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Drinking Dates Solution Has Positive Effects on Fencing Field Test Performance

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Abstract

This study investigated the effect of drinking dates solution (DS) on fencing players' performance and physiological variables in field test. Six Kuwaiti fencing players participated in this study. Their mean and standard deviation for the age, height, weight, body mass index (BMI), and percent of body fat (PBF) were (22.3 ± 4.2 y), (176.5 ± 6.3 cm), (79.8 ± 11.5 kg), (25.6 ± 3.2 kg.m-2), and (19.1 ± 4.1 %), respectively. The subjects completed five stages of a fencing performance test. Each stage included forward and backward steps, gradually increasing over four test repetitions. The distance and speed taken by forward and backward steps increased, and the subjects performed the test to exhaustion. This test was applied for each subject individually in three trials in random order. The trials consisted of the control test, in which nothing was consumed; the intervention test, where the subject was given dates solution (DS); and the final test, the placebo test, where the subjects drank an artificially sweetened drink containing zero calories. The trials were separated by 7 to 10 days. One-way repeated measures ANOVA test and the mean and standard deviation of the variables were calculated. There were no statistically significant differences for all physiological variables measured in this study at (P ≤ 0.05), except for pre-test blood glucose for the (DS) test, where the mean was (7.1 ± 0.82 mmol / L). In comparison, the mean for the control test was (5.50 ± 0.01 mmol / L) and the placebo test was (5.7 ± 0.43 mmol / L). As well as the average heart rate (Avg. HR) beat per minute, where the mean for the control test was (159.5 ± 7.2 b.pm), the (DS) test was (166.7 ± 9.8 b.pm), and the placebo test was (152.8 ± 6.1 b.pm). There were significant differences in the one-way ANOVA test at (P £ 0.05) in the field performance test in the final score where the mean for the control test was (22.0 ± 6.9 points), the (DS) was (25.8 ± 5.9 points), and the placebo was (20.5 ± 4.8 points); likewise, there were significant differences in the total distance in the test, where the mean for the control test was (261.7 ± 55.7 m), the (DS) was (289.0 ± 48.8 m). The placebo was (260.0 ± 30.1 m). This study shows that drinking (DS) positively affects the subject's performance in this field test. Further studies need to examine this hypothesis.

Key Words: Dates solution, Fencing players, performance, physiological variables, Total Distance

Introduction:

Dry dates are one of the most important crops for Middle Eastern countries and have an essential role in all religious ceremonies and cultural, social, economic, and health aspects of these countries. (28) Many nutritionists consider dry dates to have an important part to play in a balanced diet, as they are natural sources of many nutrients for humans and animals. Dry dates are a good source of essential vitamins such as B6, K, and A, as well as many minerals, including Potassium, Manganese, and Magnesium, in addition to fiber and antioxidants. However, Dry Dates are high in calories in the form of carbohydrates (CHO), which are (Fructose, Glucose, and Sucrose). (2, 3, 33, 37) The percentage of CHO in dates ranges from (70-80%) of the dry dates' components depending on the type of dates. These CHO are characterized by rapid digestion, absorption, and transfer into the blood; every 100 grams of dates contains 67-83 grams of CHO, which produces 274 calories. (2, 22, 38)

Nutrition is one of the most essential tools many athletes use to enhance performance during competition or training; many nutritionists in sports science rely on CHO to improve athlete's performance. (1, 39) CHO is one of the most essential energy sources for the body during physical activity and sports, providing the glucose and glycogen needed for energy

production. Some physiological changes occur when glycogen storage is depleted because of physical activity. The symptoms of these changes are low blood sugar, known as hypoglycemia, and a reduction in glycogen in the working muscles, called Peripheral fatigue, and a reduction in workout rate. (1, 10, 18)

