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**MEETING ABSTRACTS**

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**POSTER PRESENTATIONS**

**P1**

Innovative assessment of seasonal variations in body composition of elite soccer players with the integrated analysis DXA-BIVA

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**Background:** Body composition (BC) and its changes over time may influence performance in soccer players. BC assessment techniques are mainly based on quantitative evaluation, originating from model-based indirect estimates of Fat-Free Mass and Fat Mass. DXA, particularly the advanced iDXA technology, is considered to be precise enough for this kind of assessment. On the other hand, Bio Impedance Vector Analysis (BIVA) allows the direct assessment of athletes’ body composition from impedance vector (Z vector), irrespective of body weight, prediction models or hydration assumptions and may classify qualitative changes in soft tissues hydration. The objective of this study was to investigate, compare, and integrate seasonal variations of soft tissues (assessed with DXA and BIVA) in elite soccer players, playing in the Italian top level championship (national major league).

**Methods:** 10 players (age 26.7 ± 3.1) were evaluated throughout the championship. Fat-Free Mass and Fat Mass were assessed with DXA (Lunar iDXA, GE Healthcare). In the same time resistance and reactance components of impedance vector (Z vector) at 50 kHz frequency (BIA 101 RJL, Akern Italy) have been recorded. Measurements were performed at the beginning (T0) and at the end (T1) of the preseason training, therefore at mid (T2) and at the end (T3) of the regular season. During that period, athletes shared the same nutrition and supplementation programs.

**Results:** From T0 to T1, FFM relative values increased significantly (82.2 ± 2.4% vs 85.1 ± 2.4%. p < 0.05) while FM% decreased considerably (13.8 ± 2.8% vs 10.8 ± 2.5%, p = 0.55). Both values maintained steady during the rest of the season. Weight and BMI did not show significant changes during the whole period (p > 0.05). Mean impedance vector placement differed significantly (Hotelling T2 test, p < 0.001), showing body water expansion and reduction respectively in T1 (compared to T0) and in T3 (compared to T1 and T2).

**Discussion:** During the competitive season, athletes tested with both BIVA/iDXA techniques showed, as expected, an improvement of quantitative parameters of BC (Fat-Free Mass and Fat Mass) during the preseason period, and remaining almost unchanged during the rest of the season. However, parallel BIVA measurements show that early improvements of FFM/FM ratio were due to a mere fluid expansion, rather than a real change in muscle or lipid amount as DXA could wrongly display. In contrast, a sharp decrease of water compartment during the final stage of the season, against the same amount of Fat-Free Mass, during early- and mid-season period, suggests a possible improvement of muscle tissues during competitive season that DXA did not detect.

**Conclusion:** According to our data, we found that DXA technique is not adequate to discriminate variations of the Fat-Free Mass protein/cellular and hydration components. We suggest therefore to complete soft tissue assessment with BIVA technique. DXA / BIVA methods should be considered as complementary, not alternative.

**P2**

The effects of β-alanine on body composition and performance measures in collegiate females

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**Background:** β-alanine has ergogenic potential based on its relationship with carnosine. Carnosine is rapidly degraded into β-alanine orally is effective at increasing intramuscular carnosine levels. The resistance training athlete may experience a higher training volume. This proposed benefit would increase work capacity and decrease time to fatigue. Therefore, the purpose of this study is to evaluate recreationally active collegiate females, following an 8 week strength training program while consuming either β-alanine (BA) or placebo (PL) for body composition and performance changes.

**Methods:** Sixteen collegiate females (21.0 ± 2.19 yrs, 64.76 ± 8.50 kg, 164.98 ± 6.97 cm, 30.11±5.08 %BF) participated in a double blind placebo controlled strength training and supplementation study. Supplementation consisted of either 5 g maltodextrin or 3.4 g BA (Dymatize Nutrition, Farmers Branch, TX), taken 15 minutes prior to training. In addition, all subjects were given a post workout protein supplement of ISO-100 (Dymatize Nutrition, Farmers Branch, TX). All subjects were tested at baseline (T1), 4 weeks (T2), and 8 weeks (T3) over the 8 week supplementation study. Training consisted
of 4x weekly upper and lower body resistance training. Body composition variables lean muscle mass (LBM), fat mass (FM), and percent body fat (BF) were assessed using DEXA. Performance variables VO\textsubscript{2 max}, aerobic time to exhaustion (TTE), wingate peak power (PP), wingate mean power (MP), bench press 1RM (BPmax) and repetitions at 65% (BPreps), leg press 1RM (LPmax) and repetitions (LPreps), vertical jump (VJ), and standing broad jump (BJ) were assessed using standard NSCA guidelines. Statistical analyses utilized separate two-way repeated measures ANOVA (time (T1 vs T2 vs T3) \times group (PL vs BA)) for all dependent variables. 95% confidence intervals were also run for each variable.

Results: There were no time \times group interactions (p > 0.05). Body composition (LBM, FM, BF) improved over time (p < 0.01) for both groups. Maximal strength demonstrated a significant increase (p = 0.001), and VJ increased at each time point (p = 0.047). Confidence interval data demonstrated a significant increase in VJ and BJ for the BA group only from T2 to T3.

Conclusions: Results from this study suggest that 4x weekly moderate intensity training is effective for increasing body composition and strength. BA supplementation may provide some additional benefit under periods of long duration (4+weeks) training on anaerobic power in women. These findings show 4 d/wk of moderate intensity training, in conjunction with BA supplementation, demonstrated no advantage on strength and body composition. However, as a potential result of increased training volume and power, a longer BA and training regimen may have a small advantage on sports performance including vertical and broad jumps, in college-aged women.

Acknowledgements: This study was supported by Dymatize Nutrition.

P3

The effects of fat-free vs. fat-containing chocolate milk ingestion on muscular strength in female collegiate softball players

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Background: Ingesting a post-workout beverage containing carbohydrate and high quality protein has been shown to favorably improve body composition and exercise performance. Chocolate milk supplies both carbohydrate and high quality proteins (casein and whey). For this reason, chocolate milk has become an increasingly popular sports nutrition beverage. To date, no one has investigated the differences between fat-free and fat-containing chocolate milk on strength performance in collegiate athletes. The purpose of this study, therefore, was to determine the effects of ingesting two forms of chocolate milk (fat free vs. fat containing) immediately after resistance exercise over an 8-week period to determine its effects on muscular strength.

Methods: In a double-blinded manner, 16 female collegiate softball players (16.4 ± 0.6 yrs; 167.1 ± 4.4 cm; 69.5 ± 9.4 kg) were randomized to baseline & following 8-weeks of a periodized resistance training program. Dependent variables were assessed as changes (delta scores) from pre- to post-testing in each group via an independent samples t-test using IBM SPSS Statistics (v19).

Results: 1RM Bench Press at baseline and post-testing for the fat-free milk group was 87.5 ± 18.7 and 98.1 ± 22.8 lbs (an average improvement of 10.6 ± 8.6 pounds). For the fat-containing milk group, 1RM Bench Press at baseline and post-testing was 77.5 ± 11.0 and 90.6 ± 14 lbs (an average improvement of 13.1 ± 6.5 pounds). There were no significant differences in changes from baseline to post-testing between the two groups (p = 0.524). 1RM Leg Press at baseline and post-testing for the fat-free milk group was 285 ± 68.9 and 316.9 ± 94.5 lbs (an average improvement of 31.9 ± 28.3 pounds). For the fat-containing milk group, 1RM Leg Press at baseline and post-testing was 277.5 ± 51.3 and 303.1 ± 51.3 lbs (an average improvement of 25.6 ± 10.5 pounds). There were no significant differences in changes from baseline to post-testing between the two groups (p = 0.567).

Conclusions: Based on these data, the ingestion of either fat-free chocolate milk or fat-containing chocolate milk will have similar effects in relation to upper and lower body strength changes when ingested immediately following resistance exercise over an 8-week period in collegiate softball players.

P4

The effects of beta-hydroxy-beta-methylbutyrate free acid supplementation on muscle damage, hormonal status, and performance following a high volume 2-week overreaching cycle

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Background: Athletes exposed to extreme training loads such as those that occur during multiple-game tournaments, two a day practices, or sudden increases in volume are prone to overreaching. Beta-hydroxy-beta-methylbutyrate (HMB) is thought to increase regenerative capacity following high intensity exercise. However, to date, its effects on muscle damage, hormonal status, and performance during overreaching have yet to be investigated. Therefore the purpose of this investigation was to determine the effects of HMB free acid (HMB-FA) supplementation on indices of muscle damage, strength, power, and cortisol following a 2-week overreaching cycle.

Methods: Twenty resistance trained males aged 21.3 ± 1.9 years were recruited for the study and randomly assigned to consume 3 g per day of HMB-FA (combined with food-grade orange flavors and sweeteners) or a placebo (food-grade orange flavors and sweeteners). All subjects were placed on a diet consisting of 25% protein, 50% carbohydrates, and 25% fat by a registered dietician who specialized in sport (RD, LDN, CISSN).

Seventy-two hours prior to the overreaching phase subjects were tested for baseline measures of creatine kinase (CK), cortisol, Wingate power and strength on the squat, bench press, and deadlift. Following, all subjects participated in a 2-week high volume resistance-training cycle. Each Monday through Thursday, subjects performed 3 maximal sets of 8-12 repetitions and 60-90 seconds rest of squats, leg press, bench press, deadlifts, pull-ups, military press, bent over rows, barbell curls and extensions. On Friday subjects were given three 1-RM attempts on the squat, bench press, and deadlift for a total of 9 maximal working sets, followed by power testing on the Wingate on Saturday. A 2 X 3 (Group X time (weeks 0, 1, and 2)) repeated measures ANOVA was used to assess main effects. If main effects were found LSD post hoc tests were incorporated to determine where differences were located.

