

Abstract

Title: Effect of different types of bicycle tires on energy expenditure

Objectives: The aim of this bachelor thesis is to determine the difference in energy expenditure when using different types of bicycle tires.

Methods: The research group consisted of 5 males in age $26,4 \pm 2,2$ years. This was an experiment. The calculation of energy expenditure was based on the amount of oxygen consumption (VO_2) and exhaled carbon dioxide (VCO_2), i.e. indirect calorimetry. For the analysis of respiratory gases MetaMax 3B measuring device was used. Three types of bicycle tires were tested. The test ride was carried out in laboratory on the cycling rollers. Proband completed one test ride (with a cadence of 80 rpm) on each type of tires. Test ride lasted on average $4:55 \pm 1:50$ min. For results were processed values of 4 minutes steady state VO_2 .

Results: We found out the significant difference in energy expenditure between ride with road tires and ride with Fat Bike tires, and also between ride with trekking tires and ride with Fat Bike tires. The difference between ride with road and trekking tires was, due to the standard error of measurement, insignificant.

Conclusion: The energy expenditure reached a significant increase while using tires with the largest contact patch compared to using tires with the smallest contact patch. Hypothesis was confirmed.

Keywords: MTB, rolling resistance, Fat Bike, oxygen consumption, spiroergometry, indirect calorimetry