International Journal of Advances in Medicine
Paliwal S et al. Int J Adv Med. 2016 Feb;3(1):120-124
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933

DOI: http://dx.doi.org/10.18203/2349-3933.ijam20160202

Research Article

Effect of Indian spices on fibrinolytic activity on man

Sanjay Paliwal*, Syed Javed

Department of Medicine, Geetanjali Medical College, Udaipur, Rajasthan, India

Received: 02 December 2015
Revised: 11 January 2016
Accepted: 15 January 2016

***Correspondence:**
Dr. Sanjay Paliwal,
E-mail: scientificwritingsolutions@gmail.com

ABSTRACT

Background: Spices were one of the valuable items of trade in the ancient India. Herbalist and folk practitioners have used plant remedies for food, beverages, drugs and medicines centuries, but scientific research in needed to explore basic mechanism behind these wonderful natural ingredients. Spices having antioxidant potential and they are also potent inhibitors of tissue injury. spices does not provide extra calorie ,easily available and cheap, some of them like mace, greater cardamom and cinnamon reliable sources of antioxidants and other potential bioactive compounds in diet. This study thus help in establish role of some spices used in the kitchen for its aroma, flavour and taste which are potential to maintain a healthy heart.
Methods: This was a cross sectional, observational, descriptive-analytic study and was conducted in a tertiary care teaching hospital of Rajasthan, India. The duration of study was 12 months, sample size was 30. Thirty patients without being any medical or systemic disease. Patients of age less than eighteen years were excluded from the study. All those who denied participation in the study. Approval from Institutional Ethics Committee was taken before starting the study. The study was explained to them in brief in a language they can understand. Consent of participants was taken in written informed consent form. All data collected were analysed using appropriate statistical tests.
Results: Patients were having decreased fibrinolytic activity when they were subjected to bread and butter, while mean fibrinolytic activity increased by 48.21%, 41 %, 67% when combined with mace, cinnamon, greater cardamom, respectively.
Conclusions: In present study we can conclude that administration of fatty diet decrease fibrinolysis to a significant extent while, administration of mace, greater cardamom and cinnamon along with fatty meal leads to significant increase in fibnolysis is activity in healthy subjects. The effect on fibnolysis is more pronounced with greater cardamom than cinnamon and mace.

Keywords: Spices, Fibrinolytic activity, Mace, Greater cardamom, Cinnamon

INTRODUCTION

Spices have been consumed in most of the countries of the world since ages. The practice is based on the common assumption that their consumption is related to taste and aroma. However, the recent scientific research has resulted in revealing their different biological activities and important therapeutic implications as well as isolation of active components.

Spices are now known to possess hypolipideamic, hypoglycemic, anti-inflammatory, anti-thrombotic, anti-atherosclerotic and platelet aggregation inhibiting properties. In this regard, garlic, onion, ginger, clove, curcumin etc. have been extensively studied.[1]

Most of the spices are commonly consumed with fatty meal and it is assumed that they prevent the fat induced alterations in various biological processes. In this context, garlic, onion and ginger have been widely studied; and the research results show that these spices not only inhibit platelet adhesiveness and aggregation and enhance fibrinolytic activity but also prevent the fat induced alteration in fibrinolysis and platelet functions.[2]

Mace (*Myristica fragrans*), the dried part of nutmeg (Jaiphal) is commonly known as 'Jayapatri'; contains volatile oil (4-15%) and amylodextrin (25%) as the chief constituents besides sugar, pectin and resinous coloring matter. It is stimulant, carminative, astringent and aphrodisiac. In Indian traditional medicine, it is used for the treatment of human infantile diarrhoea and rheumatism. In Ayurveda, it is considered useful in heart disease.[3] It is reported as a chemopreventor of chemically induced carcinogenesis and suppresses lipid peroxidation in the liver. The later effect is as a result of its free radical scavenging property.[3]

