Caffeine Content of Tea and Coffee

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SUMMARY

The caffeine content of teas and coffees blended and marketed in South Africa was estimated. Samples of tea contain caffeine varying from 2.723% to 4.1%. Coffee 'mixtures' contain 1.23 - 1.66%, freshly ground roast coffee beans 0.8 - 1.8% and one 'instant coffee' made from 100% coffee, 4.38%.


The xanthines (caffeine, theophylline, and theobromine) occur in plants widely distributed throughout the world. Best known for the preparation of beverages are coffee beans which contain caffeine, tea leaves which contain caffeine and theophylline, and cocoa seeds which contain caffeine and theobromine. Cola-type drinks contain caffeine since they are made from extracts of kola nuts.

There are numerous brands of tea and coffee, instant and other varieties, available in South Africa. It was of interest to determine the amount of caffeine, an important active ingredient in these beverages. The country of origin of the raw material is not always disclosed on the label.

MATERIALS AND METHODS

The determination of the caffeine content of a sample of each of 21 commercial teas and 10 coffees, purchased in the open market, was based on a chromatographic-spectrophotometric method.

RESULTS

The results are shown in Tables I and II.

The country of origin of certain brands of tea and the various coffees was not indicated on the package labels.

DISCUSSION

It is stated in a number of textbooks that the amount of caffeine in tea leaves varies from 1% to 4% and that coffee contains about 1 - 2%. Cocoa is stated to contain only a small amount of caffeine but theobromine is present, 1 - 3%. Kola (cola) nuts contain 1.5 - 2.5%, and traces of theobromine. Paraguay tea (mate) contains 0.2 - 2% caffeine. Rooibos tea (and camomile tea) contains no caffeine.

The present investigation shows that teas blended, packaged and marketed in South Africa contain a high percentage of caffeine, varying from 2.73% to 4.1%; therefore a cup of tea prepared from 2.5 g tea leaves (the amount of tea usually present in a tea-bag) contains 68 - 100 mg caffeine according to the brand of tea used and the degree of extraction produced by infusion. Coffee mixed with chicory or other material contains 1.23 - 1.66%. freshly ground roasted coffee beans 0.8% - 1.08%; one
Effect of Ascorbic Acid on Lipoprotein Lipase Activity

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SUMMARY

Baboons kept on hypovitaminotic C diets, but without clinical signs of scurvy, had significantly higher heart muscle lipoprotein lipase activity than baboons on vitamin C 34 mg/kg body mass/day. When the serum vitamin C levels were above 0.35 mg/100 ml the heart muscle lipoprotein lipase was repressed. Serum vitamin C levels below 0.35 mg/100 ml stimulated lipoprotein lipase to between 2 and 3 times the repressed value.

Heart muscle lipoprotein lipase from baboons receiving dietary vitamin C was inhibited by 0.34 mM vitamin C in vitro, whereas heart muscle lipoprotein lipase from baboons on scorbutogenic diets were stimulated by addition of vitamin C in vitro.


The uptake of triglyceride fatty acids from the plasma by extrahepatic tissues is facilitated through hydrolysis of the triglycerides by the enzyme, clearing factor lipase or lipoprotein lipase. Various authors have given evidence that the enzyme acts at the surface of the capillary endothelial cells where the triglycerides, carried in the plasma very-low-density lipoproteins or chylomicrons, are sequestered.\textsuperscript{1,3}

Robinson\textsuperscript{4} also maintained that lipoprotein lipase plays a directive role in determining the pattern of triglyceride fatty acid uptake by extrahepatic tissues.

Recently, various workers have presented data indicating that the adipose tissue and heart muscle contain lipoprotein lipases having different characteristics.\textsuperscript{1,3,9}

The activities of the enzyme in specific tissues have been shown to change in particular physiological situations and such changes can be correlated with alterations in the uptake of triglyceride fatty acids by these tissues. In adipose tissue, for example, the activity of the enzyme is high in the fed state, when triglyceride fatty acids are taken up, and low in the fasted state, when uptake of triglyceride fatty acids is low. In the heart muscle, on the other hand, the activity of lipoprotein lipase is low during feeding and is elevated during fasting, when the flow of triglyceride fatty acids is from the depot fat region towards utilisation of the heart muscle.

Ascorbic acid has been implicated in the control of serum cholesterol levels by a number of investigations,\textsuperscript{8,10} although Anderson et al.\textsuperscript{12} have questioned the serum lipid-lowering effect of ascorbic acid.

Sokoloff et al.\textsuperscript{31} also discussed the decrease of serum lipoprotein lipase activity during severe atherosclerosis, and serum lipid values and the improvement of lesions during lipid intake restriction and high ascorbic acid intakes.