The interest in studying the effect of CHO on athlete performance started and continued since the 1930s when they measured muscle glycogen during various dietary and exercise interventions. (6) From that time, many sports scientists focused on nutritional strategies to maximize CHO storage in the liver and muscle as glycogen to enhance athlete's performance. (21) Despite the difficulty of conducting field tests, many studies and research have demonstrated that CHO intake before or during physical exertion positively affects performance during these activities. These studies have shown that CHO intake has a positive effect by increasing the duration of cycling. It also affects increasing the speed of running during intermittent training and its effect on team sports regarding the type and nature of movement and consumption. CHO has a positive effect on racquet sports as well. (5, 17, 25, 30)

The effect of CHO on performance is what Currell, K. and Jeukendrup, A.E. 2008 found when studying the effect of drinking glucose and fructose solution and comparing it with drinking glucose solution only. Eight cyclists participated in this study, where the subjects were divided into three groups: the first group drank mixed glucose and fructose syrup, the second group drank glucose syrup, and the third group, the control group, drank only water. The main results of this study showed that the first group increased the cycling time by 8% over the second group and by 19% over the third group, the control group. (14) In another study by Foskett et al., 2008 they examined the effect of consuming a carbohydrate-electrolyte solution on the muscle glycogen level during intermittent running. They compared it to a diet rich in CHO. This study indicated that taking CHO solution increased the endurance performance of the subjects participating in this study by increasing the running time and the distance covered in this experiment, and this may be due to the increase in the concentration of glycogen in the working muscles. (20)

On the other hand, some studies show that the consumption of CHO does not influence performance. Desbrow et al., 2004) found that consuming carbohydrate-electrolytes did not improve the time or power output of subjects tested. Nine well-trained subjects were asked to complete a set amount of work as fast as possible time trial following 24 h of dietary (subjects were provided with food, energy 57.4 ± 2.4 kcal/kg and Carbohydrate 9.1 ± 0.4 g/kg) and exercise control. During exercise, subjects were given 14 mL/kg of either a 6% carbohydrate-electrolyte solution or a carbohydrate-free placebo. Results showed that subjects did not improve time or power output to a greater degree than placebo in well-trained cyclists. (16) Similarly, Burke et al., 2000 found out that CHO loading failed to improve 100-km cycling performance in their study; seven well-trained cyclists performed two 100-km time trials on separate occasions, three days after either a CHO-loading (9 g CHO kg body mass−1 day−1) or placebo-controlled moderate-CHO diet (6 g CHO kg body mass−1 day−1). The main finding of this study was that CHO loading significantly increased muscle glycogen concentrations for CHO loading and placebo. The total muscle glycogen utilization did not differ between trials time to complete the trials or the mean power output during the trials. This placebo-controlled study shows that CHO loading did not improve the performance of a 100-km cycling time trial during which CHO was consumed. (8)

For enhancing the athlete's performance in all types of sports, there is a frantic race among scientists and athletes in various fields of sports and athletics to search for means and

ways to improve performance and excellence. These tools differ between what is permitted, such as manipulating and changing or increasing training loads, as well as following a specific diet for or during certain competitions, and what is prohibited by the laws and regulations of different sports, such as doping, the use of steroids, or various drugs and hormones to enhance performance. Research and studies are conducted continuously to find applicable and permitted ways to improve or add an advantage to athlete performance and do not have any side effects on the athlete's health or hinder his performance in any way.

One of the most important things continuously researched and studied is nutrition and diet to enhance and improve athlete's performance. CHO is leading the way in this research from all the nutrients that have been studied and researched, as they are considered one of the most important energy-producing sources during physical effort, as each gram of CHO yields four calories. (1, 19) As stated by Colombani et al., 2013, athletes not only ingest CHO as general contributors to their daily energy needs but also specifically as ergogenic agents in a more time-specific way, such as during a sporting event or in the preceding days. In general, there is a consensus regarding CHO consumption before or during competitions that it has a positive effect on the performance of athletes in various sports and that ingesting CHO could enhance the athlete's performance. (13)