Results: Significant group X time effects were found for CK, which relative to baseline values (256.1 ± 28.3 U/L) increased at weeks 1 (493.8 ± 36.3 U/L) and 2 (533.4 ± 49.0 U/L) in the placebo group, but not the HMB group (p < 0.05). There were also group X time effects for strength of the squat, bench press, and deadlift, which decreased during weeks 1 and 2 (ranging from -5.6 to -7.1% across strength measures) in the placebo group, but not the HMB group (p < 0.05). A group x time effect was found for Wingate peak power, which relative to baseline values (991.0 ± 60.1 watts) was lower at weeks 1 (924.6 ± 58.3 watts) and 2 (946.6 ± 59.1 watts) in the placebo group but not the HMB group. Finally there were group X time effects for cortisol, which relative to baseline (193.3 ± 1.4 μg/dl) increased in both weeks 1 (221.1 ± 1.4 μg/dl) and 2 (237.3 ± 1.0 μg/dl) in the placebo group, but not the HMB group (p < 0.05).

Conclusions: These results suggest HMB-FA given over a 2-week high volume, low recovery training cycle prevents overreaching, as well as the characteristic rise in serum stress hormones and serum indices of muscle damage.
P5

Effects of 12 weeks of beta-hydroxy-beta-methylbutyrate free acid gel supplementation on muscle mass, strength, and power in resistance trained individuals

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Background: Previous research in trained individuals supplemented with beta-hydroxy-beta-methylbutyrate (HMB) has been constrained to short (<10 weeks), non-periodized studies, lacking dietary control, that were subject to poor outcome measures (e.g. skin caliper measurements). These conditions make it difficult to determine HMB’s effects in athletes. The primary purpose of this study was to investigate the effects of 12 weeks of HMB free acid (HMB-FA) supplementation in trained individuals on direct skeletal muscle hypertrophy (ultrasound muscle thickness), strength, and power during periodized resistance training.

Methods: Twenty resistance trained males (21.3 ± 1.9 years) were randomly assigned to consume 3 g per day of HMB-FA (combined with food-grade orange flavors and sweeteners) or a placebo (no flavor or macronutrients) in a double-blind manner. All subjects participated in 12 weeks periodized resistance training consisting of full body workouts centered around the squat, bench press, and deadlift, and auxiliary exercises of pullups, military presses, bent over rows, barbell curls and extensions. Volume and intensity undulated such that Monday, Wednesday, and Friday subjects performed hypertrophy (3 sets of 8-12 RM loads and 60 seconds rest), power (3-5 sets of 1-5 repetitions, 40-60% 1-RM loads, 2-3 minutes rest), and strength (3-5 sets of 1-5 RM loads, with 3-5 minutes rest) respectively for weeks 1-8. This was followed by 2 weeks of an overreaching, pure hypertrophy training on M-TH, and strength on Friday. The final two weeks, subjects tapered (50-80% volume reduction) while focusing on strength and hypertrophy training on M-TH and strength on Friday. Therefore, altering the type of protein or macronutrient consumed late at night before bed. In addition, digestion and absorption kinetics of whey protein (WP) and casein protein (CP) may independently influence appetite and body composition. Therefore, altering the type of protein or macronutrient consumed late at night when starting an exercise training program may influence changes in resting metabolic rate (RMR), appetite (hunger, desire to eat, and satiety), and body composition. The purpose of this study was to compare the effects of isocaloric maltodextrin (PLA), WP and CP supplements when consumed immediately prior to nocturnal sleep when combined with four weeks of exercise training on RMR, appetite, and body composition.

Methods: Fifty-nine sedentary, overweight and obese volunteers were recruited and had baseline measurements of RMR, body composition (DXA), and appetite questionnaires taken after an overnight fast (0600-0900 h). Forty-eight completed the four-week study protocol. The participants were randomly assigned to one of three groups: PLA (n = 14, men: 4, BMI = 34.4 ± 1.5, age = 28.1 ± 1.8 years), WP (n = 17, men: 3, BMI= 34.3 ± 1.3, age= 30.1 ± 1.6 years), CP (n=17, men: 3, BMI= 35.4 ± 1.3, age= 30.1 ± 1.6 years) in a double blind design. Participants were then instructed to consume their supplement at least two hours after dinner and no more than 30 minutes before bed each night for four weeks. All participants attended supervised exercise sessions (3x/week; 2 days of resistance exercise and 1 day of high-intensity cardiovascular exercise). A one-way ANOVA was performed to examine possible group differences at baseline and differences in change between groups. Two-way ANOVA with repeated measures was used to evaluate changes in dependent variables over time (pre x post) x (PLA x WP x CP). A Tukey test was used for post hoc comparisons. Values are reported as means ± SEM.

Results: Eleven participants who completed baseline measurements failed to complete the four-week protocol and maintain satisfactory compliance with exercise and supplement intake (> 80% compliance). No significant group differences existed at baseline. There were no group x time interactions for RMR, hunger, satiety, desire to eat, fat mass, lean body mass, or weight (P > 0.05), although RMR displayed a trend towards significance with the PLA group decreasing by 74.3 ± 94.5 and WP and CP increasing by 235.73 ± 84.5 and 51.7 ± 79.4 kcal/day, respectively (P = 0.0559). Significant time effects were measured for satiety (pre: 31.5 ± 2.3, post: 40.6 ± 2.3, P< 0.0008) and BMI (pre: 51.8 ± 0.1, post: 52.3 ± 0.1, P< 0.0001).

Conclusions: Our data indicate protein type and macronutrient choice in the late evening may not influence changes in RMR, hunger, desire to eat, satiety, and body composition during the first four weeks of an exercise intervention in sedentary, overweight and obese individuals.

Acknowledgments: This study was supported by a grant from FSU’s Council on Research and Creativity.

P6

The effect of nighttime macronutrient choice and exercise training on resting metabolic rate, appetite, and body composition in overweight and obese men and women


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Background: Nighttime eating is often associated with metabolic syndrome and poor body composition and these conditions may be influenced by the natural decline in metabolism that occurs during sleep. However, previous research indicates that protein consumption increases metabolic rate more than carbohydrates or fat, and therefore may attenuate this decline when consumed at night before bed. In addition, digestion and absorption kinetics of whey protein (WP) and casein protein (CP) may independently influence appetite and body composition. Therefore, altering the type of protein or macronutrient consumed late at night when starting an exercise training program may influence changes in resting metabolic rate (RMR), appetite (hunger, desire to eat, and satiety), and body composition. The purpose of this study was to compare the effects of isocaloric maltodextrin (PLA), WP and CP supplements when consumed immediately prior to nocturnal sleep when combined with four weeks of exercise training on RMR, appetite, and body composition.

Methods: Fifty-nine sedentary, overweight and obese volunteers were recruited and had baseline measurements of RMR, body composition (DXA), and appetite questionnaires taken after an overnight fast (0600-0900 h). Forty-eight completed the four-week study protocol. The participants were randomly assigned to one of three groups: PLA (n = 14, men: 4, BMI = 34.4 ± 1.5, age = 28.1 ± 1.8 years), WP (n = 17, men: 3, BMI= 34.3 ± 1.3, age= 30.1 ± 1.6 years), CP (n=17, men: 3, BMI= 35.4 ± 1.3, age= 30.1 ± 1.6 years) in a double blind design. Participants were then instructed to consume their supplement at least two hours after dinner and no more than 30 minutes before bed each night for four weeks. All participants attended supervised exercise sessions (3x/week; 2 days of resistance exercise and 1 day of high-intensity cardiovascular exercise). A one-way ANOVA was performed to examine possible group differences at baseline and differences in change between groups. Two-way ANOVA with repeated measures was used to evaluate changes in dependent variables over time (pre x post) x (PLA x WP x CP). A Tukey test was used for post hoc comparisons. Values are reported as means ± SEM.

Results: Eleven participants who completed baseline measurements failed to complete the four-week protocol and maintain satisfactory compliance with exercise and supplement intake (> 80% compliance). No significant group differences existed at baseline. There were no group x time interactions for RMR, hunger, satiety, desire to eat, fat mass, lean body mass, or weight (P > 0.05), although RMR displayed a trend towards significance with the PLA group decreasing by 74.3 ± 94.5 and WP and CP increasing by 235.73 ± 84.5 and 51.7 ± 79.4 kcal/day, respectively (P = 0.0559). Significant time effects were measured for satiety (pre: 31.5 ± 2.3, post: 40.6 ± 2.3, P< 0.0008) and BMI (pre: 51.8 ± 0.1, post: 52.3 ± 0.1, P< 0.0001).

Conclusions: Our data indicate protein type and macronutrient choice in the late evening may not influence changes in RMR, hunger, desire to eat, satiety, and body composition during the first four weeks of an exercise intervention in sedentary, overweight and obese individuals.

Acknowledgments: This study was supported by a grant from FSU’s Council on Research and Creativity.

P7

Effects of short-term ingestion of Russian tarragon prior to createine monohydrate supplementation on anaerobic sprint capacity: a preliminary investigation

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Background: The improvement in anaerobic exercise capacity associated with the ingestion of Russian Tarragon (RT) have been reported to produce anti-hyperglycemic effects [1] and influence plasma creatine levels during the ingestion of CrM [2]. Theoretically, RT ingestion may enhance creatine retention and thereby promote greater ergogenic benefit compared to CrM supplementation alone. The purpose of this study was to
determine if short-term, low-dose aqueous RT extract ingestion prior to CrM supplementation influences anaerobic sprint performance.

