



Effects of Honey Supplementation on Sports Performance among Recreational Runners

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Abstract

This study was conducted to investigate the effects of honey supplementation on sports performance among recreational runner. Fifteen subjects (weight: 70.1 ± 10.5 kg, height: 169.7 ± 7.9 cm; body mass index (BMI): 24.3 ± 2.8 kg.m⁻²) participated in this randomized-crossover study. Subjects consumed honey supplementation or placebo 1 hour prior the sports performance test. During the sports performance trial, subject performed fitness tests such as 2.4 km run, planks core strength, push-ups, and sit-ups tests. Time to complete 2.4 km run and plank core strength test were measured and recorded. The number times doing push-ups and sit-ups in one minute were counted. Pair-t test was used to determine the differences of the measured parameter between the two trials. This present study discovered honey supplementation trial has a significantly shorter time to complete 2.4 km run in comparison with the placebo trial ($p < 0.05$). However, there was no significant improvement in the plank core strength, push-ups and sit-ups in the honey trial compared to the placebo trial ($p > 0.05$). In conclusion, this present study discovered that honey supplementation has an ergogenic effects on 2.4 km run performance but did not enhance plank core strength, sit-ups and push-ups among recreational runner.

Keywords: Honey; 2.4 km run; Plank Core Strength; Sit-Ups; Push-Ups; Recreational runner

Abbreviations: ATP: Adenosine Triphosphate; PSR: Progressive Shuttle-Run; BMI: Body Mass Index; SPSS: Statistical Programme for the Social Sciences; SD: Standard Deviation.

Introduction

Nutritional ergogenic aids are substances which can enhance athletic performance by influencing physiological and psychological processes. Nutritional strategies are the common types of ergogenic aids used by sportspersons to enhance their exercise performance. Sportspersons usually take supplements before a sports competition to make sure they have adequate nutrition, maximize their energy storage and enhance their sports performance

[1]. Supplements may enhance sports performance by increasing the available glucose and free fatty acid during exercise, increasing body glycogen storage in muscle and liver, and increasing antioxidant status [2]. The increasing availability of adenosine triphosphate (ATP) in the working muscles will augment sports performance [3]. Honey is a popular ergogenic supplement commonly consumed by sportspersons to improve sports performance and health status [4,5]. Athletes will take ergogenic supplements such as honey before, during or after exercise to enhance sports performance, maximized energy storage and to accelerate recovery process [4,6,7].

Honey is a healthy supplement which contains carbohydrates, natural enzymes, vitamins, minerals,

flavonoids, polyphenols, and amino acids [8]. It was well documented that honey has antioxidant [9-13], anti-inflammatory [14,15], antimicrobial [16,17], antimutagenic [18], and antitumor [19,20] properties. To date, there was several previous studies investigated effect of honey supplementation on sports performance among athletes [6,21,22]. Shukri found that ingestion of 500 mL of honey drink one hour before trial and 3 mL.kg body weight⁻¹ of cool honey drink every 20 minutes during the running trial was as good as a sports drink in improving running time trial performance and has similar effects on blood glucose in a hot and humid environment. Ernest reported that supplementation of honey (low glycaemic index) at a dosage of 15 g every 16 km during a simulated 64-km cycling time trial was significantly faster to complete time trial in comparison with placebo trial. However, Abbey and Rankin reported that acute supplementation of honey beverage at a dosage of 1g.kg body weight⁻¹ before and during soccer-stimulation test did not significantly improve progressive shuttle-run (PSR) test to exhaustion in comparison with the placebo trial. To date, there is still scanty information on effect of honey supplementation on sports performance in the field exercise tests such as 2.4 km running, plank core strength, sit-ups, and push-ups test. Therefore, this present study was to investigate effects of honey supplementation on sports performance in field exercise test among recreational runners.

Methodology

Fifteen recreational runners (weight: 70.1 ± 10.5 kg; height: 169.7 ± 7.9 cm; body mass index (BMI): 24.3 ± 2.8 kg.m⁻²) were randomly selected and participated in this randomized-crossover study. Subjects with hypertension, asthma, diabetes, bronchitis, anemia, any injury and heart problems, kidney, or liver diseases and or any other major disease were excluded from the study. The entire experimental protocol was informed to each subject before they participated in this study. Subjects were asked to refrain from exercise for 24-hour before the tests to ensure that they have adequate rest before trial. Their food diary and physical activity diary for the last 72 hours were also collected. Subjects recorded their 3-day food diary prior to the first trial and repeated the same diet over 3 days before the days of consecutive test to minimize the differences in muscle glycogen between the trials.

Subjects required to performance two trials of sports performance tests in a randomised cross-over trial. Subjects performed sit-ups, push-ups, plank core strength and 2.4 km run with 10 minutes rest between the tests at each trial. Subjects supplemented with 40 grams of honey with 500 ml of water or placebo one-hour prior exercise trials. Time to

complete 2.4 km run and plank core strength were measured and recorded. The number times doing push-ups and sit-ups in one minute were counted. There was one week wash-out period between the two trials. All the statistical analyses were computed by using the Statistical Programme for the Social Sciences (SPSS) version 29.0 (SPSS Incorp, United States). The level of significance for all analysis was set at p<0.05. All the collected data were expressed in mean and standard deviation (mean ± SD). Pair-t test was used to determine the differences of the measured parameter between the two trials.

