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MRC UNSOLICITED RESEARCH GRANT SCHEME:

Effects of black tea on ischaemic heart diseases among the Mauritian population

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There is convincing data indicating that excessive free radical production and lipid peroxidation are involved in pathological conditions including atherosclerosis and cardiovascular diseases among others. Evidence suggests that damage to myocardial cell during reperfusion injury may be due to the generation of toxic, reactive oxygen species while the importance of oxidative stress in the development of atherosclerosis seems to be widely accepted. The prevention of oxidative damage has been the subject of considerable investigation. In this respect plant polyphenolics and vitamins have been studied for their free radical scavenging and antioxidant properties. Epidemiological studies have shown strong correlation between increased consumption of food phenolic antioxidants and a reduced risk of cardiovascular diseases. Tea, one the most consumed beverage in the world, has received considerable attention as a protective agent against cardiovascular disease and cancer, two important targets of preventive medicine for adults. Tea is generally consumed in one of three forms, green unfermented (20%), unfermented oolong (2%) or fully fermented black (78%). The three major forms of tea differ in production process, which influences their chemical constituents and taste. Tea leaves are considered to be important sources of polyphenolics with about more than 35 % of their dry weight. The major phenolics are the catechins and flavonols. There are three predominant families of catechins in teas, the free catechins, gallocatechins and gallate esters; the theaflavins and finally the thearubigins. The main flavonols are conjugates of myricetin, quercetin and kaempferol The conjugation varies from mono- to di- and tri-glycosides. In addition to these two families, flavones and phenolic acids are also reported in teas, in particular the quinic esters of gallic, coumaric and caffeic acids. The important and diverse biological roles described for phenolic compounds, along with the reported health benefits of tea consumption have prompted increased interest in tea-derived phenolics. A number of cohort cross sectional studies have reported an inverse association between consumption of green tea and various serum markers from cardiovascular patients. No clear clinical evidence for protective effects of tea in humans, however, has been reported.

The polyphenolic composition and the antioxidant properties of infusates of Mauritian commercial black teas were evaluated in a previous MRC funded study. HPLC data of the individual compounds revealed high levels of (+)-Catechin, (-)-epicatechin, (-)-epicatechin 3-gallate, (-)-epigallocatechin, (-)-epigallocatechin 3-gallate and gallic acid. Antioxidant

data were strongly correlated to the phenolic contents. Catechins and gallic acid seem to add up to the overall antioxidant capacity of the extracts. The implication that tea may reduce the risk for cardiovascular diseases is significant with their estimated impact directly on medical costs and indirectly through productivity losses estimated at $352 billion per annum in the United States alone. Mauritius is no exception to this with an incidence of cardiovascular disease nearing the 50% of total death mark. The Ministry of Health and Quality of Life of the Government of the Republic of Mauritius has approved in 2004 this present clinical trial to evaluate the contribution of Mauritian black teas to cardiovascular health.

The *in vivo* investigation of black tea consumption in a randomised clinical trial revealed that daily consumption of a Mauritian black tea infusate (9 g daily) had a reducing effect on high fasting serum levels of glucose (> 140 mg/dl: 20%), cholesterol (> 220 mg/dl: 16 %), triglycerides (> 200 mg/dl: 56%), LDL/HDL ratio (> 3: 37%), uric acid (> 7 mg/dl: 8.5 %), creatine kinase MB (> 200 U/L: 33%), C-reactive protein (> 4 µg/L: 77%) and GOT/GPT ratio (> 2: 35%) amongst other biomarkers while blood plasma showed an increase in antioxidant status as evaluated by the FRAP assay (0.2-0.8 mmol/L: 175%) and TEAC assays (1-2 mmol/L: 32%). The outcome of this trial, approved by the Ministry of Health and Quality of Life of the Republic of Mauritius in 2004, strongly contributes to the debate of the benefit of tea drinking for prophylactic purposes, more particularly to cardiovascular health.