Methods: In a double-blind, randomized, and crossover manner; 9 untrained males (20 ± 1 yrs; 180 ± 11 cm; 79.9 ± 14 kg) ingested 500 mg of aqueous Tarragon extract (Finzelberg, Andernach, Germany) or 500 mg of a placebo (P) 30-minutes prior to ingesting 5 g of CrM (Creapure®, AlzChem AG, Germany) (CrM+P and CrM+RT groups, respectively. Subjects ingested the supplements two times per day (morning and evening) for 5-days and then repeated the experiment after a 6-week wash-out period. Subjects performed two 30-second Wingate Anaerobic Capacity (WAC) tests at baseline, days 3 and 5 of supplementation protocol on an electronically braked cycle ergometer (Lode, Netherlands) interspersed with 3 minutes rest for determination of peak power (MP), mean power (MP), and total work (TW). Data were analysed by repeated measures MANOVA on 9 subjects who completed both trials. Data are presented as changes from baseline after 3 and 5 days for the CrM+P and CrM+RT groups, respectively.

Results: Absolute MP (9.2 ± 57, 34.5 ± 57 W; p = 0.02), percent change in MP (2.5 ± 11, 6.7 ± 10%; p = 0.03), absolute TW (274 ± 1,700, 1,031 ± 1,721 W; p = 0.02), and percent change in TW (2.5 ± 11, 6.6 ± 10%; p = 0.03), increased over time in both groups. No significant time effects for both groups were observed in changes from baseline in absolute PP (-15.3 ± 377, -65.7 ± 402 W; p = 0.73) or percent change in PP (1.8 ± 21, -1.2 ± 24 %; p = 0.82). No significant differences were observed between CrM+P and CrM+RT groups in day 3, or 5 PP (CrM+P 1,472 ± 451, 1,435 ± 182, 1,380 ± 244; CrM+RT 1,519 ± 214, 1,565 ± 398, 1,519 ± 339 W; p = 0.92), MP (CrM+P 591 ± 94, 599 ± 89, 643 ± 83; CrM+RT 590 ± 103, 601 ± 78, 608 ± 96 W; p = 0.27), or TW (CrM+P 17,742 ± 2,822, 17,970 ± 2,663, 19,264 ± 2,482; CrM+RT 17,706 ± 3,098, 18,029 ± 2,339, 18,246 ± 2,888 W; p = 0.28).

Conclusions: Results suggest as little as 5g CrM taken twice daily for 3-5 days can improve MP and TW by 2-7%. However, results of this preliminary study indicate that ingesting RT 30-min prior to CrM supplementation had no additive effects on anaerobic sprint capacity in comparison to ingesting CrM with a placebo. Additional research is needed to examine whether ingestion of larger amounts of CrM in order to reduce variability, or larger amounts, changes in nutrient timing or increased duration of RT supplementation prior to and/or in conjunction with CrM ingestion would influence the ergogenic benefits of creatine supplementation.

Acknowledgements: Supported by the Martin Bauer Group, Finzelberg GmbH & Co. KG.

References

P8
Nutrition coupled with high-load or low-load blood flow restricted exercise during human limb suspension
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Background: The female athlete triad (TRIAD) affects athletic young women involved in physical activities where leanness or endurance is

Table 1

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*Significantly different vs. pre; †significantly different vs. HRE; p < 0.05. Mean ± SE, KE= Knee Extensors, PF= Planter Flexors, LP = Leg Press, CR = Calf Raise.
emphasized. Elements of the TRIAD include disordered eating, amenorrhea, and early-onset osteoporosis. Athletic training literature is consistent in the description of the medical professionals included on the TRIAD treatment team, and supports the inclusion of MDS, RDs, MHPs, and ATCs (Reinink & Alexander, 2005). In contrast to articles specific to ATCs, the literature directed to MDS, RDs, and MHPs indicates the importance of including these professionals, but inconsistently includes an ATC on the TRIAD treatment team (Sherman & Thompson, 2004). The purpose of this study was to investigate the perceptions of MDS, RDs, MHPs, and ATCs regarding the role of the ATC on the TRIAD treatment team.

Methods: One hundred seventy-five professionals (51 RDs, 48 ATCs, 41 mental health practitioners [MHPs], 35 MDs) participated in this study. RDs were randomly selected from the SCAN practice group of the American Dietetic Association. Participants completed a questionnaire with four constructs (the role of the ATC on the TRIAD team; the ability of the ATC to A) recognize, B) refer, and C) treat the TRIAD patient). Each item was anchored by a 5-point Likert scale. Data were analyzed using one-way MANOVA with an alpha level of 0.05.

Results: MANOVA results indicated that the medical profession significantly influenced the combined dependent variable of the role of the ATC on the TRIAD treatment team, and the perceived ability of the ATC to A) recognize, B) refer, and C) treat the TRIAD patient (Pillai’s Trace=.211, F(12, 510)=3.21, p<.001, partial n²=.07). A discriminant analysis yielded a significant function for role [Wilks’s Lambda=.8 chi-square (N=175, df=12]=38.16, p<.001]. This function consisted primarily of a negative relationship to the variable “treat,” and a positive relationship to the variable “refer.”

Conclusions: Registered Dietitians had statistically significant different perceptions than MDS, MHPs, and ATCs regarding the ability of the ATC to refer and treat the TRIAD patient. The ATC should refer the TRIAD patient to a RD for nutritional counseling, but should be able to identify and provide basic concepts regarding disordered eating and the relationship between a caloric deficit, amenorrhea, and stress fractures (DeSouza, 2006). Critical to appropriate treatment is timely recognition and referral by those who have daily contact with the TRIAD patient.

P10
Acute physiological effects of the commercially available weight loss/energy product, Fastin-XR® in contrast with the individual effects of caffeine and acacia rigidula
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Background: The prevalence of overweight and obesity worldwide has resulted in the growth of over the counter weight loss products into one of the largest categories of nutritional supplements. However, few commercial products have been properly examined in finished commercial form and seldom have been studied in comparison with individual active ingredients. The purpose of this study was to investigate the acute effects of the commercial weight loss/energy product, Fastin-XR® (High-Tech Pharmaceuticals, Inc., Norcross, GA) on measures of metabolic and hemodynamic activity in comparison with the effects of caffeine and the effects of acacia rigidula.

Methods: Ten recreationally active men, 28.5 ± 5 years of age, voluntarily participated in this investigation. Study participants completed four 3-hour resting metabolic testing sessions in which four treatment conditions including Fastin-XR® (FAS), 300 mg caffeine anhydrous (CAF), 250 mg acacia rigidula extract (AC), and cellulose placebo condition (PL) were examined in randomized order. Physiological activity was determined in 15 minute intervals immediately prior to and 1hr, 2hrs, and 3 hrs following ingestion. Metabolic activity was determined with open flow spirometry (VO20000, Medgraphics, St. Paul, MN) with outcomes including oxygen consumption (VO2), respiratory exchange ratio (RER), minute ventilation (V̇E) and oxygen extraction (VO2/V̇E). Hemodynamic activity was examined by measurement of heart rate (HR) and blood pressures (SBP, DBP). Values of metabolic and hemodynamic variables were adjusted into change scores relative to baseline levels. Statistical analyses were conducted using a 4x3 ANOVA for repeated measures with the accepted level of significance set at p < 0.05.

Results: The VO2 change scores for 1hr, 2hrs, and 3 hrs post ingestion were significantly greater with FAS (22.1%, 19.3%, 16.5%) compared with PL (-2.6%, -1.7%, -2.0%), C (9.9%, 8.5%, 3.5%) and with AC (12.0%, 9.3%, 12.5%). The AC condition produced significantly greater VO2 compared with PL at all three time points with CAF displaying values greater than PL at 1hr and 2hrs post ingestion. No significant main or interaction effects were detected in values of RER. The FAS condition produced significantly greater elevations in VO2 compared with PL at all three time points. Both CAF and AC produced significantly greater VO2 change scores than PL, at 1hr post ingestion. Values of VO2/VO2 were significantly reduced from baseline at 1hr and 3hrs post with FAS and were significantly lower at 1hr post with CAF while AC produced elevations in VO2/VO2 of 3%, 4%, 7%. The changes in HR were significantly greater with FAS than PL at 2hrs and 3hrs post (9.4 and 11.1bpm) while AC resulted in 2.5 and 4.1 bpm greater HR at 1hr and 2hrs post which were significantly greater than P. FAS produced significantly greater blood pressure changes at all three time points compared with PL (SBP/133%, 26%, 19%; DBP/126%, 10%, 15%). Changes in DBP were significantly greater than PL at 1hr (9.4%) and 2hrs (7.1%). Blood pressures were not significantly affected by AC.

Conclusions: These findings indicate that resting energy expenditure is significantly enhanced with Fastin-XR®, 300 mg caffeine anhydrous, or 250 mg acacia rigidula. Hemodynamic activity (HR, SBP, DBP) is significantly elevated with Fastin-XR® with modest effects displayed with caffeine or acacia.

Acknowledgements: This study was supported by funding from Hi-Tech Pharmaceuticals, Inc., Norcross, GA.

P11
Kre-Alkalyn® supplementation does not promote greater changes in muscle creatine content, body composition, or training adaptations in comparison to creatine monohydrate
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Background: Creatine monohydrate (CM) has been proven to be the most effective form of creatine and is considered the gold standard. However, a number of different forms of creatine have been purported to be more efficacious than CM. The purpose of this study was to determine if a pH balanced form of creatine (Kre-Alkalyn® (KA), All American Pharmaceutical, Billings, MT, USA) that has been purported to promote greater creatine retention and training adaptations with less side effects is more efficacious than CM ingestion.