Cinnamon (*Cinnamon zeylanicum*) has a long of both as a spice and as a medicine. The essential oil contains two pheny1 propanoids - cinnaldehyde and eugenol.[4] Both these are potent antifungal compounds. The diterpene in the oil have anti allergic activity, help reduce ulcers and augments the action of insulin.[5] Interestingly, it is also powerful antioxidant.[6] In human with type 2 diabetes, consumption of as little as 1 gm of cinnamon per day was found to reduce blood sugar, triglycerides, LDL-cholesterol and total cholesterol. The volunteers who consumed cinnamon showed increase in total antioxidant power and decrease in lipid peroxidation.[6]

Greater cardamom or large cardamom (*Amomum subulatum Roxb.*) is used for dyspnoea, cough, nausea, vomiting and itching in Ayurvedic pharmacopoeia. It is also used a preventive as well as curative for throat troubles, congestion of lungs, inflammation of eye lids, digestive disorders and in the treatment of pulmonary tuberculosis.[6]

All the three spices selected for the present study possess important medicinal properties. It is possible that they might neutralize the deleterious effects of high fat diet on fibrinolytic system and/or coagulation system as observed with other spices. As there are no reported studies in the literature towards this direction. The present study, therefore, has been planned to evaluate the acute effects of these spices on fat induced alteration on fibrinolytic system in man.

METHODS

The present study was conducted on 30 healthy volunteers of the age of 20-40 years. The underlying diseases were excluded by relevant investigations. Those who are smokers or consuming tobacco in any form or alcohol were excluded from the study.

After informed consent, they divided randomly in three groups of 10 each.

Group I - Mace group = 500 mg single dose
Group II - Cardamom group = 5 g single dose
Group III- Cinnamon group = 5 g single dose

Study protocol

Initial blood samples were collected in a fasting state. Then they were administered 50 g butter with two slices of bread. The second blood samples were collected were four hour. During these four hours they were not allowed to take anything except water.

After a gap of seven days, the same procedure was repeated but with powdered cinnamon, cardamom or mace to the respective groups. All the blood samples collected were subjected with half an hour, for estimation of fibrinolytic activity employing euglobuin clot lysis time.

RESULTS

Table 1 shows that when butter (50 g) was administered to healthy subjects and blood samples were taken after 4 hours, fibrinolytic activity decreased by 21.03% from 79.08±19.74 to 62.45± 15.76 units. It is statistically significant ($P<0.01$).

When same procedure was repeated after 7 days with 50 g butter + mace (500 mg) and blood sample was taken after 4 hrs.; the mean fibrinolytic activity increased by 48.21% from 75.33±15.52 to 111.64±20.82 units which is statistically significant ($P < 0.001$).

Table 2 shows that 4 hrs. after administration of butter (50 g) to healthy subjects, fibrinolytic activity decreased by 20.06% from 88.94±27.08 to 71.10±26.30 units. It is statistically significant ($P<0.01$).

When same procedure was repeated after 7 days with 50 g butter + cinnamon (5 g), the mean fibrinolytic activity increased from 86.12±24.83 to 121.48±27.93 units (41.0%). It is statistically significant ($P<0.001$).

Table 3 shows that when butter (50 g) was administered to healthy subjects, fibrinolytic activity decreased from 80.36±21.91 to 65.54±22.64 units at the end of 4 hrs. which is around 18% and statistically significant ($P<0.01$).

When same procedure was repeated after 7 days with butter (50 g) with greater cardamom (5 g), the mean fibrinolytic activity increased from 95.39±15.08 to 159.22±58.46 units, which is around 67% and statistically significant ($P<0.001$).

Table 1: Effect of mace (500 mg) on fibrinolytic activity in healthy individuals.