Fencing is an elegant sport that requires finesse skills, anticipation, reflexes, power, and agility. It is one of the oldest sports in the world; it goes back as far as Ancient Egypt in 1190 BC. It was accepted as an Olympic game in Athens in 1896 and has been an Olympic sport. (35) Fencing is an indoor sport played on a field known as the *piste*; it is (14 m) long and (1.5-2 m) wide, the total contest area of a Fencing (2-2.6 m^2). There are three forms of fencing; each uses a different kind of weapon and has different rules: foil, épée, and sabre. (15) Roi, G.S. 2008 reported that fencing international tournaments may last between (9-11 hours). That represents only 18% of total competition time, with an effective fight time of between (17- 48 minutes). During the competition, the player may cover a total distance of about (250-1000 m). According to Li et al., 1999, the heart rate (HR) in a woman's epee could range from (167-191 beats/min) about 70% of maximal HR for about 60 % of the fighting duration. Furthermore, this is above the anaerobic threshold (41±34%) of the fighting time. (15, 32, 34) The physical demands of the intermittent nature of fencing contests utilize both the aerobic and anaerobic metabolic systems, which are also affected by age, sex, level of training, and technical and tactical skills of the player. (26, 29, 35)

Methods:

Subjects:

Six fencing players (N=6) of the first fencing team at the Al-Qadisiyah Sports Club - Kuwait participated in the study. Their mean and standard deviation (SD) for the age, height, weight, body mass index (BMI), and percent of body fat (PBF) were (22.3 ± 4.2 y), (176.5 ± 6.3 cm), (79.8 ± 11.5 kg), (25.6 ± 3.2 kg.m-2), and (19.1 ± 4.1 %), respectively. The mean experience in fencing as a sport for the subjects in years was (10.33 ± 1.75 y). These experiences in fencing varied in three disciplines: Epee, Foil, and Sabre. All the subjects in this study received medical clearance from their physician before they took part and had a per-exercise health evaluation. They completed the health and training history questionnaire and read and signed the written informed consent forms. Procedures and protocol were approved by the Research Committee at the Public Authority for Applied Education & Training – Kuwait (PAAET) and the Research Committee in The Department of Physical Education and Sport at the College of Basic Education - Kuwait.

Procedures & Protocol:

All subjects completed three experimental trials; these tests were applied individually in random order for each subject, and each trial was separated by 7–10 days. (40) All trials were done in the same fencing arena at Al-Qadisiyah Sports Club, under the same environmental conditions, at 22° C, and at the same time for each subject. (4, 7, 25, 41) The subjects were instructed to refrain from strenuous physical activities and asked to abstain from caffeine tobacco consumption for 24 hours before each trial. (41) They should also have repeated their recorded diet for 24 hours, as closely as possible, before the first visit for every trial. (25) They should have been fasting for (> 10 hours) before every trial. (4, 5) All subjects kept an exercise diary for 48 hours before each test for repetition before each test. (7)

Experimental Design:

In the first visit, every subject was familiarized with the test procedures, protocol, purpose, and the benefits of this study before the test. Before beginning any procedures, the researchers clarified any questions or inquiries by the subjects about data gathering. Each subject signed a subject consent form. The date, time, and body temperature were recorded during the first visit. Age was recorded to the nearest one year, height to the nearest 0.5 cm, and body weight to the nearest 0.5 kg. Body composition was recorded using (Bodystat 1500, Isle of Man, British Isles), according to manufacturer instructions specified in the user's manual. The Body Composition Analyzer was used to determine body fat percentage; it is based on the bioimpedance method and was designed to give a level of accuracy comparable with hydrostatic weighing. Sensor pads were placed on the subject's right wrist and ankle. A sensor cable attaches to the sensor pads and plugs into the Analyzer. The Analyzer generates a harmless low-level electrical current, which flows through the body. The bioimpedance analyzer derives total body water from the impedance. Total body water estimates fat and fat-free mass, assuming the body's normal (fixed) hydration status.

