ACUTE EFFECT OF A MUTI-INGREDIENT PRE-WORKOUT SUPPLEMENTATION ON PACING THROUGH A HIGH-INTENSITY FUNCTIONAL TRAINING WORKOUT

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INTRODUCTION

The 'as many repetitions as possible' (AMRAP) circuit format is common in high-intensity functional training (HIFT) (2). Performance in AMRAP workouts is improved when more repetitions are completed within the allotted time. Exercise efficiency, the ability to sustain effort and power, and minimizing break and transition time appear to be important factors (6), and these might be improved with training and HIFT experience.

Several ingredients commonly found within pre-workout supplements are known to impact energy availability (1, 4, 5, 7, 9), and thus, might aid HIFT performance. Indeed, an acute dose of caffeine (6 mg·kg^{-1}) was found to improve local muscular in HIFT-trained athletes (1). Meanwhile, Outlaw and colleagues (8) noted improved performance in the second workout of back-to-back HIFT workouts after 6 weeks of supplementing with a multi-ingredient (MIPS) pre-workout supplement. However, no study has examined the effect of any MIPS formulation on acute HIFT performance.

PURPOSE

Determine the effect of acute ingestion of a MIPS formulation on pacing strategy during a 5-minute AMRAP workout.

METHODS

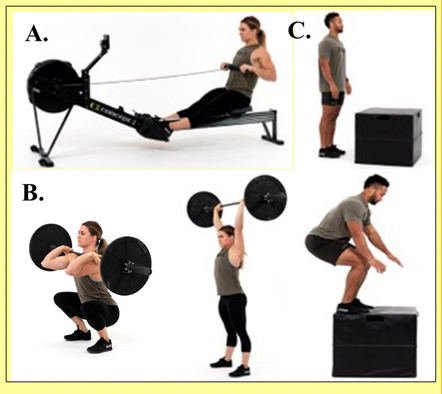
Men (n=7: 29±7 years, 173±9 cm, 83±17 kg) with HIFT experience (≥2 years) completed 4 fasted (2-3 hours) workout trials in cross-over fashion, once per week over 4 consecutive weeks at their normal workout time.

Participants randomly consumed either supplement (S, Maximum Pre-workout Formula, Shifted, LLC, Eugene, OR – see Table 1) or a non-caloric placebo (P), rested 40 minutes, and then randomly completed either a 5- or 15-minute AMRAP.

Video recordings from the 5-minute trials were analyzed to calculate the average, standard deviation (SD), and slope of time spent performing and transitioning between each exercise. Breaks and failed repetitions were also quantified.

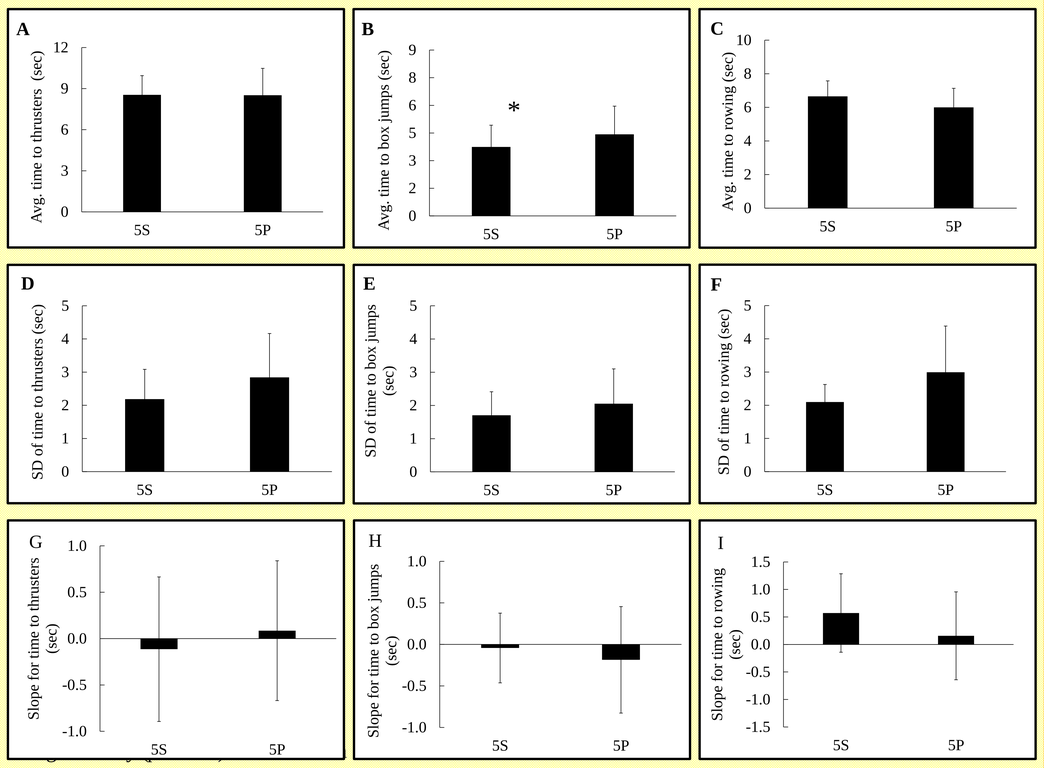
Figure 1. Workout structure

Within a 5-minute time limit, participants repeated a circuit of **(A.)** rowing for nine calories on an ergometer, **(B)** six barbell thrusters at 95 lbs. (43.1 kg), and **(C)** three 24-in box jumps while maintaining technical movement standards (2).