Results and Discussion

There were fifteen recreational runners were randomly selected and participated in this study. The physical characteristic of subjects was shown in Table 1. The mean age of the subjects was 23.3 ± 3.9 (year), weight was 70.2 ± 10.5 (kg), height was 169.7 ± 8.0 (cm). Body mass index was 24.3 ± 2.8 (kg.m⁻²) and it was categorized as normal. All subjects were healthy and free from asthma, dry cough, diabetes, hypertension, heart disease, liver disease and cancer which fulfil the inclusion selection of subjects.

| Physical characteristics of Subjects | Mean ± SD |
|---------------------------------------|-------------|
| Age (years) | 23.3 ± 3.9 |
| Weight (kg) | 70.2 ± 10.5 |
| Height (cm) | 169.7 ± 8.0 |
| Body mass index (kg.m ⁻²) | 24.3 ± 2.8 |

Table 1: Physical characteristics of the subjects. Data are presented as mean ± SD.

The most noble finding in this present study was that the time to complete 2.4 km run test in the honey trial (21.1 ± 8.7 minutes) was significantly shorter compared to placebo trial (23.8 ± 9.1 minutes) (p<0.05) (Figure 1). This present finding was agreement with several previous studies also found honey supplementation significantly improved sports performance at pre-exercise supplementation [6,21-23] and post exercise performance [24-25]. However, the present finding was different from the data reported study by Abbey and Rankin which reported that honey did not seem to contribute any ergogenic benefits on exercise performance. The inconsistent finding between this present study and Abbey and Rankin could be due to the different research protocol, subjects and environment condition of the research that has been conducted. Field work study has been reported to be not consistent because many parameters were not controlled such as ambient temperature and relative humidity.

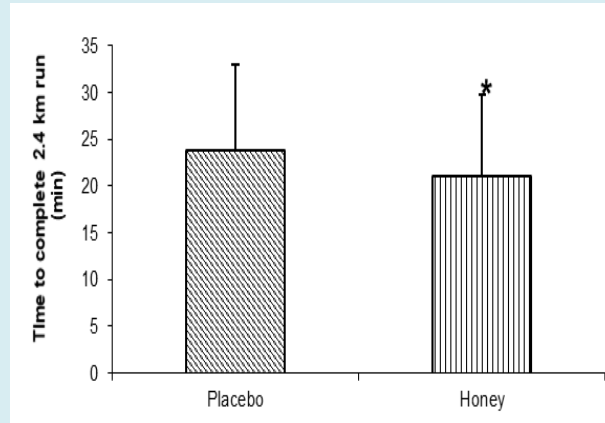


Figure 1: Time to complete 2.4 km run in the placebo and honey trials. Data are presented as mean \pm SD. *Denotes significant difference from placebo trial at $p < 0.05$.

This present study found that honey trial did not improve sit-ups, push-ups and plank core strength test significantly compared to the placebo trials ($p > 0.05$) (Figures 2 & 3). It reflected that honey did not show ergogenic effects on strength exercise in comparison with endurance running

exercise. It may be due to the difference in energy generating system which honey contribute more adenosine triphosphate (ATP) as energy in an aerobic running exercise compared to strength exercise.

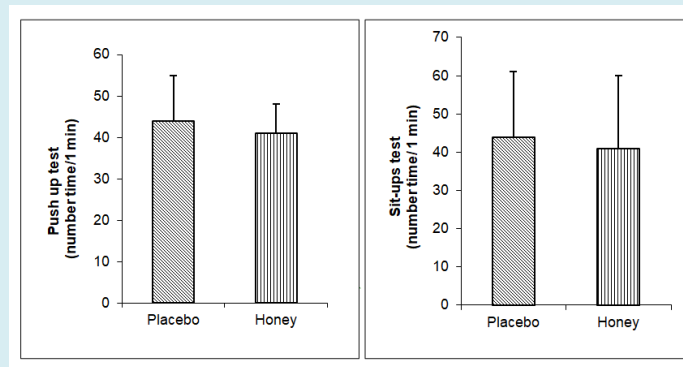


Figure 2: Push-ups and sit-ups in the placebo and honey trials. Data are presented as mean \pm SD.

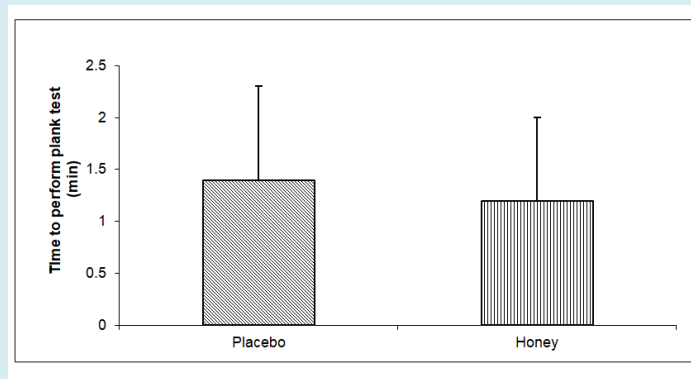


Figure 3: Plank core strength in the placebo and honey trials. Data are presented as mean \pm SD.

This present study discovered honey supplementation able to improve endurance running performance could be explained due to honey nutritional properties which contains glucose, amino acid and multivitamin-minerals. Several previous studies found that glucose supplementation at pre-exercise were able to enhance sports performance significantly [26-28]. Consuming monosaccharide carbohydrate such as glucose can increase oxidation rate and allow the overall intake of exogenous energy which was greater during prolonged endurance exercise [26,29,30]. Honey contains various sources of monosaccharide carbohydrate such as glucose and fructose which acted as energy source and enhanced the endurance running performance compared to the placebo in this present study.

Conclusion

In conclusion, this present study discovered that honey supplementation at a dosage of 40 gram has an ergogenic effect on 2.4 km run performance but did not enhance plank core strength, sit-ups and push-ups among recreational runners.

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