In the three experimental trials upon arrival of the subjects Polor short–range radio telemetry heart rate monitor was fitted to subjects (Polar Vantage NV, Polar Electro, Oy, Finland) then the subjects were required to sit quietly in a quiet place for 15 min, after 15 min, the resting value for the following measurements was taken resting heart rate(RHR), resting blood glucose (RBG), using (Accu –Chek Performa, Roche Diagnostics GmbH, Mannheim, Germany), and the resting blood lactate (RBL) using (Accutrend Plus, Roche Diagnostics GmbH, Mannheim, Germany).

Before every trial, the subjects were asked if they liked to use the bathroom to empty their bladder before any testing began. The subject was allowed 15 minutes of warm-up, which included jogging at various speeds and many types of different stretching; at the end of the 15 min. warm–up section, the test took place.

First trial:

Control trial for which baseline data was collected; the subjects did not receive any treatments during this test.

Second trial:

Drinking dates solation type (Kholas, Al–Qassim) of a velum of (200 ml) with (0.75 g. kg-1 body mass-1) dry dates diluted in water, with an average concentration of (29.85 g/200 ml), for each subject. Table (1) shows the weight of dates in (g. per body weight) that was diluted in the solution to be consumed by each subject, as well as the solution concentration.

Table (1): Dates weight (0.75 g. kg^{-1} body $mass^{-1}$) diluted in (200 ml.) and solution concentration for each subject according to body mass.

Subject	Body mass. in Kg.	Dates Weight in g.	Solation Concentration g/200ml
1	87	65	32.50
2	88	66	33.15
3	94	71	35.40
4	73	55	27.30
5	68	51	25.50
6	67	51	25.28
Avg.	79.8	59.71	29.85
SD	11.5	7.96	4.36

Third trial:

A placebo test, the Subjects drank a solution (200 ml) containing (0 calories). It was a mixture of water with (0.32 mg. lemon flavor powder) Manufacture (Grand Brans Company - Baltimore - Maryland - USA) (MFG. and DIST. By Grand Brans, INC. Baltimore, MD. USA) in addition to (0.34 mg. of artificial sweetener (Canderel Tablets)) and one drop of yellow food coloring. During these trials, the Fencing Fitness Test (FFT) was implemented.

Fencing Fitness Test (FFT):

In this study, the revised version of the forward (offensive steps) and the backward (defensive steps) Fencing Fitness Test (FFT) was adopted (Mohammad, 2000) (27). The test was designed to measure physical fitness, physical exertion, and physical demands on the fencers' during the competition. The FFT consists of five consecutive phases, each divided into four stages; each phase increases in intensity and speed in the forward and backward steps.

The test begins with the first phase, at the first stage, where the metronome's speed is set at (84 $peeps.min^{-1}$). In this stage, the subject takes forward steps for (4m) and backward steps for (4m), Followed by the second stage of (9m) forward steps, then (9m) backward step. The third stage starts with (4m) forward steps, then (9m) backward steps, and ends up with (5m) forward steps. The fourth stage starts with (9m) forward steps, then (14m) backward steps, then (5m) forward steps; that is the end of phase one of the FFT. The same procedure repeated for the remaining four phases from (phases 2-5) at different speeds for each phase: phase two at (104 $peeps.min^{-1}$), phase three at (126 $peeps.min^{-1}$), phase four at (144 $peeps.min^{-1}$), phase five at (160 $peeps.min^{-1}$). Figure (1) shows the FFT

