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EVALUATION OF DIURETIC POTENTIAL OF LEMON JUICE AND RECONSTITUTED LEMON DRINK

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ABSTRACT

Purpose: Herbal Remedies have been used since ancient times because of their safety, cost efficacy, fewer adverse effects and easy availability. Herbal Remedies are again gaining their importance in field of medicine due to adverse effects and high cost of allopathic treatment. *Citrus limon* is also known as lemon and has been known traditionally for number of uses including its anti-oxidant properties, anxiolytic, antidepressant effect as well as diuretic potential. The study is designed to evaluate the diuretic potential of Lemon Juice (Natural) and reconstituted Lemon drink (from Powder packet) available in market so it can be incorporated as non-pharmacological treatment in hypertension and urinary diseases. **Methodology:** The study is carried out on albino mice weighing 18-25gm of either sex that were first familiarized with metabolic cage and then placed in it after dosing. Mice were divided into 3 groups (Standard given 1mg/kg Furosemide, Pure Lemon Juice 1ml/kg and Reconstituted Lemon Powder 100mg/kg). The dosing was done for 7 days. **Result:** From our study we observed mice which were given Furosemide (Standard) urinated the most, whereas pure lemon juice mice urinated moderately and mice which were given reconstituted lemon drink urinated insignificantly. **Conclusion:** Our study indicated pure lemon juice is mildly diuretic whereas reconstituted lemon drink result was insignificant so lemon juice can be incorporated in diet of

hypertensive patient to cause diuresis naturally and lower the blood pressure. It can also be used in patient of urinary diseases to facilitate urination.

KEYWORDS: Diuretics, Lemon Juice, Hypertension, Reconstituted.

INTRODUCTION

Hypertension is one of the most prevailing disease conditions in Third world countries as well as developing countries. Hypertension is defined as sustained increase in systolic blood pressure above 140mmHg and diastolic pressure above 90mm Hg.[1] There are commonly two types of hypertension based on cause i.e Primary hypertension of unknown etiology and secondary hypertension due to disease condition or drug use.[2] Many factors can affect blood pressure such as dietary salt intake,[3] kidney function, smoking, obesity and effect of hormones. Persistent high pressure taken by sphagmomanometer three times in one month is used to diagnose hypertension. Recently there has been a trend in Resistance Hypertension (uncontrolled hypertension) due to non adherence to therapy by patients. Uncontrolled hypertension can increase risks of cardiovascular diseases.[4] Nowadays focus is being shifted towards herbal treatment. Herbs can provide beneficial therapeutic effects, safer to use and considered cheaper therapy.[5]

Citrus limon commonly known as lemon belonging to family Rutaceae is commonly cultivated in South Asian Countries.[6] Lemon is rich source of nutritional supplement containing carbohydrates, fats, proteins, vitamins such as Thiamine, Riboflavin, Niacin, Pantothenic acid, folate, choline and rich source of vitamin C. Lemon also contains trace elements like Calcium, Magnesium, Potassium and Zinc. Lemons contain number of phytochemicals such as tannins, terpenes, polyphenols and flavonoids.[7]

It has shown to possess antifungal, hypocholestrolemic, anticancer and shown to possess anti-thrombin component making it useful as cardioprotective. It also possesses neuroprotective effects.[8]

The present study was designed to study the Diuretic effects of Natural lemon juice and reconstituted lemon drink so it can be suggested as non pharmacological treatment in managing hypertension and urinary diseases.

MATERIALS AND METHOD

Experimental Animals: The experimental study was designed comprising of albino mice of either sex weighing 18gm-25gm kept at room temperature 25±2℃ in laboratory environment. They were given food and water ad Libitum.

Material: The lemons were purchased from local market identified by Department of Pharmacognosy Jinnah University for Women and then their juice was taken and filtered. The lemon powder was also purchased from local market in Karachi.

Dosing Protocol: The animals were divided into 3 groups each comprising of 10 mice. One group was administered Furosemide 1mg/kg (standard), Second group was administered Pure Lemon Juice 1ml/kg and Third group was administered lemon Powder 100mg/kg reconstituted in water. Solution was prepared by dissolving 75 gm powder in 25 ml water. The mice were administered dose according to weight.

