



## The Effect of Ramadan Fasting on Biochemical and Performance Parameters in Collegiate Wrestlers

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#### Introduction

Ramadan is the holiest month in Muslim's calendar. Ramadan takes place in different seasons and duration, from ۸-۱۶ hours in tropical countries. In this month, adult and healthy Muslims refrain from food, liquids and smoking from approximately ۱ hour before sunrise till sunset, averaging about ۱۵ hours a day for ۲۹-۳۰ days. Because of type and duration of diet, Ramadan is an excellent opportunity to study the effects of various diets on human body. There have been few studies on the effect of Ramadan fasting in athletes and especially in wrestlers, and this is still a matter of debate. Related studies showed that fasting in Ramadan without any health problems caused significant changes in body weight (۱), blood glucose concentration, lipid profile, also sleep duration at night (۲), and daily physical activity (۳) are reduced during the month of Ramadan. These changes in diet and lifestyle have remarkable effects on the body metabolism (۴). Some studies showed positive effects of fasting on the lipid profile and performance parameters (۵), while some opposite effects were observed in others (۶). Thus, the purpose of this study is determination of Ramadan fasting effects on lipid profile, glucose concentration and performance parameters such as body composition, aerobic and anaerobic power and strength in elite collegiate wrestlers

#### Ma-terials & Methods

Fourteen collegiate male wrestlers (age,  $20.12 \pm 2.0$  yrs) volunteered as subjects for the study. They all had at least four years' training experience. Subjects were tested three times, one week before the beginning of Ramadan (Pre-RF), the last two days of Ramadan (End-RF) and the last two days of the ۴th week after the end of Ramadan (After-RF). All performance measurements were taken at the same time of the day (between ۱۰:۰۰AM and ۱۲:۰۰AM) at a constant environmental temperature ( $22-25^{\circ}\text{C}$ ). Blood samples was also taken at

the same time of the day (between 16:00 PM and 17:00 PM). Within 48 hours prior to the resting, no intensive training was allowed. Body composition was assessed using a bio impedance method. Each subject performed a graded treadmill exercise test (Bruce protocol) in order to estimate VO<sub>2</sub>max. Anaerobic power measured by RAST (Running Anaerobic Sprint Test) protocol (6x30m sprint with 1.5 rest intervals between sets). Muscular strength tests included squat, bench press and dead lift. Venous blood samples were taken at the same time and before the physiological tests. Paired sample t-test was used to assess the differences in pre and post-performance tests and repeated measures ANOVA (repeated measures factorial 2x2) and Bonferroni post hoc test were used to determine differences between three blood samplings (p < 0.05).

## Results

Body composition (weight, free fat mass & body fat percentage), muscular strength (squat, bench press & dead lift), aerobic and anaerobic power measures are listed in table 1. Significant decrease and increase consequently observed in glucose and HDL-C. Also, CH and LDL-C levels were decreased after-RF comparing to pre-RF, but one month after Ramadan (after-RF) it reached to higher levels comparing to pre-RF, which were not statistically significant. TG and VLDL levels in end-RF comparing to before-RF were increased and after-RF gains lower levels comparing to levels in before-RF.

Table 1: Body composition and physical performance measurements before and after Ramadan (n= 14). Mean ± SD

			P value	t	End-RF	Pre-RF	Variables
*0.001	7.146	68.96 ± 18.1	70.71 ± 18.40		Body mass (kg)	Body composition	
*0.019	2.63	09.72 ± 12.14	60.28 ± 12.28		Fat free mass (kg)		
*0.001	4.03	12.26 ± 0.07	13.39 ± 4.94		Fat percentage (%)		
							Aerobic power
*0.001	4.79	49.19 ± 6.08	01.00 ± 0.90		VO <sub>2</sub> max ml.kg <sup>-1</sup> .min <sup>-1</sup> )		
0.140	1.03	649.31 ± 170.76	670.19 ± 180.8		Peak power (w)	Anaerobic power	
*0.004	3.34	489 ± 106.4	020.81 ± 113.30		Mean power (w)		
0.890	0.134	8.77 ± 3.76	8.73 ± 3.44		Fatigue index (%)		
0.086	-1.838	1.70 ± 0.32	1.79 ± 0.36		Squat (kg/w)	Strength	
0.281	-1.118	1.33 ± 0.22	1.31 ± 0.23		bench press (kg/w)		
0.067	-1.978	1.08 ± 0.20	1.04 ± 0.204		dead lift (kg/w)		

.Significant at α < 0.05\*

## Discussion and Conclusion

Our results showed that Ramadan fasting leads to a decrease in body mass and body fat percentage. As we will report later, decreases in glucose levels in this month occurs, which logically decrease the insulin levels and this consequences lead to enhance in fat oxidation. Also, considering that subjects were wrestlers and kept their training program, more fat oxidation may occur. Reduction in aerobic power suggests that during

Ramadan the down regulation of body metabolism in the period of day time occurs, which reflect a conserving energy mechanism. In conclusion, Ramadan fasting appears to have significant effect on body composition, aerobic power and lipid profile. Ramadan fasting may be a healthy non-pharmacological method for improving lipid profile. Anyway, Ramadan fasting had no adverse effect on the subjects. Athletes can save their physical capacity and sport performance with delicacy in choose in training type and volume, .daily caloric intake and food type, body fluid and electrolytic balance, total sleeping hours

.Key words: Ramadan fasting, performance, power, lipid profile, body weight

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