Methods: In a double-blind manner, 36 resistance trained participants (20.2 ± 2 yrs, 181 ± 7 cm, 82 ± 12 kg, 14.7 ± 5% body fat) were randomly assigned to supplement their diet with CM (Creatpure®, AbtChem AG, Germany) for 28-days (20 g/d for 7-d, 5 g/d for 21-d), an equivalent amount of KA as a high dose supplement (KA-H), or the manufacturer’s recommended dose of KA (1.5 g/d for 28-d, KA-L). Participants were asked to maintain their current training programs and record all workouts. Muscle biopsies from the vastus lateralis, fasting blood samples, body weight, DXA determined body composition, 1RM bench press and leg press, and Wingate Anaerobic Capacity (WAC) tests were performed at 0, 7, and 28-days. Data were analyzed by MANOVA with repeated measures and are presented as mean ± SD changes from baseline after 7 and 28-d, respectively.

Results: Muscle free creatine content increased in all groups over time (1.7 ± 2.2 and 10.2 ± 23 mmol/kg DW, p = 0.03) with no significant differences among groups (KA-L -3.3 ± 1.9, 0.53 ± 22; KA-H ± 12.8, 9.1 ± 23; CM 2.8±32, 22.3±28 mmol/kg DW, p=0.19). In percentage terms, free creatine muscle content significantly increased over time (10.7 ± 41, 29 ± 46%, p = 0.003) with no differences observed among groups (KA-L -5.9 ± 35, 11.9 ± 40; KA-H 6.2 ± 29, 27.3 ± 49; CM 34.6 ± 50, 50.4±45%, p=0.10). Bodyweight increased in all groups over time (1.7 ± 3.1 and 10.2 ± 23 kg, p < 0.05). All changes were significantly different from baseline.
Neither manufacturers recommended doses or equivalent
Methylsulfonylmethane (MSM) has been reported to
in sports nutrition, creatine
ECG intervals over the four-hour
t rate based on the stimulatory
ary thermogenic
This study was sponsored by a grant from
i o x i d a n te f e c k s i nb o t ha n i m a la n d
MSM, especially when provided at 3.0 grams per day, may
This study was funded by Dymatize Nutrition.
9(Suppl 1):
ntioxidant Capacity [TEAC], and
th, or anaerobic capacity than CrM.
Ingestion of caffeine is traditionally thought to acutely
D-fructose) is a low-
™
9(Suppl 1):
extract, raspberry ketones, and L-C
evaluate the safety of the ingest
systems, and this effect is primarily dependent on the dose as well as
of creatine.
These findings do not support claims that KA is a more efficacious form
of creatine.
Acknowledgements: Supported by AbChem AG, Germany.

P12
Evaluation of ingesting Dyma-Burn Xtreme, a thermogenic dietary
supplement, on hemodynamic and ECG responses in young
males and females
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Background: Ingestion of caffeine is traditionally thought to acutely elevate both blood pressure and heart rate based on the stimulatory properties that it exerts on both the central and peripheral nervous systems, and this effect is primarily dependent on the dose as well as an individual’s sensitivity to caffeine. The purpose of this study was to evaluate the safety of the ingestion of a proprietary thermogenic dietary supplement, including the ingredients caffeine, green tea extract, raspberry ketones, and L-Carnitine on ECG and hemodynamic responses.

Methods: In a double-blind, crossover design 6 male (N = 6, 23.6 ± 5.8 years, 180.5 ± 60.0 cm, 89.7 ± 7.1 kg, 16.5 ± 7.1 IBF) and 6 female (N = 6, 21.3 ± 3.8 years, 162.0 ± 60.0 cm, 64.1 ± 7.4 kg, 28.8 ± 7.6 %BF) moderate caffeine users (< 00 mg/day) reported to the lab on a 12 hour fast and had a baseline heart rate (HR), blood pressure (SBP and DBP), and ECG variables (RR interval, PR interval, QRS duration, and QT interval) assessed. Subjects consumed either a 2 capsule serving of Dyma-Burn Xtreme (DBX) or placebo (PLC) and had HR, SBP/DBP assessed at the end of each hour; and assessed ECG variables in a supine position at 1 hour (1HR), 2 hour (2HR), 3 hour (3HR), and 4 hour (4HR) post consumption. All data was analyzed utilizing a 2x2 ANOVA and one-way ANOVAs were used in the case of a significant interaction. A significance value of 0.05 was adopted throughout.

Results: No significant (p < 0.05) time or group x time interaction effects were observed for SBP, DBP, and HR. SBP delta responses (DBX vs. PLC) from baseline are as followed: 1HR (12.4 ± 11.8 vs. 17.5 ± 10.4 mmHg), 2HR (10.0 ± 14.0 vs. 0.0 ± 7.9 mmHg), 3HR (13.5 ± 22.4 vs. -2.5 ± 8.1 mmHg), and 4HR (8.3 ± 10.5 vs. 1.5 ± 0.6 mmHg). Delta responses (p) for DBP were as followed (DBX vs. PLC): 1HR (4.8 ± 7.4 vs. 0.6 ± 7.9 mmHg), 2HR (-0.25 ± 13.2 vs. -1.0 ± 7.2 mmHg), 3HR (6.7 ± 20.9 vs. -4.5 ± 10.1 mmHg), and 4HR (1.25 ± 6.8 vs. 1.1 ± 11.0 mmHg). The observed delta responses for HR are as followed (DBX vs. PLC): 1HR (-3.0 ± 6.2 vs. -2.5 ± 5.5 bpm), 2HR (-2.9 ± 6.5 vs. -1.0 ± 10.0 bpm), 3HR (-2.3 ± 5.6 vs. -0.5 ± 8.7 bpm), and 4HR (-1.4 ± 6.8 vs. -0.3 ± 7.4 bpm). No significant (p < 0.05) group or time differences were observed for ECG intervals (RR, PR, and QT) and QRS duration.

Additionally, no observed changes in ECG rate and rhythm abnormalities (i.e., PVCs, arrhythmias, etc.) were seen across any time points.

Conclusion: Acute ingestion of DBX had no significant effects on hemodynamic function and various ECG intervals over the four-hour observation period in daily caffeine users. The stimulatory effects that traditionally occur following caffeine ingestion was not observed, which could be explained by a decreased sensitivity to caffeine from regular consumption.

Acknowledgements: This study was funded by Dymatize Nutrition.

P13
Influence of methylsulfonylmethane on markers of exercise recovery
and performance in healthy men: a pilot study
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Background: Methylsulfonylmethane (MSM) has been reported to provide anti-inflammatory and antioxidant effects in both animals and man. Strenuous resistance exercise has the potential to induce both inflammation and oxidative stress. Using a pilot (proof of concept) study design, we determined the influence of MSM on markers of exercise recovery and performance in healthy men.

Methods: Eight, moderately exercise-trained men (27.1±6.9 yrs) were randomly assigned to ingest MSM (Opti MSM™) at either 1.5 grams per day or 3.0 grams per day for 30 days (28 days before and 2 days following exercise). Before and after the 28 day intervention period, subjects performed 18 sets of knee extension exercise in an attempt to induce muscle damage (and to be used partly as a measure of exercise performance). Sets 1-15 were performed at a predeteremined weight for 10 repetitions each, while sets 16-18 were performed to muscular failure. Muscle soreness (using a 5-point Likert scale), fatigue (using the fatigue-inertia subset of the Profile of Mood States), blood antioxidant status (glutathione and Trolox Equivalent Antioxidant Capacity (TEAC)), and blood homocysteine were measured before and after exercise, pre and post intervention. Exercise performance (total work performed during sets 16-18 of knee extension testing) was also measured pre and post intervention.

Results: Muscle soreness increased following exercise and a trend was noted for a reduction in muscle soreness with 3.0 grams versus 1.5 grams of MSM (p = 0.080), with a 1.0 point difference between dosages. Fatigue was slightly reduced with MSM (p = 0.073 with 3.0 grams; p = 0.087 for both dosages combined); TEAC increased significantly following exercise with 3.0 grams of MSM (p = 0.035), while homocysteine decreased following exercise for both dosages combined (p = 0.007). No significant effects were noted for glutathione or total work performed during knee extension testing (p > 0.05).

Conclusion: MSM, especially when provided at 3.0 grams per day, may favorably influence selected markers of exercise recovery. More studies are indicated to extend the work and findings of this pilot trial.

Acknowledgements: This study was sponsored by Bergstrom Nutrition, Vancouver, WA.

P14
A double blind clinical trial evaluating the relative pharmacokinetics and bioavailability of oral creatine monohydrate when combined with either isomaltulose or dextrose in healthy adult males
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Background: Isomaltulose (6-0-α-D-glucopyranosyl-D-fructose) is a low-glycemic, low-insulinemic disaccharide that is absorbed more slowly than conventional sugars (monosaccharides). In sports nutrition, creatine
monohydrate is often combined with dextrose (a monosaccharide) for the purpose of enhanced absorption and cellular uptake.

**Methods:** In a prospective, randomized, double blind, active-comparator-controlled, parallel group pilot study, 30 male subjects, age 27.0 ± 4.6 years, with BMI of 24.75 ± 1.99 kg/m² and a body surface area (BSA) of 1.953 ± 0.075 m², were randomly assigned to ingest 3 grams of creatine monohydate (CM) in combination with isomaltulose (ISO) or dextrose (DEX) in 1 of 3 concentrations (5 gm liquid, 17 gm capsules or 50 gm liquid). Rate of absorption (tₘₐₓ) and overall absorption (from BSA adjusted AUC₀⁻₈ and Cₘₐₓ) of CM was determined via changes in serum creatine over an 8-hour test period. Blood was collected at baseline and 0.5, 1, 2.5, 4 and 8 hours post ingestion with efficacy endpoints including Cₘₐₓ, Max, AUC₀⁻₈ and λₑₑᵣᵣ derived from normalized concentration vs. time curves for serum creatine (AUC by trapezoidal integration). Serum creatine levels were normalized by BSA using the Mosteller formula. For PK parameters, paired Student t test (or Wilcoxon if non-normally distributed) was used and for categorical variables, Fisher Exact test (or Chi-Square if necessary) was used. Statistics were calculated by R v2.14.0 (www.r-project.org).

