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Letter to Editor

The Potential of Parish Rice (Rice with Low Glycemic Index) to Inhibit Obesity and Diabetes in Mice

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Dear Editor

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia, while Type 2 diabetes mellitus (T2DM) accounts for about 90% of cases due to insulin resistance (1). Globally, T2DM affects approximately 462 million people (6.28% of the population). Southeast Asian countries, including Indonesia, Malaysia, Thailand, and Vietnam have also seen rising cases over the past two decades. The increasing prevalence of T2DM is linked to unhealthy diets, sedentary lifestyles and high carbohydrate intake, particularly from foods like rice (2). Rice with low glycemic index (GI), such as Parish rice, has been developed to help regulate blood sugar level by slowing digestion and reducing glucose spikes (3). However, *in vivo* research on Parish rice remains limited, despite its potential benefits in preventing obesity and diabetes. This study examined the subchronic metabolic responses to Parish Rice consumption over 28 days. Specifically, the study investigated the effect of Parish rice on changes in body weight, body mass index (BMI), blood glucose level, and the proportion of White Adipose Tissue (WAT) in male C57BL/6 mice.

Our findings indicated that mice fed with Parish rice demonstrated a significantly greater reduction in body weight and BMI than controls due to its lower glycemic index, which helps reduce body fat accumulation (Figure 1 and 2). Blood glucose analysis revealed that the Parish rice group illustrated a gradual decrease in glucose level over 28 days, with a lower area under the curve (AUC), indicating reduced overall glucose exposure (Figure 3). Food consumption was similar between both groups, suggesting that the observed metabolic effects were due to nutritional composition rather than differences in the intake (Figure 4). However, WAT analysis showed no significant difference between groups, indicating that Parish rice aids in weight and glucose control, but it does not specifically alter the body fat distribution (Figure 5).

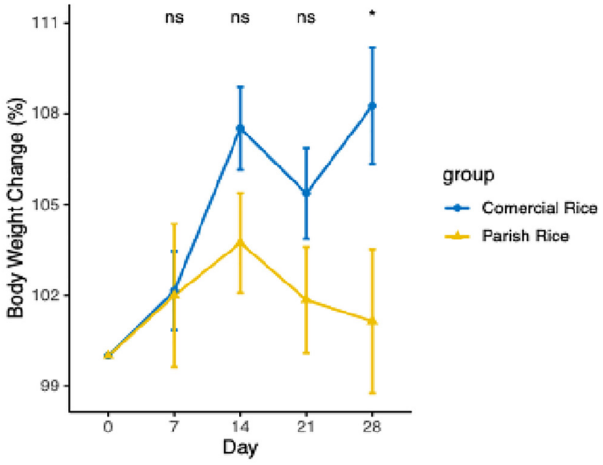

Figure 1: Body weight data.

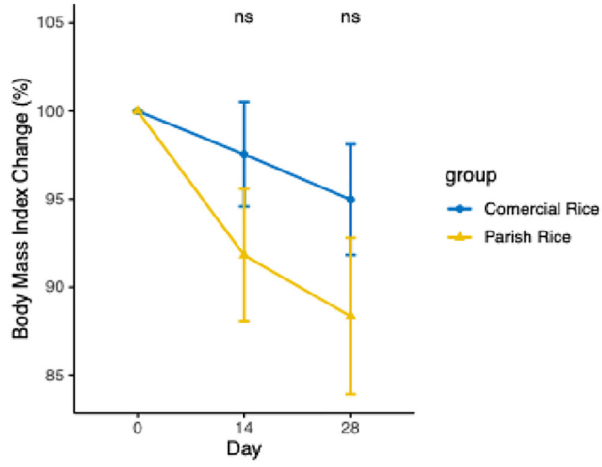

Figure 2: Body mass index data.