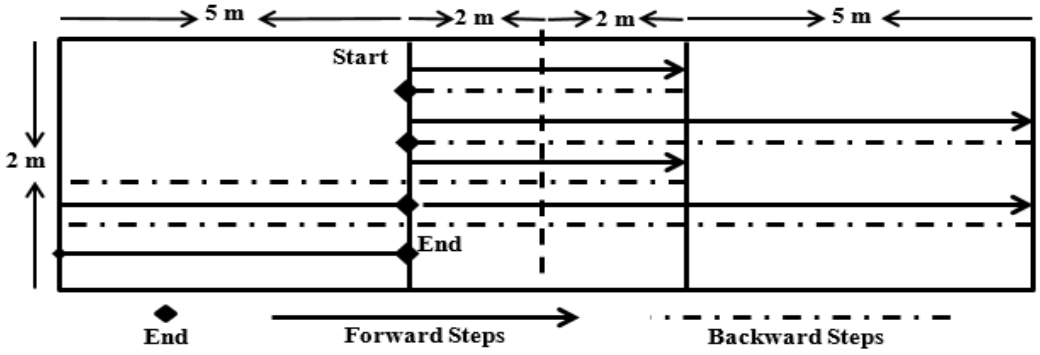

Figure (1): The Fencing Fitness Test (FFT) with the forward and backward test for fencing players.

To ensure the subject's performance at the highest level, they received encouragement and cheers from the researchers' assistants and their teammates to perform and continue to the highest level of their fitness, and neither the researchers' assistants nor the teammates were aware of the type of substance consumed before each the test. The ten-point rate of exertion scale (Borg's Rated Perceived Exertion (RPE) was used to measure the exertion rate at the end of each stage. There is a strong correlation between a number in the (RPE) and physiological variables during physical exertion (heart rate, lactic acid level (Lactate Production). (7, 11, 12, 27) At the end of the test, the following data were recorded (maximum heart rate (max HR), average heart rate (avg. HR), post-test blood glucose, post-test blood lactate, final stage, final level, and total distance).

Procedures of Scoring (FFT):

To estimate the subject's performance of the (FFT) the points system was used to evaluate the performance, which was as follows: When the subject completes any of the phases of the FFT, he receives a point for each of the stages of that phase, as well as the points for the phases which is as follow the 1st phase one point, the 2nd phase two point, the 3rd phase three points, the 4th phase four points, and the 5th phase five points. When the subject completes all the phases and stages of the FFT, the test's total score will be 35 points, as it is the perfect score for the FFT.

Statistical Analysis:

All data were analyzed using SPSS for Windows version 22.0 (SPSS, Inc., Chicago, IL. USA). One–way ANOVA with repeated measures and a t-test was used to analyze the overall differences in the physiological responses and the subject's performance in the trials. Significance differences were set at the ($P \leq 0.05$) confidence level; descriptive statistics' results were presented as a mean ± standard deviation and standard.

Results & Discussion:

The results will be presented and discussed in terms of mean (avg.) and standard deviation (SD) for all of the physiological variables examined, and if there is any statistically significant difference between these tests in (One-way repeated measures ANOVA) and t-test at ($P \leq 0.05$), for each of these variables in the three trials (Control test) nothing consumed, (Intervention test) after drinking the (DS), and (placebo test) after drinking placebo solution. During these three conditions, at rest period before consuming any substance (Resting Values), after drinking the solution (DS), before any testing (Per-test), and after ending the FFT (Post-test) for each of the physiological variables under investigation. Table (2) shows the blood glucose and lactic acid values in the three trials and conditions.

Table (2): The (Avg ± SD) of blood glucose and lactic acid values in the three trials and three conditions (N = 6)

Variables \ Conditions		Control Test	Dates solution	placebo
Resting Values	Blood Glucose (mmol/L)	5.3 ± 0.8	5.5 ± 0.3	5.5 ± 0.4
	Lactic Acid (mmol/L)	2.1 ± 0.6	1.8 ± 0.6	1.8 ± 0.4
Per-test	Blood Glucose (mmol/L)	5.5 ± 0.5	7.1 ± 0.8 *	5.7 ± 0.4
	Lactic Acid (mmol/L)	2.1 ± 0.4	2.3 ± 0.5	2.1 ± 0.3
Post-test	Blood Glucose (mmol/L)	5.2 ± 0.4	5.6 ± 1.1	5.4 ± 0.3
	Lactic Acid (mmol/L)	8.0 ± 2.7	9.7 ± 2.7	8.8 ± 2.9