RESULTS

Figure 2. 5S and 5P average transition time to (A-C), as well as the SD (D – F) and slope (G – I) of these transitions.



Independent sample t-Tests revealed:

- No differences (p = 0.485) in repetitions completed during S (80 ± 8) and P (81 ± 6), nor any differences in repetition completion rate for any individual exercise (average time, slope, and SD; see Table 2).
- Average transition time to box jump ($p < 0.05$) was the only significant difference seen between S and P (p = 0.041; see Figure 2).
- **No breaks were taken (within an exercise set) nor were any failed repetitions observed during either condition.**

Table 2. Repetition completion rate for each exercise across seconds of each workout condition (mean ± SD)

	5S	5P	*p*-value
Rowing 9 calories			
Average	0.37 ± 0.06	0.37 ± 0.07	0.523
Standard Deviation	0.05 ± 0.03	0.06 ± 0.05	0.507
Slope	-0.03 ± 0.02	-0.03 ± 0.04	0.668
6 Thrusters			
Average	0.45 ± 0.05	0.44 ± 0.03	0.376
Standard Deviation	0.04 ± 0.03	0.05 ± 0.01	0.559
Slope	-0.01 ± 0.02	0.00 ± 0.01	0.128
3 Box Jumps			
Average	0.42 ± 0.07	0.43 ± 0.07	0.376
Standard Deviation	0.05 ± 0.03	0.05 ± 0.02	0.681
Slope	-0.02 ± 0.02	-0.02 ± 0.02	0.633

Table 1. Supplement ingredient list

Serving Size: 1 scoop (30 g)

Ingredients	Amount per serving	% DV
Calories	5	
Total Carbohydrate	1 g	<1%*
Niacin (as Nicotinic Acid)	15 mg	94%
Vitamin B6 (as Pyridoxine HCl)	1 mg	59%
Vitamin B12 (as Methylcobalamin)	100 mcg	4167%
Iron	1 mg	6%
Magnesium (from Red Spinach Leaf Extract and Dimagnesium Malate)	9 mg	2%
Sodium (as Pink Himalayan Sea Salt)	40 mg	2%
Potassium (from Red Spinach Leaf Extract and Potassium Chloride)	248 mg	5%
L-Citrulline	8 g	**
Creatine Monohydrate	5 g	**
Taurine	3 g	**
Beta-Alanine (as CarnoSyn®)	2.5 g	**
Betaine Anhydrous	2.5 g	**
L-Tyrosine	2 g	**
Red Spinach Leaf Extract (as Oxystorm®)	1 g	**
Beet Root Extract	1 g	**
Alpha-GPC (Alpha-Glycerol Phosphoryl Choline 50%)	300 mg	**
Caffeine Blend Caffeine Anhydrous (250 mg) zümXR® Delayed Release Caffeine (50 mg)	300 mg	**
L-Theanine	150 mg	**
ElevATP® (Ancient Peat and Apple Fruit Extract)	150 mg	**
Pink Himalayan Sea Salt	100 mg	**
Rhodiola rosea (root) Extract	100 mg	**
Co-Enzyme Q10	25 mg	**
AstraGin® [Astargalus membranaceus (root) Extract & Panax notoginseng (root) Extract]	25 mg	**
BioPerine® (Black Pepper Fruit Extract)	5 mg	**

*Percent Daily Values (DV) are based on a 2,000-calorie diet
** Daily value not established
OTHER INGREDIENTS: Citric acid, Natural Flavor, Calcium Silicate, Malic Acid, Silicon Dioxide, Sucralose, Spirulina Powder

CONCLUSIONS

Although transition time between thrusters and box jumps was reduced, MIPS did not impact repetitions completed or any other pacing variable. This agrees with previous data (3) where the present pre-workout formula did not affect vertical jump performance, but contrasts others reporting improved exercise performance with caffeine (1, 5) and chronic HIFT exercise performance with another MIPS formulation (8). It is possible that the imprecise caffeine dosage (300 mg regardless of body size), whereas the lack of a loading phase may have inhibited the effect of ingredients such as creatine monohydrate (4) and β-Alanine (9). Additionally, assessing averaged pacing values across a multi-round workout with a limited sample size may explain the lack of agreement.

PRACTICAL APPLICATIONS

Maintaining consistent power output across rounds in AMRAP-style workouts is a valid strategy for maximizing HIFT workout performance. The data from the present study does not support consuming this multi-ingredient supplement to improve 5-minute AMRAP pacing in men experienced with HIFT.

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ACKNOWLEGEMENTS

THIS STUDY WAS FUNDED BY SHIFTED, LLC (EUGENE, OR).