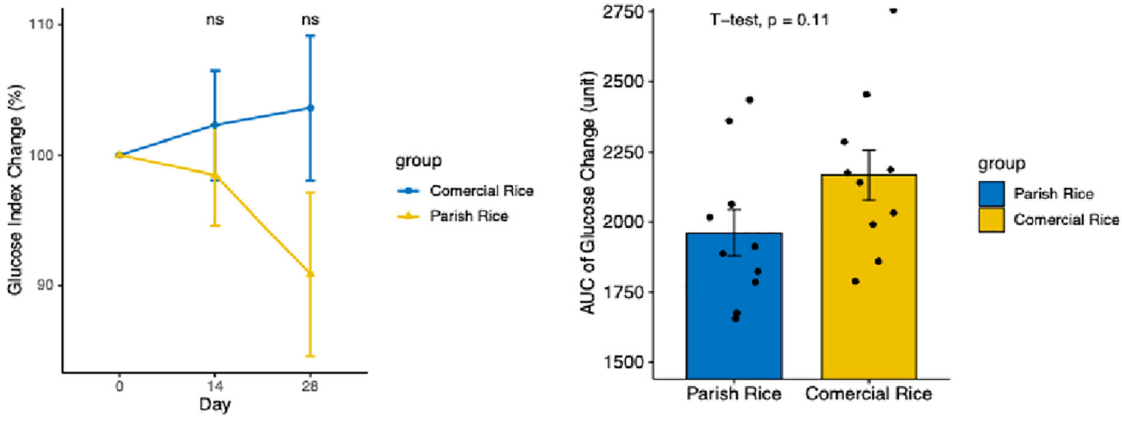

Figure 3: Blood glucose and area under the curve (AUC) index.

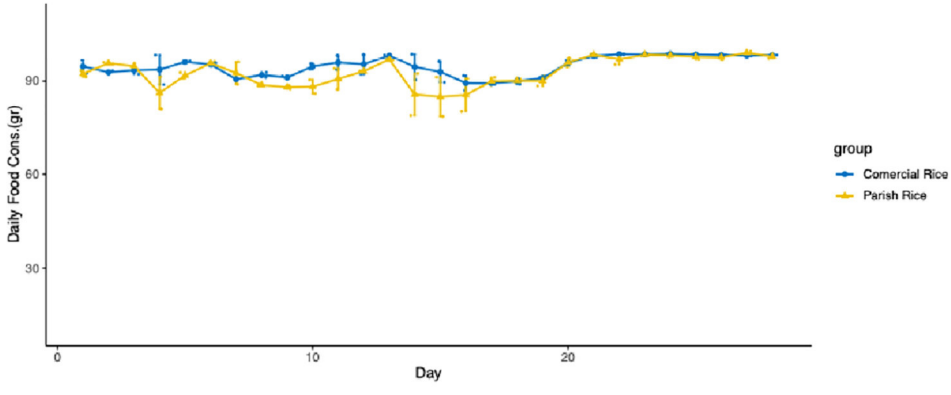

Figure 4: Food consumption data.

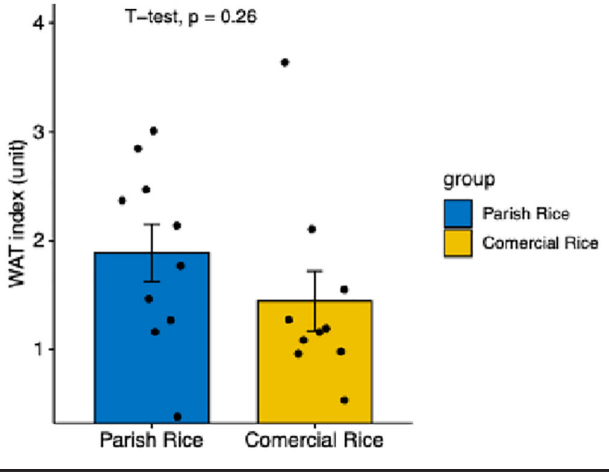

Figure 5: White Adipose Tissue (WAT) organ index.

