# Use of Goat Milk and Goat Meat as Therapeutic Aids in Cardiovascular Diseases

By: Dr. John R. Addrizzo, M.D. Staten Island Medical Center
11 Ralph Place Staten Island, N.Y.

One of the 5 risk factors for coronary/arteriosclerotic heart disease and peripheral vascular disease is an elevation in the lipid profile, particularly cholesterol and the low density lipoprotein fraction, especially if the ratio of LDH-C/HDL is greater than 5. Elevations for total cholesterol greater than 200; LDL-C greater than 150 and HDL-C less than 35; and triglycerides greater than 150 place the patient at an elevated risk of coronary heart disease.

In an attempt to control the hyperlipemic state, diet and exercise are utilized as the first line of defense. Our office offers the following diet over the last eight years and has found tolerance to be acceptable along with lowering of the hyperlipemic state in 80% of the patients:

ETHNIC DIET (1)

| | |
|---|---|
| Fish | Vegetables (steamed) |
| Chicken | 1 slice of bread |
| Goat meat | (chevon) Water with lemon |
| Venison | No desserts, Fruits only |

(1) In Restaurant Portions; typical: Chinese, Mediterranean, Mexican or Indian

Only 20% of patients needed the introduction of pharmacological agents to achieve satisfactory levels. Once the diet was adhered to for greater than 6 months, both significant reductions in the dyslemic state and weight occurred. Of interest is the ease of maintaining both risk factors at a satisfactory level.

The diet consists of ethnic food base prepared with care as to low saturated fatty foods; steamed vegetables and lean red meats. Culturally, the average American consumes beef -130 pounds; pork - 65.5 pounds; chicken - 63 pounds; turkey -15 pounds; and fish -15 pounds per year. The American diet is therefore disproportionally high in saturated fats. Thus, with proper dietary intervention, it is possible to reduce the mean Wood cholesterol by 3 to 23% in 90% of the test population (Emholm et al., 1982). Characteristically, the American diet contains red meat in the form as mentioned of primarily beef and pork, with veal and lamb as a second choice; with the new shift away from red meats to Poultry and seafood in an attempt to achieve a lower fat/cholesterol diet. Beef consumption in the United States declined by 15% over the ten year span from 1975 to 1985; while poultry increased by 45% during the same period (U.S.D.A.,1989) However, due to the development of hormonal contamination and salmonellosis, even chicken is not a very acceptable alternative; the same fate has affected fish with the great concern about chemical and bacterial contamination. Moreover, the last decade's consumption of fish has risen by 25% (12 1/2 to 15 1/2 Pounds Per year), however, according to C.R. (1992). Almost 40% of the fish sampled was fair to poor in quality and 30% was "downright poor". In addition, chemical contamination with PCB, mercury, pesticides and lead range from 45% to 90% depending upon the species and the water habitat. This leaves chevon as the best alternative; being the leanest of the red meats, free of bacterial and chemical contamination.

Goat meat cuts have fat content 50%-65% lower than similarly prepared beef, but have a similar protein content, have between 42%-59% less fat than lamb, and are about the same to 25% lower than veal. This pattern was repeated for the cooked sample (James et al., 1990). In addition, the percentage of saturated fat in goat meat is 40% less than chicken without skin, being far below beef, pork and lamb by 850, 1100 and 900%, respectively (U.S.D.A, 1981,1989).

Devendra (1988) states that unsaturated fatty acids predominate in goat meat to 68.5% to 72.3% compared to 50% by Eastridgc (1990) and agree with the U.S. Handbook (1989) value of 69%, Lauric, myristic and palmitic acid are saturated fatty acids of the hypercholesterolemic group found in goat meat. Their percentage is 2%, 2.6%, and 27.6%, respectively. The non-hypercholesterolemic group of fatty acids consists of one saturated fatty acid, C:

18.0 stearic acid (14% to 16.6%) and the unsaturated fatty acids, C: 18.1 oleic (30.1% to 37%), C: 18.2 linoleic (13.4%) and C: 18.3 linolenic (.4%). Universally the fatty acid and protein values are constant with the intramuscular fat disposition of .94% to 1.4% in the indigenous breeds of the Indian subcontinent when compared with Alpine, Toggenburg, Nubian and Saanen goats (2.01 %) over a range of live weights (Devendra, 1988).

Cholesterol content of chevon is controversially similar to that of beef, lamb, pork and chicken and much lower than some dairy, poultry products and some seafoods. Further studies of cholesterol indicate levels of 76 mg% compared to 70 mg% fo beef, fish and lamb; 60 mg% for pork and chicken (Pond and Maner, 1984; Potchoiba et al., 1990). Cholesterol of beef meat, uncooked, ranges from 36 mg% to 46 mg% to 78.2 mg% (Stromer et al.,1966; Terrell et al., 1969) compared to 57.8 mg% to 69.5 mg% of chevon (Park et al.. 1991).

The key fact is that your blood cholesterol level depends less on your intake of cholesterol from foods and more on the amount of saturated fats consumed, especially the ratio of polyunsaturated to saturated fats. Therefore, by reducing the consumption of foods high in saturated fats, a more effective measure of cholesterol control is achieved. Polyunsaturated fats and monosaturated fats pack less tightly and are liquid at room temperature which is common to the drippings of goat meat, unlike beef and lamb. The inspection of congealed fat drippings is a visual index as to the degree of saturated fats present. This is noticeably absent in goat meat. The wealth of documentable evidence indicates that goat meat (chevon) regardless of age, breed, or region will supply a high quality protein source along with a healthy fat (increased unsaturated fats/saturated fats ratio) with a minimal cholesterol intake risk. In addition, chevon comparatively contains higher values of iron, potassium and thiamine associated with a low sodium level (Eastridge and Johnson, 1990). All essential amino acids are present and a low calorie per serving value is available. As a result of the above, chevon should be designated as - the naturally occurring health meat.