**There is a significant difference at (P ≤ 0.05) in the one-way (ANOVA) test.*

As shown in Table (2), there were no statistically significant differences found in the

physiological variables for this study in the one-way repeated measures ANOVA test at ($P \leq 0.05$), except for pre-test blood glucose after drinking the solution table (2). One-way within the subject's repeated measures, ANOVA was conducted to explore whether blood glucose levels differed in three conditions (Control, Drinking (DS), and Placebo). The results indicated that there is a significant effect on blood glucose where the value of (F) was [$F(1.07,5.33) = 11.86$, $P = 0.016$, $\eta\rho2 = 0.70$]. Bonferroni post hoc test showed that drinking (DS) significantly increased blood glucose levels where the (mean ± SD) was (7.1 ± 0.8 mmol/L) ($P = 0.007$), compared to the control test (5.5 ± 0.5 mmol/L), and the placebo test (5.7 ± 0.4 mmol/L) ($P = 0.03$). However, the difference between the control and placebo tests was insignificant ($P = 0.22$). These findings were supported by Campbell et al. (2008), which stated that all CHO supplement types were equally effective in maintaining blood glucose levels during exercise. (9)

Table (3): The (Avg ± SD) of Heart Rate (HR b.pm) values in the three trials and three conditions (N = 6)

Variables \ Conditions		Control Test	Dates solution	placebo
Resting Values	RHR	69.5 ± 12.3	71.8 ± 11.7	70.0 ± 9.5
Per-test	Pre-test RHR	68.2 ± 2.5	74.8 ± 11.0	73.0 ± 5.9
Post-test	Post-test HR	177.7 ± 10.4	183.2 ± 9.6	172.2 ± 10.9
	Max HR	180.7 ± 10.4	186.2 ± 9.1	175.2 ± 10.9
	Avg. HR	159.5 ± 7.2	152.8 ± 6.1	166.7 ± 9.8 *

**There is a significant difference at ($P \leq 0.05$) in the one-way (ANOVA) test.*

As shown in Table (3), there were no statistically significant differences found in the heart rate values in the three conduction in one-way repeated measures ANOVA test at ($P \leq 0.05$), except for the pots-test (Avg. HR) for the placebo solution test table (3). The results indicated that there is a significant effect on the pots-test (Avg. HR) for the placebo solution where the value of (F) was [$F(2,10) = 8.82$, $P = 0.006$, $\eta\rho2 = 0.64$]. The value of the (Avg. HR) was (166.7 ± 9.8 b.pm) for the placebo solution, compared to the control test (159.5 ± 7.2 b.pm) and the (DS) test (152.8 ± 6.1 b.pm). Rowlatt et al. (2017) found in their study that there was an increase in HR and overall RPE in consuming CHO solution and drinking water, and there was no difference in blood glucose or blood lactate between the two conditions. (36) Ingestion of CHO gel did not significantly influence HR in adolescent team games. (31)

Total distance:

There was a significant difference in the total distance in the (m) test in the one-way repeated measures ANOVA test; the value of (F) is ($F(2,10) = 5.23$, $P = 0.03$, $\eta\rho2 = 0.51$). When comparing the results of the total distance using paired samples t-test, there was a significant difference between the control trial test (261.7 ± 55.7 m) and (DS) (289.0 ± 48.8 m) where the t-test value was ($t(5) = 3.72$, $P = 0.01$). There is a significant difference between the placebo trial (260.0 ± 30.1 m) and (DS) (289.0 ± 48.8 m) where the t-test value was ($t(5) = 2.70$, $P = 0.04$) at ($P \leq 0.05$) as it shows in Figure (2).