**Results:** For the 17 gm concentrations, ISO had a significantly higher Cₘₐₓ than DEX (18.1 ± 1.5 vs 12 ± 1.6 mg/dl*m²; p<0.001) and for the 50 gm concentrations, the ISO trended higher for ISD than DEX (19.1 ± 6.4 vs. 13.7 ± 3.5 mg/dl*m²; p=0.099). The AUC for the 50 gm concentration was significantly higher for ISO than DEX (54.6 ± 9.2 vs 40.3 ± 10; p=0.046). The 17 gm (1.9 ± 0.8 hrs) and 50 gm (1.3 ± 0.7 hrs) concentrations were associated with larger tₘₐₓ, which trended toward significance over the 5 gm concentration (1 ± 0 hrs) for ISO (p=0.078) and was not significant for DEX. For all 3 concentrations, the Cₘₐₓ and AUC were significantly higher for ISO than DEX (17.8 ± 4.7 vs 13.5 ± 2.8 mg/dl*m² and 50.8 ± 17.1 vs 38.8 ± 10.3; p=0.003 and p=0.027 respectively).

**Conclusions:** CM appears to be absorbed more efficiently when combined to ingest 3 grams of creatine monohydate (CM) in combination with isomaltulose (ISO) or dextrose (DEX) in 1 of 3 concentrations (5 gm liquid, 17 gm capsules or 50 gm liquid). Rate of absorption (tₘₐₓ) and overall absorption (from BSA adjusted AUC₀⁻₈ and Cₘₐₓ) of CM was determined via changes in serum creatine over an 8-hour test period. Blood was collected at baseline and 0.5, 1, 2.5, 4 and 8 hours post ingestion with efficacy endpoints including Cₘₐₓ, Max, AUC₀⁻₈ and λₑₑᵣᵣ derived from normalized concentration vs. time curves for serum creatine (AUC by trapezoidal integration). Serum creatine levels were normalized by BSA using the Mosteller formula. For PK parameters, paired Student t test (or Wilcoxon if non-normally distributed) was used and for categorical variables, Fisher Exact test (or Chi-Square if necessary) was used. Statistics were calculated by R v2.14.0 (www.r-project.org).

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**P16**

The effects of beta-alanine and creatine monohydrate supplementation on muscle carnitine, body composition and exercise performance in recreationally active females

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**Background:** Acute ingestion of a protein beverage consumed late in the evening on metabolism, appetite, mood state, and blood lipids in overweight and obese adults


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**Background:** Common perception for nocturnal eating has deemed food off-limits during this time due to the potential health implications associated with increased food intake and lack of physical activity during sleep. However, given that macronutrients elicit different effects on metabolism, appetite and cardiometabolic health, it is possible that protein may be optimal for consumption in the evening before sleep. Therefore, the purpose of this study was to investigate the acute impact of protein ingestion consumed in the late evening before sleep on fat metabolism, appetite, mood state, and blood lipids in overweight and obese adults.

**Methods:** Forty sedentary overweight or obese (age, 18-45 years), but otherwise healthy, men (n = 8) and women (n = 32) participated in this a placebo-controlled, double blind study. Participants came to the lab fasted (0600-0900) for baseline measurements of appetite ratings (hunger, satiety, desire to eat), mood state, resting metabolic rate (RMR), and blood lipids and glucose. Participants were matched for body fat percent and randomized to one of three groups: carbohydrate placebo (PLA, n = 12; 150 kcal), whey protein (WP, n = 14; 150 kcal), or casein protein (CP, n = 14; 140 kcal). Participants consumed their respective supplements as the last food or caloric beverage at least 2 hours after dinner but no more than 30 minutes prior to nocturnal sleep. The following morning all participants returned to the laboratory for acute testing to repeat all measurements. Statistical analysis was conducted using 3x2 repeated measures and a Tukey test was used for post hoc comparisons. Significance was set at p<0.05 and all values are reported as means ± standard error.

**Results:** There were no differences in the dependent variables between groups at baseline as indicated by a one way ANOVA. A repeated measures ANOVA revealed a group by time interaction for higher respiratory quotient (RQ) at baseline in the PLA group compared to the protein groups (p<0.04). Group effects were observed for hunger, RMR, RQ, and glucose. Main effects for time were present for satiety (baseline, 29 ± 2 vs. acute, 37 ± 2) and desire to eat (baseline, 55 ± 2 vs. acute, 47 ± 2). Self-perceived mood indicating more vigor and less confusion in the PLA group compared to the protein groups was reported. All groups had less anger (PLA, baseline, 7.4 ± 1.6 vs. acute, 5.3 ± 1.6; WP, baseline, 9.7 ± 1.5 vs. acute, 6.6 ± 1.5; CP, baseline, 9.6 ± 1.5 vs. acute, 7.6 ± 1.5) and fatigue (PLA, baseline, 8.6 ± 1.1 vs. acute, 7.8 ± 1.1; WP, baseline, 8.8 ± 1.0 vs. acute, 7.9 ± 1.0; CP, baseline, 11.1 ± 1.0 vs. acute, 8.1 ± 1.0) although not statistically significant (p = 0.06 for both variables). No differences in blood lipids were present.

**Conclusions:** Acute ingestion of a protein beverage consumed in the late evening before sleep does not influence fat metabolism, appetite, mood state, or blood lipids and glucose in overweight and obese adults. Extending the duration of supplementation and including an exercise regimen may provide alternative results and warrants investigation. This study was supported by a grant from FSU’s Council on Research and Creativity.

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**P17**

Effects of 28 days of beta-alanine and creatine monohydrate supplementation on muscle carnitine, body composition and exercise performance in recreationally active females

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Background: Early research with beta-alanine (β-ALA) supplementation has shown increases in muscle carnosine as well as improvements in body composition, exercise performance and blood lactate levels. Creatine monohydrate supplementation has been extensively researched for its effects on anaerobic exercise performance. Recently, studies have examined the combined effects β-ALA and creatine supplementation on anaerobic exercise performance and lactate threshold. The purpose of the present study was to examine the acute and chronic effects of β-ALA supplementation with and without creatine monohydrate on body composition, aerobic and anaerobic exercise performance, and muscle carnosine and phosphagen levels in college-aged recreationally active females.

Methods: Thirty-two females were randomized in a double-blind placebo controlled manner into one of four supplementation groups including β-ALA only (BA), creatine only (CRE), β-ALA and creatine combined (BAC) and placebo (PLA). Participants supplemented for four weeks using an individualized daily dosing strategy that included a loading phase for the creatine for 1 week of 3.0 g/kg of body weight and a maintenance phase for weeks 2-4 of 0.1 g/kg of body weight, with or without a continuous dose of β-ALA of 0.1 g/kg of body weight. They reported for testing at baseline, day 7 and day 28. Testing sessions consisted of a resting muscle biopsy of the vastus lateralis, body composition measurements (DEXA), a graded exercise test on the cycle ergometer for VO_{2max} and lactate threshold, and multiple Wingate tests for anaerobic exercise performance.

Results: Results showed all supplementation strategies increasing muscle carnosine levels over placebo after four weeks, but not between groups. The percent change for each group after four weeks were 35.3 ± 44.8% (p = 0.02) for BA, 42.5 ± 99.3% (p = 0.01) for BAC, 6.7 ± 27.1% (p = 0.04) for CRE versus 13.9 ± 44.0% for PLA. Muscle total creatine showed trends of increasing for all active supplement groups after four weeks, but not between groups. The percent change in muscle creatine after four weeks was 4.63 ± 71.4% for BA, 154.0 ± 375.0% for BAC, 1.7 ± 41.6% for CRE and 4.1 ± 10.9% for PLA (p = 0.72). There were improvements for all groups with percent body fat after four weeks (p = 0.01), despite the present study not including a specific training protocol. The delta values were -2.3 ± 2.6% BAC, -1.4 ± 4.5% CRE, 0.2 ± 1.8% BA and -1.3 ± 2.2% PLA. There were no group differences observed for VO_{2max} (p = 0.27), peak lactate (p = 0.05) lactate threshold (p = 0.67), ventilatory threshold (p = 0.35), peak power (p = 0.42), mean power (0.28), total work (p = 0.28) or rate of fatigue (0.20).

Conclusions: The present study failed to show any additive effects of β-ALA and creatine supplementation for body composition, aerobic exercise, lactate threshold or anaerobic exercise measures. This could be due to the small sample size resulting in low power and effect sizes. Previous research has demonstrated that four weeks of β-ALA and creatine supplementation was enough time to increase muscle carnosine and phosphagen levels. However, perhaps more time is needed for performance adaptations to occur, especially without the addition of an exercise training component.

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P18 Self-reported nutritional supplement usage among professional mixed martial artists – preliminary findings

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Background: Although mixed martial arts (MMA) has been around for decades in other countries such as Brazil, it is still a relatively new sport for most of the world. Research on competitive sport athletes has focused primarily on the various individual sports that compose MMA such as judo, boxing, and wrestling. To date, there is limited peer-reviewed research investigating professional mixed martial artists. More specifically, there is very limited information regarding the dietary supplement habits of current professional mixed martial artists. Thus, the purpose of this study was to investigate various dietary habits, beliefs, and nutritional supplement usage, in professional mixed martial artists.

Methods: Male professional mixed martial artists (18-50 y/o) in every recognized weight class (i.e., bantam weight, featherweight, lightweight, welterweight, middleweight, light-heavy weight, and heavy weight) were eligible to participate in this study. Participants were recruited from various mixed martial art gyms primarily from, but not limited to, the states of Texas and Nevada. The investigators developed a new questionnaire that addressed various aspects of nutritional intake, sport supplement beliefs and usage, as well as weight cutting strategies. Once developed, the questionnaire was reviewed by 2 registered dietitians who have expertise in exercise nutrition, 3 exercise physiologists (2 of which are Certified Strength and Conditioning Specialists), and a physical therapist. Before the questionnaire was administered, a copy of the questionnaire was given to the participant so that they could visually read along as the questions were being asked to them by the investigators. The investigators verbally asked the participants the questions included in the questionnaire and wrote down their responses.