The rice with low GI such as Parish rice can offer a potential solution for the management of T2DM. With a GI of 41±9, Parish rice was developed through partial removal of carbohydrates that is slowly digested and prevents sharp glucose spikes. This high-protein, low-GI rice presents a promising dietary option for controlling blood sugar and reducing diabetes-related complications. The results showed that rats fed with Parish rice experienced significant weight loss compared to rats fed with conventional rice (Figure 1), likely due to its lower GI which helps regulate glucose level, reduce fat accumulation, and maintain metabolic balance. Low-GI foods can slow down carbohydrate digestion, minimize rapid glucose spikes and fat storage, and support their role in weight management and obesity prevention (4). Previous studies have shown that low-GI germinated pigmented rice improves lipid and glucose metabolism in high-fat diet-fed rats and leads to weight loss (5). Additionally, rice protein has been found to enhance fat breakdown (lipolysis); while inhibiting the fat formation (lipogenesis), and further contributing to weight reduction (6). It was shown that incorporating low-GI foods like brown rice into the diet can improve metabolic health and support long-term weight management strategies (7).

We showed that BMI analysis highlighted the link between dietary choices and body composition revealing that rats fed with Parish rice had a lower BMI value that support our observed weight loss (Figure 2). These findings exhibit that Parish rice consumption may promote better weight distribution due to its slow digestion and a lower GI. Some studies indicated that low-GI foods help reduce body fat and improve metabolic health by gradually releasing glucose into the bloodstream, prevent insulin spikes, and promote fat oxidation rather than storage (4, 5).

A lower BMI observed in the Parish rice group reflects a healthier body composition, which is crucial for reducing the risk of obesity-related diseases. Parish rice consumption was shown to lead to a gradual decrease in blood glucose level and a lower AUC value compared to conventional rice, indicating the reduced glucose exposure and a lower risk of diabetes-related complications. These findings align with a previous research finding that low-GI foods can stabilize blood sugar level, reduce postprandial glucose spikes, and enhance antioxidant capacity (8). It was demonstrated that incorporating low-GI foods, such as brown rice, into the diet significantly improved glycemic control in individuals with T2DM (9). The observed improvements in glycemic control reinforce Parish rice's potential as a preventive measure against hyperglycemia. Additionally, a low-GI diet not only regulated blood glucose level; but also supported the overall metabolic health by reducing energy intake and increasing satiety, that further emphasizes the role of Parish rice in diabetes prevention strategies (9).

The feed consumption analysis showed no significant difference between the Parish rice and conventional rice groups, indicating that Parish rice was equally palatable suggesting that the observed differences in body weight and BMI were due to the unique nutrient composition of Parish rice rather than variations in food intake. The similar taste and texture of Parish rice make it a practical substitute for conventional rice without affecting dietary preferences. A research highlighted the importance of palatability in food choices and compliance, emphasizing that sensory attributes like taste, texture, and aroma could influence consumer acceptance (10). These findings reinforce that Parish rice can be an effective alternative to manage the weight and glycemic control; while maintaining consumer satisfaction.

In conclusion, the analysis of WAT indices revealed no significant difference in fat distribution between the Parish rice and conventional rice groups, despite reductions in body weight and BMI. This suggests that Parish rice primarily affects overall weight rather than targeting specific fat stores, even weight loss can occur without notable changes in fat distribution, particularly in the absence of targeted exercise. These findings highlight the complexity of dietary influences on fat metabolism and emphasize the need for further researches to explore the long-term effects of Parish rice on fat storage and redistribution, as individual responses to dietary changes may vary.

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Authors' Contribution

M.H, W.W, L.D, and H.U were involved in all stages of the study, including conceptualization, design, data collection, analysis, and manuscript preparation. F.H.Z and D.N.T contributed to specific parts of the experimental work and provided technical support. All authors reviewed and approved the final version of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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