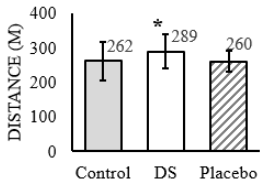

Figure (2): The total distance in (m) between the three condition

The difference in the subject's performance increased by 27.3 m, representing 7.6% for the (DS) compared to the control test, and an increase of 29.0 m, representing an 8.1 % increase in performance between the (DS) and the placebo trial. Also, there is a slight increase in performance when comparing the control and placebo tests. The control test increased by 1.7 m, representing a 0.5% increase for the control test on the placebo, as shown in Figure (2). This increase in the total distance could be due to drinking (DS) at the beginning of the trail. There is evidence in research that ingestion of CHO at the onset of the workout positively affects overall performance. (23,24)

Performance Test (FFT) Score:

Regarding performance, there is evidence that CHO ingestion enhances performance. (9, 24) Similarly, in this study, we found that the subject's performance of the (FFT) improved in the fencing performance; when the subject completes all the phases and stages of the (FFT) test, the total score of the test the subject, in this case, will be 35 points this will represent perfect score for the (FFT). In this test, there was a significant difference in the scores of performances in the (FFT) test, where the value of (F) for the different conditions was ($F(2,10) = 4.57$, $P = 0.04$, $\eta\rho 2 = 0.48$). The score for the control test was (22.0 ± 6.9 points) which represents 62.9% on performance, were the (DS) was (25.8 ± 5.9 points) which represents 73.7% on performance, while the placebo test was (20.5 ± 4.8 points) which represents 58.6% on performance. Jeukendrup et al. (1997) found that cyclists' performance improved when ingested CHO. (23, 24)

Rate of Perceived Exertion (RPE):

Rate of Perceived Exertion (RPE) 10 points scale was used to assess the workout intensity in every stage and level of the (FFT) throughout the three trials and conditions. The test begins with the speed of (84 peeps.min-1) of the metronome at the first stage, and the first level will end with the speed of (160 peeps.min-1) at the last stage in the last level. Table (4) shows the (RPE) score for each subject in every stage and the minimum, maximum, and the (mean ± SD) for the score of the (RPE) in the (FFT)

Table (4): The (RPE) score for each subject in every stage and the minimum, maximum, and the (mean ± SD) for the score of the (RPE) in the (FFT) for subjects (N=6)

subjects	RPE at (84 peep.nim^{-1})			RPE at (104 peep. nim^{-1})			RPE at (126 peep. nim^{-1})			RPE at (144 peep. nim^{-1})			RPE at (160 peep. nim^{-1})		
	Control	(DS)	Placebo	Control	(DS)	Placebo	Control	(DS)	Placebo	Control	(DS)	Placebo	Control	(DS)	Placebo
1	3	2	2	5	4	5	6	6	6	9	10				
2	1	2	1	3	2	2	5	3	4	6	6	6	10	8	8
3	3	2	1	5	3	2	6	4	3	10	8	9		10	
4	5	5	2	6	6	5	8	8	6	10	10	10			
5	2	1	2	5	3	4	7	6	7	9	8	8			
6	6	5	2	9	7	5	9	10	9			10			
Min	1	1	1	3	2	2	5	3	3	6	6	6	10	8	8
Max	6	5	2	9	7	5	9	10	9	10	10	10	10	10	8
mean	3.3	2.8	1.7	5.5	4.2	3.8	6.8	6.2	5.8	8.8	8.4	8.6	10.0	9.0	8.0
SD	1.9	1.7	0.5	2.0	1.9	1.5	1.5	2.6	2.1	1.6	1.7	1.7	0.0	1.4	0.0