Procedure: The diuretic activity in mice was studied by modified Lipchitz test.[9] The mice were placed (3 mice of same group) in metabolic cage designed in such way to separate urine and feces and one mouse of each group was housed separately in metabolic cage. The urination sample was collected after 24 hours in cylinder and its volume was measured. The experiment was carried out for 7 days.

RESULT AND DISCUSSION

From above study we found that the mice which were given furosemide a diuretic agent urinated most followed by Natural lemon juice and then reconstituted drink. Since traditional times fruits and their juices have been known for their health promoting effects. Numerous studies have shown effectiveness of fruits and their juices for treatment or prevention of chronic diseases. Diuretics are class of drugs used for treatment of hypertension.[10] Furosemide is loop diuretic and works by inhibiting NA-K-Cl in thick ascending loop of henle. It is used mainly for treatment of hypertension and edema.

From our results we found that after 3 day dosing when urination was observed for 24 hours it was seen that mice given Natural Lemon juice had urinated but when compared to standard i.e Furosemide it was highly significantly less, where as lemon drink reconstituted from powder packet showed highly significantly less effects too as compared to standard.

Similarly when readings were taken after 5 day and 7 day dosing they showed Natural lemon Juice had moderate diuretic effect whereas reconstituted lemon drink had less significant effect. This was concluded on basis of comparison with Furosemide (standard) drug. *Citrus limon* contains abundant flavanoids such as rutin, hesperidin, quercitrin, narirutin, didumin and naringin.[11] Quercitrin and Iso quercitrin has been shown to possess diuretic effect.[12]

It has been proved that diuretics are very effective in treating mild to moderate hypertension. It is also thought to enhance the effect of other antihypertensive drugs.[13] Diuretics are also useful in preventing recurrent calculi.

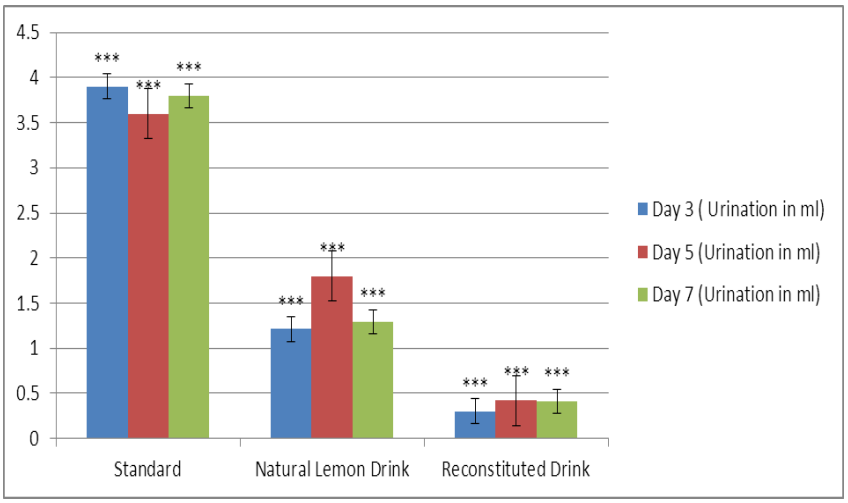
Table 1

Groups	Urination in ml (3 day dosing)		Urination in ml (5 day dosing)		Urination in ml (7 day dosing)	
	Mean ± S.D	p- value (Standard)	Mean ± S.D	p-value (Standard)	Mean ± S.D	p-value (Standard)
Standard	3.9± 0.14		3.6± 0.28		3.8± 0.13	
Natural Lemon Juice	1.21 ± 0.16	***0.000	1.8 ± 0.42	***0.000	1.29 ± 0.21	***0.000
Reconstituted Lemon Drink	0.3 ± 0.07	***0.000	0.42 ± 0.27	***0.000	0.41 ± 0.11	***0.000

Values are mean ± S.D

N=10= number of animals.

*****p<0.0001 = highly significant**



Graph 1

CONCLUSION

From above study we can conclude that Natural lemon Juice can be incorporated into diet of hypertensive patients to increase diuresis so increasing trend of Resistant hypertension due to

non-compliance can be reduced. It can also be included as non-pharmacological therapy in patients who suffer only from hypertension without any co-morbid conditions. Our study also showed natural juices should be preferred as compared to reconstituted drinks because they do not possess same beneficial effects due to presence of sugars and preservative agent.

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