The data presented in this abstract focuses on sport supplement usage and weight cutting in the 48 hours prior to competition. Averages and standard deviations were calculated on Microsoft Excel.

Results: To date, 11 male professional mixed martial artists (29.9 ± 3.6 y/o; range: 23-37 y/o) participated in this ongoing study. On average, the participants have been competing professionally for 5.3 ± 4.6 years (range: ~ 0.7 – 12 years) and have had 14.2 ± 15.9 professional MMA fights (range: 2-42). Featherweight (~145 lbs), lightweight (~155 lbs), welterweight (~170 lbs), light heavyweight (~ 205 lbs) and heavyweight (~ 225 lbs) weight classes were represented in this sample. Out of the 11 participants who completed the questionnaire, 27.3% reported that they regularly consume creatine at least five to six times per week. Beta-alanine was consumed by 36.4% of the participants at least two to four times per week. Fish oil was consumed by 63.6% of the participants at least two to four times per week, while one participant reported consuming fish oil less often than once per month. Additionally, 36.4% of the participants consumed a thermogenic supplement five to six times per week. Furthermore, hydroxymethylbutyrate (HMB) was not consumed by any of the respondents. Regarding weight cutting practices, the respondents lost an average of 12.73 ± 7.2 lbs. (range: 0-22 lbs) during the forty-eight hours prior to competition.

Conclusions: The results of the study report common dietary supplements consumed by professional mixed martial artists. Current research regarding the dietary habits of professional mixed martial artists is currently lacking and thus more research is needed.

P19 Self-reported energy intake of male & female bodybuilders in the scientific literature

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Background: Nutrient intake is critical to a bodybuilder in terms of improving the overall muscular appearance of their physique. Total energy intake and the proportion of the kilocalories derived from carbohydrates, protein, and fats are often precisely planned and implemented to maximize skeletal muscle hypertrophy and reduce body fat. The purpose of this study is to describe the self-reported energy intakes of male and female bodybuilders and to determine if differences exist between the genders in regards to total energy intake and macronutrient composition.

Methods: A comprehensive literature review was performed using the PubMed database. Every effort was made to generate all relative articles pertaining to male and female bodybuilders’ self-reported energy intakes. The study yielded a total of 13 articles, 8 male bodybuilder studies and 5 female bodybuilder studies. The studies summarized contained professional, collegiate, and international bodybuilders during the offseason or non-competitive/non-dieting phase. In 12 of the
13 studies included, energy intakes were derived from food records ranging from 3 days to 7 days. The other study used a food frequency questionnaire. Total kilocalories, kilocalories/kg of body mass, kilocalories/kg of fat-free mass (FFM) and macronutrient composition were recorded and analyzed. Differences between male and female bodybuilders were analyzed via an independent samples t-test using IBM SPSS Statistics (v20).

Results: All data are reported as means ± standard deviations. Total kilocalories were 4,049 ± 892 and 2,067 ± 525 for male and female bodybuilders, respectively. The males ingested significantly more total kilocalories than the females (p = 0.001). When kilocalories were expressed per kilogram of body weight, male bodybuilders ingested 47.4 ± 10 and females ingested 35.8 ± 9. No significant differences existed between male and female bodybuilders (p = 0.064). When kilocalories were expressed per kilogram of FFM, male bodybuilders ingested 54.3 ± 12 and female bodybuilders ingested 41.6 ± 11. There were no significance differences in the amount of kilocalories per kilogram of FFM (p = 0.126). Total % of carbohydrate ingested was 48 ± 6% and 54 ± 3% for males and females, respectively. No significant differences were demonstrated between the genders (p = 0.070). The total % of protein ingested for males was 21 ± 2% and females was 24 ± 6%. No significant differences were demonstrated (p = 0.245). The total % of fat ingested for males was 31 ± 4% and females was 25 ± 8%. Although males reported a higher percentage of total fat ingested, no significant differences existed (p = 0.060).

Conclusions: Based on the data, male bodybuilders reported ingesting significantly more total kilocalories than female bodybuilders. However, when adjusted for body mass and fat free mass, no significant differences exist between the genders. In relation to macronutrient composition (% Carbohydrate, % Protein, & % Fat), no significant differences exist between male and female bodybuilders.

Effect of caffeine on lipid profile in ciclism practitioners
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Background: Caffeine is a β2 agonist that increases energy expenditure both at rest and during sports, increasing lipolysis and fatty acid oxidation. Caffeine may also increase the utilization of lipids as energy source during aerobic exercises.

Methods: The objective of this study was to investigate if caffeine can influence lipid profile in trained cyclists. 19 trained and familiarized male cyclists with a mean age of 35 ± 8.1 were randomly assigned to placebo (PLA) or Echinacea (ECH) groups, a proposed non-hematological response to the Echinacea-induced increase in EPO could be enhanced NO production. The purpose of this investigation was to determine whether six weeks of oral echinacea supplementation augmented NO production as a result of an Echinacea-induced increase in EPO and/or Echinacea-induced macrophyge activity.

Results: Twenty-four males (mean ± SE): age = 25.2 ± 1.4 yr, height = 1.81 ± 1.4 cm, mass = 78.1 ± 1.6 kg, percent body fat = 12.7 ± 0.9 %, VO2max = 52.9 ± 0.9 mL·kg⁻¹·min⁻¹ were randomly grouped using a stratified randomization technique. Total % of fat ingested for males were 31 ± 4% and females was 25 ± 8%. Although males reported a higher percentage of total fat ingested, no significant differences existed (p = 0.060).

Conclusions: Based on the data, male bodybuilders reported ingesting significantly more total kilocalories than female bodybuilders. However, when adjusted for body mass and fat free mass, no significant differences exist between the genders. In relation to macronutrient composition (% Carbohydrate, % Protein, & % Fat), no significant differences exist between male and female bodybuilders.

P20

Effect of caffeine on lipid profile in ciclism practitioners

P21

Effect of six weeks of oral echinacea purpurea supplementation on nitric oxide production

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Background: Echinacea purpurea, a purple coneflower plant of the composite family (Asteraceae), is native to North America and commonly used as an herbal supplement to enhance immune function. Echinacea purpurea has been shown to stimulate macrophyge activity which is a known stimulator of nitric oxide (NO) production. Echinacea purpurea supplementation (8,000 mg·d⁻¹) in untreated (42.5 ± 1.6 mL·kg⁻¹·min⁻¹) males was shown to elicit a 63% increase (p < 0.05) in serum erythropoietin (EPO) following two weeks of supplementation. This is supported in part by earlier findings which indicated that four weeks of Echinacea purpurea supplementation demonstrated a non-significant increase in maximal oxygen uptake (VO2max). It is plausible that Echinacea-induced EPO production may stimulate physiological responses independent of and/or in addition to erythropoiesis. There is also evidence suggesting EPO has vasculo-protective effects including the activation of endothelial nitric oxide synthase (eNOS). Based on these findings, a proposed non-hematological response to the Echinacea-induced increase in EPO could be enhanced NO production.

Methods: Twenty-four males (mean ± SE): age = 25.2 ± 1.4 yr, height = 1.81 ± 1.4 cm, mass = 78.1 ± 1.6 kg, percent body fat = 12.7 ± 0.9 %, VO2max = 52.9 ± 0.9 mL·kg⁻¹·min⁻¹ were randomly grouped using a stratified randomization technique. Total % of fat ingested for males were 31 ± 4% and females was 25 ± 8%. Although males reported a higher percentage of total fat ingested, no significant differences existed (p = 0.060).

Conclusions: Based on the data, male bodybuilders reported ingesting significantly more total kilocalories than female bodybuilders. However, when adjusted for body mass and fat free mass, no significant differences exist between the genders. In relation to macronutrient composition (% Carbohydrate, % Protein, & % Fat), no significant differences exist between male and female bodybuilders.

Results: All data are reported as means ± standard deviations. Total kilocalories were 4,049 ± 892 and 2,067 ± 525 for male and female bodybuilders, respectively. The males ingested significantly more total kilocalories than the females (p = 0.001). When kilocalories were expressed per kilogram of body weight, male bodybuilders ingested 47.4 ± 10 and females ingested 35.8 ± 9. No significant differences existed between male and female bodybuilders (p = 0.064). When kilocalories were expressed per kilogram of FFM, male bodybuilders ingested 54.3 ± 12 and female bodybuilders ingested 41.6 ± 11. There were no significance differences in the amount of kilocalories per kilogram of FFM (p = 0.126). Total % of carbohydrate ingested was 48 ± 6% and 54 ± 3% for males and females, respectively. No significant differences were demonstrated between the genders (p = 0.070). The total % of protein ingested for males was 21 ± 2% and females was 24 ± 6%. No significant differences were demonstrated (p = 0.245). The total % of fat ingested for males was 31 ± 4% and females was 25 ± 8%. Although males reported a higher percentage of total fat ingested, no significant differences existed (p = 0.060).

Conclusions: Based on the data, male bodybuilders reported ingesting significantly more total kilocalories than female bodybuilders. However, when adjusted for body mass and fat free mass, no significant differences exist between the genders. In relation to macronutrient composition (% Carbohydrate, % Protein, & % Fat), no significant differences exist between male and female bodybuilders.
P22
The effects of a caffeine-containing beverage on neuromuscular performance during a multi-joint, lower body power exercise
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Background: Current research has shown varied results when comparing the effects of caffeinated beverages on explosive exercise movements. We hypothesized that lower body muscular explosiveness would be significantly increased (p < 0.05) after Redline® energy drink ingestion versus a similar placebo (PLB) drink in recreationally active subjects (n = 16).

