

Effect of Buffalo Gourd (*cucurbita Foetidissima*) Oil on Platelets Aggregation in Human Blood

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ABSTRACT

Seven healthy adults participated in this study. Blood was drawn from each subject at initial fasting control and immediately after initial fasting but with Buffalo Gourd oil incorporated into the syringes. Platelets were obtained from the blood by centrifugation and platelets aggregation was measured using aggreganometer supplied with a recorder.

Results indicated that Buffalo Gourd oil incorporation into the blood resulted in preventing platelets aggregation enhanced by ADP, epinephrine or collagen. The inhibition of platelets aggregation was dose-related. The present data provide additional information on the benefits of using this oil for human consumption.

The feral xerophytic Buffalo Gourd, *Cucurbita foetidissima*, has evolved in the semi-arid regions of western north America and is well adapted to desert environments¹. This plant has abundant yields of seeds rich in edible oil and protein and abundant Carbohydrate reserves in the form of starch in the large storage root^{2,3}. *Curcubita foetidissima* was first described in 1817, its natural habitat is western United States, Mexico and the Middle East⁴.

Curtis described the potential of Buffalo Gourd as a crop⁴. The seed coat of this plant accounts for 30% of the seed weight, the embryo contains a protein level of up to 37.5% and an oil content of 48%. The oil possesses very desirable storage characteristics, having a high (up to 46%) content of linolenic acid and low linolenic acid.

Fatty acid contents and the properties and characteristics of Buffalo Gourd oil have been extensively studied by Vasconcellos, et al⁵. The present experiment was conducted to study the effect of Buffalo Gourd oil on platelets aggregation in as much as this plant has been claimed to possess antiatherogenic activity.

METHODS

Seven healthy adults (4 males and 3 females) between the age of 25 and 46 years were studied. All subjects were not taking any drug known to affect platelets aggregation. Twenty ml of whole blood were drawn from each subject by free-flow into sodium citrate containing tubes, centrifuged immediately at room temperature (100 xg) for 15 minutes to obtain platelets rich plasma (PRP). Platelets poor plasma (PPP) was obtained by centrifugation of the remaining blood at 1400 xg for 10-15 minutes. An aggreganometer supplied with recorder⁶ was used for the platelets aggregation study. Collagen, epinephrine and ADP were used as aggregating agents. Aggregation was studied twice: 1) at initial fasting control and 2) immediately after initial fasting but with Buffalo Gourd oil incorporated into the citrate in the syringes. Oil used in this study was extracted from the seeds using the soxhelt extraction with hexane.

RESULTS AND DISCUSSION

Extensive research has been conducted on the possible use of Buffalo Gourd as an alternative food source for human² and animal⁷ in arid land in an attempt to combat the

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† (Professor Cossack passed away after submitting this paper. Since his wife requested that it is his last wish to get this paper published, the Board of Bahrain Medical Bulletin decided to publish it while expressing its deep sorrow and condolences to his family).

food shortage in arid lands particularly in developing countries. Result from several investigations have shown that this plant produces abundant amounts of good quality starch which can be used to produce fructose, gasohol or be used as cooking starch¹. Each plant produces 200 fruits (pepos) which contain the seeds. The seed contains 37% of crude protein of high quality and 48% of oil. The oil of this plant is similar to the commonly used cooking oils with regards to its biochemical and physical characteristics⁵. This oil contains 64% linolenic acid and low content of linolenic acid. Thus, this oil is stable and has a very good and desirable storage characteristics. The ratio of unsaturated to saturated fatty acids in Buffalo Gourd is 4.45 which is higher than that of corn oil (3.18) or cottonseed oil (3.40). Some oils, such as garlic oil, have shown to be protective against atherosclerosis mediated by its effect on platelets aggregation.

Table 1
Effect of buffalo gourd oil on platelets aggregation

<i>Maximum fall in optical density (Mean + SD)</i>				
	<i>ADP</i> 2.5 ug	<i>Epinephrine</i> 2.5 ug	<i>Collagen</i>	
Without Buffalo Gourd oil	54.2 ± 6.3	60.1 ± 4.2	70.8 ± 3.0	
With Buffalo Gourd oil				
20 ug	5.8 ± 2.1	4.8 ± 1.0	4.6 ± 0.9	
15 ug	10.4 ± 2.1	12.1 ± 2.3	7.5 ± 1.2	
10 ug	17.3 ± 3.5	18.2 ± 2.9	12.1 ± 1.9	
5 ug	40.1 ± 5.1	42.3 ± 3.8	16.5 ± 2.0	

As shown in table 1, the addition of Buffalo Gourd oil prevented platelets aggregation enhanced by ADP, epinephrine or collagen. The inhibition of platelets aggregation, as shown in this study, was dose-related. We expect that this oil increases the fibrinolytic activity and prevents the thrombus formation. However, the mechanism by which platelets aggregation is prevented by the use of this oil needs further studies.

REFERENCES

1. Bemis WP, Berry JW, Weber CW. The buffalo gourd: a new potential horticultural crop. *Hortscience* 1978;13:235-40.
2. Berry JW, Weber CW, Dreher ML, Bemis WP. Chemical composition of buffalo gourd, a potential food source. *Journal of Food Science* 1976;41:465-6.
3. Schreens JC, Bemis WP, Dreher ML, et al. Phenotypic variation in fruit and seed characteristics of buffalo gourd. *J Am Oil Chem Soc* 1978;28:90-5.
4. Curtis LC. The possibility of using species of perennial cucurbits as source of vegetable fats and protein. *Chemurgic Digest* 1946;5:221-4.
5. Vasconcellos JA, Berry JW, Weber CW. The properties of cucurbita foetidissima seed oil. *J Am Oil Chem Soc* 1980;57:310-3.
6. Bordia A. Effect of garlic on human platelets aggregation in vitro. *Atherosclerosis* 1978;30:355-60.
7. Cossack ZT, Waymack LB, Weber CW. Nutritional availability of buffalo gourd residue. *American Society of Animal Science Proceedings* 1979;30:156-8.