

Ergogenic property of *Morinda citrifolia* L. leaf extract affects energy metabolism in obese Sprague Dawley rats

ABSTRACT

Ergogenic property is the ability to enhance capacity for physical activities through efficient production of energy and is potentially beneficial in weight management for the obese. In this study, ergogenic property of *Morinda citrifolia* leaf's extract (MCL) was evaluated using AMP-activated protein kinase (AMPK) activity and high fat diet-induced obese rats. Findings from the study showed that MCL demonstrated ergogenic activity via enhancement of AMPK activity using L6 skeletal muscle cell line. Interestingly, the result also revealed that rats treated with the intermediate dosage of MCL experienced the lowest % weight gain. The rats fed the highest dose of 200 mg/kg BW MCL demonstrated the longest swimming time of approximately three times that of green tea and caffeine-fed rats. The highest dose fed rats were also found to have lower glucose and lactate levels, suggesting that energy metabolism was more effective in these rats. In addition, lactate dehydrogenase and creatinine kinase activities, the muscle injury indicators, were found to be the lowest in rats fed the highest MCL dose. The same effect was not seen in rats fed either caffeine or green tea, indicating that MCL treatment is may be protective of the rats' muscles. It was also shown that MCL consisted of various flavonoids with epicatechin, catechin, and quercetin that may be responsible for the effects measured. In conclusion, improvements were seen in rats fed MCL in terms of weight management, endurance capacity, energy metabolism, and muscle injury parameters. **PRACTICAL APPLICATIONS:** Results of the study revealed that *Morinda citrifolia* leaf has great potential to be used as functional ingredient in the development of designer food/drink as ergogenic aid for both obese and non-obese individuals. *Morinda citrifolia* leaf could help in the weight management of obese people and enhance endurance capacity and energy metabolism in active individuals.

Keyword: *Morinda citrifolia*; Obesity; Ergogenic; Forced swimming test; Phytochemicals; Plant extracts