoxine as a standard cardiotonic drug-S1

S.NO.	DRUG	DOSE(ml)	BEATS/MIN.	CARDIAC OUTPUT(ml)	CHANGE IN FORCE
1.	-	Normal	32	24	Normal
2.	S1	0.1	30	21	Increase
3.	S1	0.2	27	19	Slight increase
4.	S1	0.3	24	17	Slight increase

Result and Discussion

The dilution of coconut water (*Cocos nucifera*) restores cardiac activity on Frog's hearts i.e. it decreases rapidity and force of contraction. (Figurea,b,c, and Table 1,2,3& comparitive graph). It was found that sample T1 (undiluted coconut water) showed better response as compared to other sample. These preliminary studies confirm the better cardiotonic activity of the coconut water (*Cocos nucifera*).

Further studies, in future will be interesting to isolate the active chemical constituents which are responsible for the cardiotonic activity as well as to determine the possible mechanism of action of coconut water (*Cocos nucifera*).

References

1. Ross and Wilson "Anatomy and Physiology in Health and Illness" Anne Waugh Allison Grant, 9th edition 77
2. V. N. Sharma "Essential of Pharmacology" , 2nd edition 2003,150-200
3. Harshmohan "The Pharmacology Basic of Therapeutics" Copy right 1996 International edition 9th edition 278-324
4. Goodman and Gillman "The Pharmacological Basis of Therapeutics". 759-875
5. Bodhankar "Pathophysiology" Nirali Prakashan 1st edition.1-6 Barar F.S.K., "Essentials of Pharmacotherapeutics," 1st edition 1985, S.Chand Publications: 250-254
6. Charles W. Fetroo, Juan R. Avila "The Complete Guide To Herbal Medicines". 7. Bertram G "Basic

and Clinical Pharmacology"Katzung ,9th edition,Copy Right 2004.158-160

7. Remington: "The Science and Practice of Pharmacy,"19th Edition, Mack Publishing Company:956.

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