With respect to goat milk and the cardiovascular system, one finds it similar to cow's milk. By lowering the fat content to the "skim" level, it would be a very acceptable nutritional milk. Goat milk's only deficiency is a low folate level, otherwise it is a complete dietary supplement It is used in treating cow's milk allergy; extremely palatable due to natural homogenation; supplies all calcium requirements and is most like human milk in composition.

In conclusion, the goat is genetically structured due to the distribution of body fats (to peritoneum and internal organs, not intermuscular) and composition of these fats (low saturated; high polyunsaturated/saturated fat ratio) to be considered "user friendly" in our modem health conscious society. In addition, it supplies a nutritious "white gold" milk.

**NOTE: Tables Follow References List.**

## REFERENCES


Consumer Reports. 1992. "Is our Fish Fit to Eat" February, pp. 103-120.

Devendra, C. 1988. The nutritional value of goat meat. Proceedings
(IDRC-268e) Goat Meat Production in Asia. March 13-18, pp. 76-86.

Eastridge, J.S. and Johnson, D.D. 1990. The effect of sex class on nutrient composition of goat meat. International Goat Production Symposium Oct. 22-26, pp. 143-146.

Emholm, C., Huttunen, J.K., Pietinen, P., 1.982. Effect of diets on serum lipoproteins in a population with a high risk of coronary heart disease. N Engl J Med, 307:850-855.

James, N.A., Berry, B.W., Kotula, A.W., Lamikanra, V.T., and Ono, K. 1990. Physical
separation and proximate analysis of raw and cooked cuts of chevon. International Goat Production Symposium Oct. 22-26,
pp.22.

Nutritive Value of Foods, 1981. Home and Garden Bulletin, Number 72, U.S.D.A., Washington, D.C. U.S. Government Printing Office.

Park, Y.W., Kouassi, M.A., and Chin, K.B. 1991. Moisture, total fat and cholesterol in goat organ and muscle meat. J. Food Science 56 (5): 1191-1193

Pond, W.G. and Maner, J.H. 1984. Swine Production and Nutrition. The Avi. Publishing Company, Inc. Westport, Connecticut.

Potchoiba, M.J., Lu, C.D., Pinkerton, F. and Sahlu, T. 1990. Effects of all milk diet on weight gain, organ development, carcass characteristics and tissue composition, including fatty acids and cholesterol contents of growing male goats. Small Rumin. Res. 3: 583-592.

Stromer, M.H., Goll, D.E. and Roberts, J.H. 1966. Cholesterol in subcutaneous and intramuscular lipid depots from bovine carcasses of different maturity and fatness. J. Animal Sci. 28:454

Terrell, R.N., Suess, G.G., and Bray, R.W. 1969. Influence of sex, live-weight and anatomical location on bovine lipids. Lipid components and subjective scores of six muscles. J. Animal Sci. 28:454. U.S.D.A. Handbook #8, 1989.

# TABLES

**TABLE 1**. COMPARISON OF GOAT MEAT TO OTHER MEATS

| 3 OZ COOKED | CALORIES | FAT | SAT'D FAT | PROTEIN | IRON |
|---|---|---|---|---|---|
| (roasted) | (gm) | (gm) | (gm) | (gin) | (gm) |
| Goat (1) | 122 | 2.58 | 0.79 | 23 | 3.2 |
| Beef (2) | 245 | 16.00 | 6.80 | 23 | 2.9 |
| Pork (2) | 310 | 24.00 | 8.70 | 21 | 2.7 |
| Lamb (2) | 235 | 16.00 | 7.30 | 22 | 1.4 |
| Chicken (2) | 120 | 3.50 | 1.10 | 21 | 1.5 |

Sources:

(1) USDA Handbook #8, 1989
(2) Nutritive Value of Foods. Home And Garden Bulletin Number 72, U. S. Dept. of Agriculture, Washington, D.C., I Government Printing Office, 1981.

**TABLE 2.** COMPARISON OF THE COMPOSITION OF COW, GOAT, AND HUMAN MILK/lOOgms

| NUTRIENT | COW | GOAT | HUMAN |
|---|---|---|---|
| Protein (gm) | 3.3 | 3.6 | 1.0 |
| Fat (gm) | 3.3 | 4.2 | 4.4 |
| Carbohydrates (gm) | 4.7 | 4.5 | 6.9 |
| Calories | 61 | 69 | 70 |
| Phosphorus (gm) | 93 | 111 | 14 |
| Calcium (gm) | 119 | 134 | 32 |
| Magnesium (mg) | 13 | 14 | 3 |
| Iron (mg) | .05 | .05 | .03 |
| Zinc (mg) | .38 | .30 | .17 |
| Sodium (mg) | 49 | 50 | 17 |
| Potassium (mg) | 152 | 204 | 51 |
| Vitamin A (UI) | 126 | 185 | 241 |
| Thiamin (mg) | .04 | .05 | .014 |
| Riboflavin (mg) | .16 | .14 | .04 |
| Miacin (mg) | .08 | .28 | .18 |
| Vitamin B-6 (mg) | .04 | .05 | .01 |

Source:

Adapted from "Composition of Foods; Dairy and Egg Products", Agricultural Handbook No. 8-1, Agricultural Research Service. Washington. D.C.; USDA, 1976.