Methods: After a day of dietary control and caffeine abstinence, otherwise-fasted participants performed four separate, strict squat jumps (SJ) under both conditions (30 min before practice conditions and 90 min post practice conditions) at baseline and during each of the 5-days of supplementation to determine metabolic differences between upper- and lower-body power exercises as they respond to caffeine-related interventions.

Results: These preliminary data illustrated a significant increase in peak velocity in the Redline® energy drink condition versus PLB (Redline® 2.35 ± 0.36 m/s vs. PLB 2.29 ± 0.34 m/s (p = 0.033)). All other variables were regarded as non-significant.

Conclusion: Our early findings only partially support our hypothesis because all but one variable was unaffected during the squat jump. Future research should focus on potential differences between upper- and lower-body power exercise.

P24
Effects of short-term ingestion of Russian Tarragon prior to creative monohydrate supplementation on whole body and muscle creatine retention: a preliminary investigation
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Background: It has been well-established that muscle creatine monohydrate (CrM) increases whole body creatine retention and muscle creatine content. Extracts of Russian Tarragon (RT) have been reported to produce anti-hyperglycemic effects [1] and influence plasma creatine levels during CrM ingestion [2]. Theoretically, RT ingestion with CrM may promote greater creatine retention than ingesting CrM alone. The purpose of this preliminary study was to determine if short-term, low-dose aqueous RT ingestion prior to CrM supplementation influences whole body creatine retention or muscle creatine content.

Methods: In a double-blind, randomized, and crossover manner; 10 untrained males (20 ± 2 yrs; 179 ± 9 cm; 91.3 ± 34 kg) ingested 500 mg of aqueous Tarragon extract (Finzelloberg, Andemach, Germany) or 500 mg of a placebo (P) 30-minutes prior to ingesting 5 g of CrM (Creature®, AlChem AG, Germany) (CrM+RT). Subjects ingested the supplements two times per day (morning and evening) for 5-days and then repeated the experiment after a 6-week wash-out period. Urine was collected at baseline and during each of the 5-days of supplementation to determine urine creatine content. Whole body creatine retention was estimated as the difference from orally ingested CrM (10 g/d) from the amount of creatine excreted daily in urine. Muscle biopsies were also obtained from the vastus lateralis at baseline and after 3 and 5 days of supplementation for determination of muscle free creatine content. Data were analysed by MANOVA with repeated measures.

Results: Daily urinary excretion of creatine increased in both groups from baseline (0.4 ± 0.5; 1.9 ± 1.4, 3.5 ± 2.4, 4.4 ± 3.2, 3.9 ± 2.6, 5.2 ± 3.1 g/d; p = 0.001) with no differences observed between groups (CrM+P 0.4, 0.4 ± 1.9 ± 1.6, 3.5 ± 2.3, 4.7 ± 2.8, 5.0 ± 3.4; CrM+RT 0.5 ± 0.6, 1.7 ± 1.1, 3.4 ± 2.7, 4.2 ± 3.3, 4.6 ± 2.2, 5.4 ± 3/2 g/d; p = 0.59). Whole body daily creatine retention increased following supplementation (0.0 ± 0.0; 8.2 ± 1.4, 6.5 ± 2.4, 5.6 ± 3.2, 6.1 ± 2.6, 4.8 ± 3.2 g/d; p = 0.001) with no differences observed between groups (CrM+P 0.0 ± 0.0, 8.1 ± 1.6, 6.5 ± 2.4, 5.3 ± 3.2, 6.8 ± 2.8, 5.0 ± 3.4; CrM+RT 0.0 ± 0.0, 8.3 ± 1.1, 6.6 ± 2.7, 5.8 ± 3.5 ± 2.2, 4.6 ± 3.2 g/d; p = 0.59). Total whole body creatine retention during the supplementation period were not significantly different among groups expressed in total grams retained (CrM+P 31.7 ± 11.1; CrM+RT 30.6 ± 10.3 g; p = 0.82) or percentage retained (CrM+P 63.4 ± 22.3%; CrM+RT 61.2 ± 19.9%; p = 0.82) over the supplementation period.

Conclusions: Muscle protein metabolism is regulated on a meal-to-meal basis and consuming multiple evenly distributed protein meals that stimulate MPS multiple times is superior for optimizing muscle mass compared to consuming the majority of protein at a single meal.
to CrM supplementation did not affect whole body creatine retention or muscle free creatine content during a short-period of creatine supplementation (10 g/d for 5-days) in comparison to ingesting a placebo prior to CrM supplementation. Additional research is needed with a larger sample size to examine: 1.) whether ingestion of greater amounts of RT prior to and/or in conjunction with CrM ingestion would affect creatine retention; 2.) whether ingestion of RT with CrM over longer periods of time would affect creatine retention; and, 3.) whether co-ingesting RT with CrM and carbohydrate may reduce the need for ingesting carbohydrate with CrM in order to promote greater creatine retention.

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References

P25

Dose finding of OpunDia™ (O. ficus-indica extract) for its effect on oral glucose tolerance and plasma insulin

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Background: High-intensity exercise typically leads to a depletion of body carbohydrate stores, primarily muscle glycogen. Therefore, typical ‘sports recovery drinks’ include a high carbohydrate dose together with proteins so as to stimulate muscle glucose uptake and glycogen resynthesis via increased plasma insulin level. In fact, any intervention that elevate plasma insulin following exercise could facilitate repletion of muscle glycogen stores, and serve as a useful ‘recovery agent’. Extracts of the prickly pear cactus (Opuntia ficus-indica; OFI) can stimulate insulin secretion [1], but the most effective dose was not yet elucidated.

Methods: A double-blind randomized cross-over study was performed. Five subjects participated in four experimental sessions after a 10-12 hr overnight fast with a 1-week interval in between. They received either 500, 1000 or 1500 mg of encapsulated OFI-extract (OpunDia™), an aqueous extract of OFI; Finzelberg GmbH & Co. KG, Germany), or placebo capsules (LUVOS Heilerde) with identical appearance. Thirty min after ingestion of the capsules, a 2-hr oral glucose tolerance test (OGTT: 75g of glucose in 300ml water; blood samples (5ml) at 0, 30, 60, 90, and 120 min) was started. Plasma samples were assayed for glucose and insulin concentration. Student’s paired T-tests were used to evaluate treatment effects. A probability level (p) < 0.05 was considered statistically significant.

Results: Compared with placebo, the area under the serum insulin curve in the OGTT was significantly lower (p<0.05) at 1000 and 1500 mg OFI, but not in 500mg OFI. Administration of OFI in a dose of 1000 mg increased serum insulin concentration throughout the OGTT about two-fold compared with placebo, but no further increase occurred at an even higher dose (1500mg).

Compared with placebo, the area under the blood glucose curve (AUC) was not significantly decreased after oral administration of either 500, 1000 or 1500 mg of encapsulated OFI-extract. The lowest value was found at 1000 mg of OFI with a drop (n.s.) of about -14% compared to placebo.

Conclusions: It was previously shown that the aqueous extract of OFI stimulates insulin secretion before and after endurance exercise bouts (although not significant) and lowered the blood glucose level in young healthy sportmen. The current study identifies the most effective dose of OFI to stimulate post exercise insulin secretion to be 1000mg of aqueous extract of prickly pear (OpunDia™). It may be a promising and safe ingredient for the development of dietary and sports supplements with insulin secreting activity. Thus, OpunDia™ might act as a ‘recovery agent’ to stimulate post exercise muscle glycogen and protein resynthesis. Additional studies are requested to test the hypothesis that ingestion of OFI-extract together with carbohydrates can stimulate post-exercise muscle glycogen resynthesis, indeed.

Reference

P26

Thermic effect of soy versus whey protein – a pilot trial

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Background: Protein has a thermic effect that exceeds both fat or carbohydrate. However, it is unclear if there is a difference in the thermic effect of feeding (TEF) between different protein sources. Thus, the purpose of this study was to determine the thermic effect of an isocaloric feeding of whey versus soy protein.

Methods: In this single blind cross-over study, young male and female subjects (n=5, three males, two females; age range 18-21) consumed 40 grams of either whey (Zero Carb SRO by VPX) or soy protein (Iso-Rich Soy by Jarrow Formulas). Subjects reported to the lab on separate days (with at least 2 days between testing sessions) and underwent 3 hours of resting metabolic rate (RMR) testing. The thermic effect of feeding (TEF) was assessed via oxygen uptake measures at baseline and 1, 2, and 3 hours post-consumption of protein. Data was collected via the ParvoMedics metabolic cart.

Results: A paired t-test for AUC revealed a 14.54% greater TEF for the whey protein than soy (p < 0.05). The range amongst the subjects was 4.05%-23.36% greater increase in TEF. The average peak in oxygen uptake was 29.94% for whey protein and 23.98% for soy protein, respectively.

Conclusion: Based on this small sample size, there is evidence to suggest that whey protein may have a greater TEF than soy.

Competing interests: Jose Antonio is a sports science consultant to VPX Sports.

Figure 1 abstract P25

Figure 2 abstract P26
P27
The acute effects of a free acid beta-hydroxy-beta-methyl butyrate supplement on muscle damage following resistance training: a randomized, double-blind, placebo-controlled study

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Background: Beta-hydroxy-beta-methyl butyrate (HMB) when given over a two-week period of time (loading phase) has been demonstrated to decrease skeletal muscle damage, and improve recovery. However, few studies have investigated its acute effects on muscle damage and recovery. Therefore the purpose of this investigation was to determine the acute effects of a free acid HMB (HMB-FA) supplement on serum indices of muscle damage and perceived recovery following a high volume, muscle damaging training session.

