INTRODUCTION

High intensity exercise can lead to muscle damage (EIMD) which causes symptoms of strength loss, soreness and increases in various blood biomarkers partially due to inflammation. Soy protein contains isoflavones, isoflavones have anti-inflammatory capabilities and have been shown to reduce reactive oxygen species production by neutrophils which may help reduce the initial inflammation following high-intensity exercise. Current consumption recommendation following high-intensity exercise is 6-20 grams of protein combined with 30 to 40 grams of carbohydrates which provide energy necessary for muscle protein resynthesis. Additionally, products containing 21-41 mg of isoflavones have been shown to have an antioxidant effect after EIMD in multiple studies.

This SSP was found to be acceptable and significantly more satiating than the wheat control (WSP) when tested on both normal and athlete populations.

OBJECTIVES

• Use the previously formulated, acceptable SSP containing optimal protein, carbohydrate & isoflavone content to conduct clinical exercise trial assessing the impact of consumption on acute exercise recovery.

• Compare the athlete’s muscle soreness, urinary isoflavone concentration and various blood biomarker levels to those present after consumption of WSP.

METHODS

Recruitment

10 male subjects recruited from the Ohio State Club Rugby team and the OSU Health and Rehabilitation Sciences Graduate School.

Forms: AHA/ACSM Health/Fitness Facility Pre-Participation Screening Questionnaire, ParQ and You.

ACSM Risk Stratification, Family and Personal Medical/Social History and Informed Consent.

Inclusion criteria: exercise vigorously at least 3 days/week for 30 minutes, male, healthy, free of musculoskeletal injuries affecting their ability to engage in regular resistance exercise.

Exclusion Criteria: allergies to any ingredients found in the soy or wheat pretzels, proven to be “moderate or high risk” by standards outlined in the various surveys/questionnaires or history of adverse events to blood draws, history of blood clotting disorders, etc.

Since this is a preliminary study n=10 is set very low with plan for a larger scale study with appropriate funding in the future.

Study Design

• Participants consumed 3 pretzels (study agent or control), perform 6 sets of 10 repetition squats at 70% of their 1 repetition maximum on the Smith Machine and consume remaining 4 pretzels. Post-exercise blood draw and soreness assessment.

• Monitored: Blood pressure, heart rate, spO2, height and weight.

Exercise Protocol

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EXPECTED RESULTS

Soreness

• Predicted that the SSP will result in faster muscle recovery, thus faster reduction of muscle soreness at the post-exercise time points when compared to WSP.

Blood Biomarkers

• Creatine Kinase and Myoglobin indicate muscle damage. Increase in these biomarkers validate that the exercise protocol was intense enough to induce muscle damage. We expect an increase in both the SSP and WSP groups, however, predict less of an increase in the soy group.

• C-reactive protein is highly responsive to inflammation. Due to the anti-inflammatory effects of isoflavones, we expect less of an increase in the soy group.

• Anabolic hormones IGF-1, testosterone and insulin: we predict a greater release of these hormones in the soy group indicating increased muscle growth stimulation and protein synthesis.

• TNFα, IL1-B and IL-6: we predict more of an increase in these anti-inflammatory cytokines in soy than wheat.

Urinary Isoflavones

• We predict higher concentrations of isoflavones following consumption of SSP than WSP due to the high concentration of isoflavones in the soy pretzel.

CONCLUSIONS

Should our results occur as predicted, we could conclude that short-term supplementation with soy protein mitigates the symptoms of EIMD following acute resistance training.

FUTURE WORK

Long-term supplementation with SSP to assess the effectiveness of chronic consumption of soy on muscle health and recovery in athletes.

REFERENCES