S. No.	Fibrinolytic activity (units)			
	Initial	**4 hrs. after 50 g butter**	**Initial**	**4 hrs. after butter (50 g) + mace (500 mg)**
1.	54.00	54.95	52.57	89.39
2.	62.33	65.33	54.40	81.66
3.	105.98	87.61	74.63	144.75
4.	108.18	74.02	81.35	117.72
5.	99.01	69.33	92.68	124.45
6.	58.92	35.03	60.45	92.96
7.	78.92	41.54	85.23	120.93
8.	68.54	61.08	70.29	92.26
9.	70.18	60.56	85.97	126.29
10.	84.74	75.02	95.72	125.73
Mean	79.08	62.45	75.33	111.64
% change	↓ 21.03		↑ 48.21	
±S.D.	19.74	15.75	15.52	20.82
±SEm	9.02	5.25	5.17	6.94
P	< 0.01		< 0.001	

Table 2: Effect of cinnamon (5 mg) on fibrinolytic activity in healthy individuals.

S. No.	Fibrinolytic activity (units)			
	Initial	**4 hrs after 50 g butter**	**Initial**	**4 hrs after butter (50 g) + cinnamon (5 g)**
1.	113.63	103.33	63.69	90.09
2.	74.02	65.31	69.50	112.35
3.	84.74	62.34	139.03	128.2
4.	69.93	60.07	111.06	131.94
5.	118.05	93.94	66.97	185.37
6.	143.88	119.95	101.01	133.92
7.	76.87	60.06	90.67	130.36
8.	78.92	50.46	80.57	110.76
9.	71.56	62.07	77.76	101.25
10.	57.75	33.43	60.89	90.56
Mean	88.94	71.10	86.12	121.48
% change	↓ 20.06		↑41.07	
±S.D.	27.08	26.30	24.83	27.93
±SEm	9.02	8.76	8.27	9.31
P	< 0.001		< 0.001	

Table 3: Effect of greater cardamom (5 mg) on fibrinolytic activity in healthy individuals.

S. No.	Fibrinolytic activity (units)			
	Initial	4 hrs. after 50 g butter	Initial	4 hrs. after butter (50 g) + greater cardamom (5 g)
1.	76.92	66.66	107.30	157.51
2.	57.14	30.03	104.78	183.33
3.	76.92	44.44	105.30	162.61
4.	70.03	60.08	88.10	188.67
5.	68.01	62.08	63.69	96.29
6.	70.18	63.03	115.63	192.59
7.	58.60	50.08	97.67	147.34
8.	120.45	106.79	80.26	140.35
9.	90.09	80.10	92.76	150.76
10.	115.26	92.07	98.38	172.79
Mean	80.36	65.54	95.39	159.22
% change	↓ 18.45		↑ 66.92	
±S.D.	21.91	22.64	15.08	28.46
±SEm	7.30	7.54	5.02	9.49
P	< 0.001		< 0.001	

DISCUSSION

There are at present several agents for the prevention and treatment of reduced fibrinolytic activity. Most of them are however antigenic (streptokinase), very expensive (urokinase, TPA) or transient in effect (nicotinic acid). Their main use is still acute episodes of coronary, pulmonary and peripheral thromboembolism. They are only effective when given parenterally and none can be used on a long term basis to prevent process of thrombo atherosclerosis. Efforts are being made all over in the hope of discovery of the cheap, non-antigenic drug or dietary supplement which can be administered orally for longer duration without any side effect.

Bordia A. described that ayurvedic preparations have been reported to have important effect on fibrinolytic activity. It has been reported that essential oil of garlic and onion[7,8] increase the fibrinolytic activity in normal individuals when fed on fatty diet as well as in patients of CAD to a significant level. Similarly, asafoetida when administered orally also increases fibrinolytic activity to a significant level. Likewise the effect of amla has been reported to enhance fibrinolysis.

Bordia and associates[9] reported the effect of garlic on alimentary hyperlipedemia. In their study on healthy volunteers it was found that feeding of 100 g butter leads to a significant increase in the serum cholesterol and plasma fibrinogen after 3 hours. At the same time there was decrease in the plasma fibrinolytic activity and whole blood coagulation time. Addition of 50 g of garlic to fatty meal caused decrease in the plasma fibrinogen and increase in the fibrinolytic activity to a statistically significant level.

According to Verma SK and Srivastava KC administration of ginger[10] & clove oil was found to be beneficial in patients of CAD because of their effect on fibrinogen and fibrinolytic activity.

