

**Effects of Red Raw and Red Parboiled Rice on
Glycaemic Control and Lipid Profiles of Type 2
Diabetes Mellitus Patients**

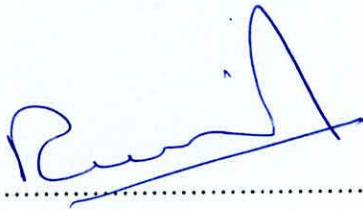
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The work described in this thesis was carried out by me under the supervision of Prof. Priyadarshika Hettiarachchi of the University of Sri Jayewardenepura, Sri Lanka, Prof. Kamani Wanigasuriya, University of Sri Jayawardenepura, Sri Lanka and Dr. Rasika Perera of University of Sri Jayewardenepura, Sri Lanka, and a report on this has not been submitted in whole or in part to any University or any other institution for any other degree/diploma.



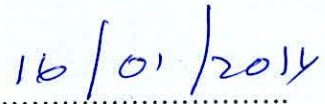
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LIST OF ABRIVIATIONS

ADA	American diabetes association
ADP	Adenocine-5- diphosphate
AHDL	Automated high density lipoprotein
ATP	Adenocine-5-triphosphate
BG	Bathalegoda
BMI	Basal metabolic index
BP	Blood pressure
BR	Brown rice
CAD	Coronary artery disease
CI	Confidence interval
CO	Carbon monoxide
CRMLN	Cholesterol reference method laboratory network
DBP	Diastolic blood pressure
DCCT	Diabetes control and complication trial
DSME	Diabetes self management education
EASD	European Association for study of diabetes
EDTA	Ethylene diamine tetraacetic acid

G-6-PDH	Glucose-6-phosphate dehydrogenase
GI	Glycaemic index
GK	Glycerol kinase
GL	Glycaemic load
GLM	General linier model
H ₂ O	Water
H ₂ O ₂	Hydrogen peroxide
HbA _{1c}	Glycosylated haemoglobin
HDL	High density cholesterol
HPO	Horse radish peroxide
LDL	low density lipoprotein
NADP	Nicotinamide adenine dinucliotide phosphate
NCEP	National cholesterol education programme
OGTT	Oral glucose tolerance test
SBP	Systolic blood pressure
SD	Standard deviation
T2DM	Type 2 diabetes mellitus
TC	Total cholesterol

TG	Triglyceride
UK	United Kingdom
USA	United State of America
VLDL	Very low density lipoprotein
WHO	World Health Organization
WKS	Weeks

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Effects of red raw and red parboiled rice on glycaemic control and lipid profiles of type 2 diabetes mellitus patients

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ABSTRACT

The aim of this study was to assess the effects of red raw and red parboiled rice on the Glycaemic control, lipid profiles, BMI and blood pressure (BP) of type 2 diabetic mellitus patients. Rice, the staple diet of the majority of Sri Lankans, comprises of different varieties depending on the color of the pericarp, and whether it is consumed raw or parboiled. Glycaemic index of different rice varieties might be of significance in determining the impact on the human body. Red parboiled rice has been reported as having a low Glycaemic index. However, most diabetics in Sri Lanka consume red raw rice. In this analytical cross-over study, 102 diabetes mellitus patients from Welikada prison were fed with red raw rice for 16 weeks and red parboiled rice for the next 16 weeks. Time point of 16 weeks consumption of red raw rice was considered as 0 weeks for red parboiled rice consumption. FBG, BMI and BP were assessed at 0 week and at 4 weekly intervals throughout the study. HbA_{1c} and lipid profiles were assessed at 0 week and at 16 weekly intervals throughout the study. Four weekly values of FBG, BMI and BP, and 16 weekly values of HbA_{1c} and lipid profiles during consumption of red raw and red parboiled rice were compared with their baseline values (0 week values). The FBG value after consumption of red raw rice for 8 weeks was

significantly lower compared to the base line FBG ($p=0.001$). The FBG value after consumption of red parboiled rice for 8 weeks ($p=0.006$), 12 weeks ($p=0.002$) and 16 weeks ($p=0.005$) was significantly lower compared to the base line. There was no significant difference in the HbA_{1c} level after consumption of red parboiled rice or red raw rice when compared to the baseline although the levels had a decreasing trend. The LDL ($p=0.001$), TC ($p=0.013$), and TC/HDL ratio ($p=0.032$) at 16 weeks after consumption of red parboiled rice was significantly lower compared to the base line. The TC/HDL ratio at 16 weeks after consumption of red raw rice was not significantly lower when compared with the baseline. The BMI value at 8 weeks during consumption of red raw rice was significantly lower ($p=0.009$) compared to the baseline. The BMI value during consumption of red parboiled rice was significantly lower at 8 weeks ($p=0.028$) and 16 weeks ($p=0.003$) compared to the baseline BMI. A significant change was not observed in the SBP or DBP after consumption of red raw and red parboiled rice. Consumption of red parboiled rice improves FBS, LDL, TC, TC/HDL ratios and BMI in T2DM patients. Consumption of red parboiled rice for 16 weeks may be insufficient to achieve a significant reduction in HbA_{1c} level, SBP, DBP, and to increase HDL. Routine individual monitoring and health advice have an impact on the decrease in blood glucose, lipid status and BMI.