Methods: Twenty resistance trained males aged 21.3 ± 9 years with an average squat, bench press, and deadlift of 172 ± 2.0, 138 ± 1.9 and 2.07 ± 2.7 times their bodyweight were recruited for the study. The participants were randomly assigned to receive either a 3 g per day of HMB-FA (Combined with Food-grade orange flavors and sweeteners) or a placebo (Food-grade orange flavors and sweeteners) divided equally into servings given 30 minutes prior to exercise and with two separate meals on day 1. They were then instructed to consume the same amount of HMB-FA or placebo divided into break fast, lunch and dinner on day 2. Immediately prior to the exercise session and 48 hours post exercise, serum creatine kinase (CK), testosterone, cortisol, and perceived recovery scale (PRS) measurements were taken. Perceived Recovery Status consists of values between 0-10, with 0-2 being very poorly recovered with anticipated declines in performance, 4-6 being low to moderately recovered with expected similar performance, and 8-10 representing high perceived recovery with increased expect in performance. A 2 x 2 repeated measures ANOVA was used to assess any main effects. If any main effects were found LSD post hoc tests were incorporated to determine where those differences were located.

Results: Significant time and group x time effects were found for CK, which increased to a greater extent in the placebo (140.7 ± 40.9 to 603.8 ± 249.0) than HMB-FA group (158.0 ± 50.9 to 322.2 ± 115.9) (p < 0.05). There were also significant time and group x time effects for PRS, which decreased to a greater extent in the placebo (9.1 ± 1.2 to 4.6 ± 1.4) than the HMB-FA group (9.1 ± 0.9 to 6.3 ± 0.9) (p < 0.05). There were no time or group x time effects for testosterone or cortisol.

Conclusions: These results suggest that an HMB-FA supplement given over a short period of time (48 hours), and without a loading phase to resistance trained athletes can blunt increases in muscle damage and prevent declines in perceived readiness to train following a high volume, muscle damaging resistance training session.

P28
Dietary supplementation and the quality of life of retired football players

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Methods: Questionnaires were completed by 15 ambulatory retired football players with the average age of 49.6 (±8.2) years and average professional football career of 7.6 (±3.2) years. In this open label study, the subjects had daily intake of the following supplements for 6 months: Fish oil with vitamin D3, antioxidant, natural vitamin and mineral supplement, glyconutrient and a phytosterol-amino acid complex. Outcome measures included “Healthy Days Measures” (CDC HRQOL-4), WHO Quality of Life (WHOQOL-BREF), Profile of Mood States (POMS) and Memory Functioning Questionnaire (MFQ). Self-assessments of pain of joints and extremities as well as range of motion were also collected using a questionnaire. Mean differences were assessed between baseline and each data collection point at 1, 3 and 6 months.

Results: Statistically significant differences from baseline were obtained in key outcome measures. CDC HRQOL general health rating showed improvement at month 1 (p = 0.008) and sustained to month 6 (p < 0.0001). There was increased number of healthy days per month related to physical health and mental health and the improvement in the number of mental health days was significant at 6 months (p = 0.029). WHOQOL-BREF showed improvement on the rating of quality of life at 6 months (p = 0.038) and satisfaction with health in all measurement points (p < 0.05). Both the Physical and Psychological Domains showed significant improvement at 6 months (p < 0.05). General Rating of Memory using the MFQ showed significant improvement at 3 and 6 months (p < 0.05). The POMS showed that the participants rated the Vigor scale significantly higher at 3 months compared to the baseline (p = 0.024). Self-assessment of pain showed decreasing trends but only the elbow and knee pain showed statistically significant improvement at 1 and 3 months (p < 0.05). There were no adverse events related to the supplementation.

Conclusions: This preliminary study demonstrates that multiple dietary supplementations enhanced the quality of life of this special group of retired football players. However, a larger well controlled clinical trial is needed to determine whether these findings can be replicated not only in this special population but also in other group of retired athletes.

Competing interests: R. A. Sinnott and R. L. Maddela are employees of Mannatech, Incorporated. The other authors do not have any conflict of interest.

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P29
The combination of green tea, caffeine, conjugated linoleic acid and branched chain amino acids have no effect on body composition and abdominal fat changes in overweight and obese men and women

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Background: Caffeine, conjugated linoleic acid (CLA), green tea and branched chain amino acids (BCAA) have shown to individually improve body composition in overweight and obese men and women. The purpose of this study was to investigate the effects of a multi-ingredient dietary supplement containing caffeine, CLA, green tea, and BCAA on body composition and abdominal fat mass in overweight and obese men and women.

Methods: Thirty-four healthy men and women were randomly assigned to two groups: 1) a soybean oil placebo (PL) or 2) a multi-ingredient
dietary supplement (DS) containing 99 mg of caffeine and a proprietary blend containing 1510 mg of CLA, green tea extract (45% EGCg), L-leucine, L-isoleucine and L-valine. Twenty-two participants completed the study (PL: n = 11); age, 34 ± 12 years; body mass, 97.0 ± 22.6 kg; BMI, 34.1 ± 6.1; DS: n=11; age, 36 ± 11.1 years; body mass, 91.9 ± 18.7 kg; BMI, 30.0 ± 4.9). Both groups consumed two pills with breakfast and two pills with lunch. Body composition and android fat (dual-energy X-ray absorptiometry), waist and hip circumferences, blood pressure and heart rate were measured at baseline and after 8 weeks of supplementation. Participants were instructed to maintain normal dietary and exercise habits for the duration of the study. Data was analyzed using JMP 9 Pro (Cary, NC); significance was set to p < 0.05. A two-way ANOVA with repeated measurements was used to evaluate changes in dependent variables over time ([Pre x Post] x [PL x DS]). If significant time, group, or group-by-time interactions were reported, a Tukey test was used for post hoc comparisons.

Results: Twenty two participants finished the study. Five participants dropped the study due to personal reasons and seven were excluded from the data due to low compliance (<80%) to the supplement. No significant changes were measured in body composition, android fat, waist or hip circumference, heart rate and blood pressure.

Conclusion: Eight weeks of supplementation of a multi-ingredient supplement containing caffeine, CLA, green tea, and BCAA did not affect body composition, android fat, heart rate, or blood pressure in overweight and obese men and women.

Acknowledgements: This study was supported by a grant from the International Society of Sports Nutrition.
Background: While there are numerous natural products being marketed and sold that claim to help consumers lose body weight and body fat, very few undergo finished product-specific research demonstrating their safety and efficacy. Additionally, there is a growing interest in the role of adipokines in the development of Metabolic Syndrome and the regulation of body fat, blood pressure, insulin sensitivity, carbohydrate and lipid metabolism. The purpose of this study was to determine the safety and efficacy of a multi-ingredient supplement containing primarily raspberry ketone, caffeine, and Citrus aurantium (Prograde Metabolism™ (Metabo)) as an adjunct to an eight-week weight loss program.

Methods: Using a randomized, placebo-controlled, double-blind design, 70 healthy men and women were matched for gender and body mass index and then randomly assigned to ingest 4 capsules per day of METABO or a placebo. Following baseline testing, both groups underwent eight weeks of daily supplementation, a calorie restricted diet, and supervised exercise training. All subjects were tested for changes in body composition via DEXA, serum adipokines (adiponectin, resistin, leptin, TNF-α, IL-6) and general markers of health (heart rate, blood pressure, and comprehensive clinical chemistry panels of sera and plasma) before and after 8-weeks of supplementation. Data were analyzed via ANCOVA using baseline scores as the covariate and statistical significance was set a priori at P≤0.05.

Results: Significant differences were noted in body weight (METABO: -2.0%; 94.3 ± 23.3 [wk 0] to 92.4 ± 23.4 kg [wk 8] vs. placebo: -0.5%; 91.0 ± 25.1 [wk 0] to 90.5 ± 24.9 kg [wk 8], P < 0.01), fat mass (METABO: -7.8%; 37.2 ± 14.9 [wk 0] to 34.3 ± 14.8 kg [wk 8] vs. placebo: -2.8%; 32.6 ± 13.5 [wk 0] to 31.7 ± 12.7 kg [wk 8], P < 0.001), lean mass (METABO: +3.4%; 52.8 ± 13.5 [wk 0] to 54.6 ± 13.8 kg [wk 8] vs. placebo: +0.8%; 50.5 ± 13.6 [wk 0] to 50.9 ± 13.6 kg [wk 8], P < 0.03), waist girth (METABO: -2.0%; 104.1 ± 15.3 [wk 0] to 102.1 ± 14.7 cm [wk 8] vs. placebo: -0.2%; 104.6 ± 18.3 [wk 0] to 104.4 ± 18.1 cm [wk 8], P < 0.0007), hip girth (METABO: -1.7%; 114.3 ± 13.4 [wk 0] to 112.5 ± 13.5 cm [wk 8] vs. placebo: -0.4%; 113.5 ± 15.1 [wk 0] to 113.3 ± 14.9 cm [wk 8], P < 0.003), and energy levels (METABO: +29.3%; 3.0 ± 0.9 [wk 0] to 3.9 ± 0.6 [wk 8] vs. placebo: +5.1%; 3.3 ± 0.7 [wk 0] to 3.5 ± 0.9 [wk 8], P < 0.04). We also observed effects/trends for maintaining elevated serum leptin (P < 0.03), increased serum adiponectin (P<0.15), and decreased serum resistin (P < 0.08) in the METABO group vs. placebo. No changes in systemic hemodynamics or clinical blood chemistries were noted between groups.

Conclusions: These preliminary data indicate that METABO administration is a safe and effective adjunct to an eight-week diet and weight loss program. Ongoing studies are attempting to confirm these results and clarify the mechanisms by which METABO exerts the observed salutary effects.

Competing interests: TZ and HL are consultants of Ultimate Wellness Systems Inc and have received direct remuneration for scientific and technical services related to dietary supplements.

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