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EFFECTS OF ACUTE DARK CHOCOLATE INGESTION ON CARDIOVASCULAR ENDURANCE AND REDUCING MUSCLE PAIN AMONG RECREATIONAL ATHLETES

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ABSTRACT

Introduction: Dark chocolate (DC) have been an essential ergogenic aids and as energy source for endurance athletes and recreational athletes. Dark chocolates contains 70-90% cocoa are very beneficial to health as it contain essential flavanols, polyphenols and caffeine. *Purpose:* The aim of this study was to investigate the effect of acute dark chocolate ingestion on cardiovascular (CV) endurance and reducing muscle pain among recreational athletes. *Methods*: A group of twenty six (N=26) male recreational athletes were recruited by using a convenience sampling methods. Three days before the pre-test, the subjects attended the familiarization phase and filled the Inform Consent form and PAR-Q. After 3 days, the pre-test were conducted. Subjects ingested only mineral water during pre-test. The CV endurance (VO_2max) and total distance of the subjects were assessed through 20m shuttle run test. After undergo the testing, they were given a week of washout period as recovery before the post-test session. During post-test 1, after 10 hours of fasting, dark chocolate drinks were ingested to all of the subjects an hour before the 20m shuttle run testing executed. Exactly 24 hours after each testing, muscle pain were assessed by using the Visual Analogue Scale. The same procedural were used during post-test 2 which ingested White Chocolate as the controlled drinks. *Results*: All of the subjects showed an improvements on their VO_2max and total distance through the ingestion of DC drinks ($P < .05$) but there was no significant effect showed on muscle pain ($P > .05$). Conclusion: Results of the current finding indicate that DC can improve CV endurance performance. However, ingestion of DC does not showed effects in reducing muscle performance. DC also showed higher improvements than WC.

Keywords: Dark Chocolate, Cardiovascular Endurance, Recreational Athetes

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Dietary supplementation like dark chocolate is very rich in abundant flavanols which will boost the mechanism of nitric oxide (Patel, Brouner & Spendiff, 2010). Oxygen demands are shown to be reduce from the breakdown of nitrate during submaximal exercise (Bailey, Wilkerson, DiMenna & Jones, 2009). The breakdown of nitrate may conceivably increase vasodilation and administer muscular contraction (Corti, Flammer, Hollenberg & Luscher, 2009) which will resulted in lower respiratory exchange ratio (RER) and increase on performance in moderate intensity exercise. In addition, acute supplementation of dark chocolate containing quercetin which is a natural polyphenol flavonoid are proof to increase endurance capacity of a person (Davis, Calstedt, Chen, Carmichael & Murphy, 2010).

Plus, caffeine and theobromine can also be found in dark chocolate which both of them will act as a potential ergogenic effects (Allgrove, Farrel, Gleeson, Williamson & Cooper, 2011). Caffeine is one of the highest alternative of an ergogenic aid among all athletes including the recreational athletes (Beck, Housh, Malek, Mielke & Hendrix, 2008) The presence of caffeine can increased the secretion of cathecolamines which is an epinephrine and noriepinephrine which also can increase the motor unit recruitment and firing rates (Beck et al, 2008) Caffeine are shown to elicit performance during endurance-based activities (Beck et al, 2008).

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION OF CHOCOLATES

Chocolates is well known by the majority because of its numerous differ benefits and advantages and usually be consumed by people because of its benefits in medical field and health (Dillinger, 2000). Katz (2011) from the previous studies of cocoa and chocolate in human health and disease defined chocolate as a sort of solid food from the combination of cocoa liquor with cocoa butter and sugar.

2.2 TYPES OF CHOCOLATE

The amount of cocoa liquor in the final product determine the end products whether it is prone to darker chocolate while the existence of white chocolate is the addition of powdered milk in the mixture of chocolates (World Cocoa Foundation, 2010). Therefore, there are 2 types of chocolate made which is dark chocolate and white chocolate.

Weijzen (2008) studied about the results of complexity and intensity on sensory specific satiety and acceptance in consuming food on repeated consumption stated that dark chocolate has a more intense cocoa flavour which leads to stronger sensory signal and stronger satiety response on human. Semisweet or bittersweet chocolate is usually referred to the dark chocolate and also the amount of cocoa liquor in it is lesser than 35% (US Food and Drug Administration, 2010).