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**Effect of carbohydrate ingestion during ‘spin’ classes  
on health and fitness parameters, quality of life and  
mood in recreational exercisers**

**– Happy Carb Study.**

**A thesis presented for a degree of Masters of Science in Sport and Exercise Science at Massey  
University, Auckland, New Zealand.**

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## Abstract

**Background:** Carbohydrate plays an important role in energy provision during exercise, and is a well-known performance-enhancing ergogenic aid. Carbohydrate ingestion has also been shown to influence mood and lead to more pleasurable feelings during exercise. However, carbohydrate ingestion especially from 'sugary' sports drinks is perceived to be detrimental for health and weight management. 'Spin' classes are popular group fitness cycling sessions where participants work at self-selected exercise intensities. Carbohydrate supplements may allow recreational exercisers to improve exercise performance and enhance the 'feel-good' aspects of exercise, leading to an improvement in health and fitness parameters, as well as mood. Extensive research has been conducted with well trained and/or elite athletes to examine the effects of carbohydrate ingestion during single bouts of exercise. However, studies on carbohydrate ingestion during single and repeated bouts of exercise, in recreational exercisers are lacking.

**Aim:** The primary aim of this study was to examine the effect of regular carbohydrate ingestion during exercise in a 10-week intervention on health and fitness parameters, mood and quality of life in recreational exercisers. A secondary aim was to examine the effect of 10-weeks of cycling exercise (spin classes) on health and fitness parameters, as well as quality of life.

**Methods:** Twelve recreational exercisers that attended regular spin classes volunteered to participate in this study. These participants in the Exercise cohort (EXE) were randomly allocated to either Carbohydrate (7.5% carbohydrate solutions; 5 mL/kg of body mass per exercise session; n = 6; CHO) or Placebo (0% carbohydrate, taste- and volume-matched solutions; n = 6; PLA) groups. They each underwent 2 x 45-minute spin classes per week, over a 10-week intervention period. Before each class, participants were given their allocated drinks to consume during the exercise class. Various heart rate parameters, as well as perceptual measures of exertion, pleasure-displeasure and activation (arousal) were assessed after each exercise session. Five non-exercisers were recruited for the Control group (age and gender-matched; CON); they continued their normal daily activities throughout the 10 weeks. All participants (n = 17) were required to attend pre- and post-intervention testing sessions where anthropometry, fat composition (BodPod), physiological measures (resting heart rate, resting blood pressure and oxygen saturation rate), cardiorespiratory fitness (cycling test;  $\dot{V}O_2\text{max}$ ), quality of life (questionnaire), and various metabolic markers (via collection of blood samples) were assessed.

**Results:** There were no changes from pre- to post-intervention in the measures of body mass, fat composition, waist-to-hip ratio, body mass index (BMI), resting heart rate and systolic blood pressure, oxygen saturation rate,  $\dot{V}O_2$ max, metabolic markers (triglyceride, total cholesterol, low density lipoprotein and high density lipoprotein) and quality of life measures between CHO and PLA groups (all  $p > 0.05$ ). However, a significant decrease in the resting diastolic pressure in the CHO group was observed post-intervention ( $p = 0.02$ ). Throughout the 10-week intervention, mean heart rate, proportion of time spent in different heart rate zones, perceived working resistance, and perceptual ratings of exertion and pleasure-displeasure did not change between CHO or PLA groups (all  $p > 0.05$ ). However, the level of activation throughout the intervention increased in CHO participants, while it decreased in the PLA group ( $p = 0.03$ ). Furthermore, a higher proportion of participants within the CHO group were in the 'high-activation, pleasurable' quadrant (circumplex model of affect) throughout the intervention. The 2-hour fasted glucose ( $p < 0.01$ ) and high density lipoprotein ( $p = 0.04$ ) levels also significantly decreased in the CHO group, while it increased in the PLA group.

There were no differences in any health and fitness parameters between EXE and CON groups following the 10-week intervention (all  $p > 0.05$ ) except for a decrease in waist-to-hip ratio of the EXE cohort, and an increase in the CON group ( $p = 0.02$ ). Lower BMI ( $p = 0.03$ ) and resting heart rate ( $p < 0.01$ ), and higher cardiorespiratory fitness ( $p < 0.01$ ) and 'work' subscale of quality of life ( $p = 0.03$ ) were seen at baseline in the EXE cohort.

**Conclusion:** Carbohydrate ingestion during regular exercise over a 10-week period did not have any physiological benefits in recreational exercisers. However carbohydrate ingestion appeared to enhance 'feel-good' state of recreational exercisers throughout the intervention period. The 10 weeks of regular exercise did not incur any additional benefits relative to no exercise. Nevertheless, the exercisers showed better physiological and cardiovascular fitness relative to non-exercisers.

**Keywords:** Feeling Scale, Felt Arousal Scale, circumplex model.

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