The present work therefore, establishes the age old concept of supplementing various species with the food rich in fat. All the fatty food dishes are usually cooked with a variety of condiments and spices. These are added not for mere smell and flavor but because of their beneficial activities. The fatty food invariably decreases fibrinolytic activity significantly as greater cardamom, cinnamon and mace with the fatty meal, not only check the fall of fibrinolytic activity but actually enhance to the extent of 41 to 67%. This rise is statistically highly significant (P<0.001). The maximum rise in fibrinolytic activity is with greater cardamom than with mace and then with cinnamon.

The exact mechanism of enhancing fibrinolytic activity by various spices is not clear. They might decrease fibrinogen or increase the activity of proteolytic enzyme plasmin. However, further studies are warranted to unravel the mechanism of enhancement of fibrinolysis by these spices.

CONCLUSIONS

The fibrinolytic activity is important for keeping blood in fluid state; in deficiency of such mechanism blood will clot inside the vessels and will hamper the circulation in vital organs.

There are at present several agents for the prevention and treatment of reduced fibrinolytic activity. Most of them are however antigenic, very expensive or transient in effect or used parenterally. The aim of present study is to evaluate mace, cinnamon and cardamom as a dietary agent for their effect on fibrinolytic activity.

Thus from the present study it can be fairly concluded that administration of fatty diet decrease fibrinolysis to a significant extent while, administration of mace, greater cardamom and cinnamon along with fatty meal leads to significant increase in fibnolysis is activity in healthy subjects. The effect on fibnolysis is more pronounced with greater cardamom than cinnamon and mace. There was no untoward effect of administering even such large doses to healthy volunteers. If these observations are confirmed in further larger trial, well then they may be welcome addition to already existing list of natural substances like garlic, onion, asafoetida, amla, ginger and gum gugulu.

ACKNOWLEDGEMENTS

My gratitude to my teacher Dr. S.K.Verme, M.D., Ph.D., D.Sc.,Incharge Indigenenous Drug Research Centre, Department of General Medicine, R.N.T. Medical College, Udaipur.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Bordia A and Verma SK. Effect of Garlic feeding on regression of experimental atherosclerosis in rabbits. Artery. 1980;7:428.
2. Bordia A. Effect of Garlic on serum fibrinolytic activity in patients with CAD. Atherosclerosis. 1977:28:155.
3. The wealth of india. First supplement series, Vol. 4, NISCAIR, CSIR, New Delhi. 2003:183.
4. Heller B. Healing herb from the kitchen. Available at www.nutritional wellness.com/columnist/heller. Accessed on 20 November 2015.
5. Nagi H, Shimozawa T, Motsuura N, Koda A. Immunopharmacological studies on the aqueous extract of *Cinnamomum cassia* (ccAq) antiallergic action Jpn. J. Pharmacol. 1982;32:813.
6. Murcia MA, Egea I, Romojaro F, Paras P, Jimenez AM, Martinez Tome A. Antioxidant evaluation in dessert spices compared with common additives. Influence of irradiation procedure. J Agric Food chem. 2004;52:1872.
7. Bansal HC, Khabiya BL, Arora SK, Singh SV. Effect of Essential oil from onion on alimentary lipemia. Indian Heart J. 1974;26:29.
8. Wessinger J. Effect of nutmeg, aspirin, chlorpromazine and lithium on normal intestinal transport. Proc West pharmacol Soc. 1985,28:267-3.
9. Bordia A. Effect of active principle of garlic and onion on alimentary lipemia. Atherosclerosis. 1975;21:15.
10. Verma SK, Srivastava KC. Effect of ginger and fenugreek on blood lipids, blood sugar, platelet aggregation in patients with coronary artery disease, prostaglandins leukot. Essen Fatty Acids. 1997;56:379.

Cite this article as: Paliwal S, Javed S. Effect of Indian spices on fibrinolytic activity on man. Int J Adv Med 2016;3:120-4.