Table (4) shows the (mean ± SD) for the RPE it was easy at the speed of (84 peeps.min-1) for all three conditions, where the score for the control trial was (3.3 ± 1.9 RPE), and the (DS) was (2.8 ± 1.7 RPE), while the placebo trial was (1.7 ± 0.5 RPE). When the speed increased to (104 peeps.min-1), the level of exertion for the (FFT) increased for the (mean ± SD) for the control trial was (5.5 ± 2.0 RPE), which indicates that the level of exertion at this stage was challenging for the control trial, and for the (DS) was (4.2 ± 1.9 RPE) which indicate effort for this trial was moderate. At the same time, the placebo trial was (3.8 ± 1.5 RPE), indicating that this trial's effort was easy to moderate. At the speed of (126 peep.min-1) the effort for all three trials was hard in the RPE scale for the control was (6.8 ± 1.5 RPE), and for the (DS) the score was (6.2 ± 2.6 RPE), while the placebo was (5.8 ± 2.1 RPE). At the speed of (144 peeps.min-1), the level of exertion was hard for all three trials. The RPE scale score for the control trial was (8.8 ± 1.6 RPE). The score for the (DS) was (8.4 ± 1.7 RPE). At the same time, the placebo was (8.6 ± 1.7 RPE); for the last stage of the (FFT) at the speed of (160 peeps.min-1), only two subjects reached this stage one subject score at the control trial ten, which is the maximal score, the same subject score 8 for the both (DS) and the placebo trials which indicate the level of exertion for him at these trials was really hard. The other subject reached this stage only in one trial, the (DS) trial; his score at this trial was 10, representing the maximal exertion score on the RPE scale.

Water Consumption:

There was no significant difference in water consumption in the three trials. In the control tests, the subjects did not drink any water before the test; however, in the (DS) trial, the subjects consumed water before the test in a volume of (449.2 ± 395.6 ml), while the placebo trial volume was (156.7 ± 184.8 ml).

Conclusion:

The main finding of this study indicates:

1- There were no statistically significant differences found in the physiological variables in the one-way repeated measures ANOVA test at ($P \leq 0.05$), except for pre-test blood glucose after drinking the (DS).

2- The same results were found in the heart rate values in the three conductions, except for the pots-test (Avg. HR) for the placebo solution test; there was a significant difference in the pots-test (Avg. HR) for the placebo solution.

3- Drinking (DS) positively affects the total distance for the (FFT). There was a significant difference between the three trials, and this was reflected in the increased distance for the (DS) trail by 27.3 m, which represents an improvement of 7.6% compared to the control test, the same as there is a difference between (DS) trail and the placebo.

4- The difference between the two trails is 29.0 m, representing an 8.1 % increase in performance for the (DS).

5- The performance test score confirmed this, indicating that there was a significant difference in the performance scores in the (FFT) test, where the score for the control test was (22.0 ± 6.9 points) which represents a 62.9% increase in the level of performance, where the (DS) was (25.8 ± 5.9 points) which represents 73.7% of the level of the performance. In comparison, the placebo test was (20.5 ± 4.8 points) representing 58.6% on performance.

Recommendations:

What we conclude from the results of this study, the researchers recommend the following:

- Drinking Dates Solution (DS) could benefit fencing performance, especially before the competition, because of its positive effect on the player's performance in terms of

increasing the distance completed in the test and the total score, as shown in the results.

- The reaches recommend conducting more studies and research in the field of the consumption of natural substances that will improve the player's performance during the competition and will not have an adverse effect on the athlete's health.
- The researchers recommend conducting more studies and research in the field of nutrition for players and the impact of nutrition programs on players' performance.
- The researchers recommend replicating this study, considering the increase in subjects participating in the study or a different sport.

References:

1) Abu Al-Lail, A.A., Al-Jaser, T.A., Ali, T.S., Nawaf Mujbel Al-Shammari, N. M. (2010) "Physiology of Sports Training" Library of Academic Publishing House, Kuwait. (In Arabic)
2) Al-Farsi, M.A., And Lee C.Y., (2008). Nutritional and functional properties of dates: A Review. Critical Rev. Food Sci. Nutr. Vol. 48: 877-887
3) Al-Tamim E. A. (2014); Study of anti-nutrients and antioxidant in date palm fruits (*Phoenix Dactylifera* L.) from Saudi Arabia and Egypt. J. of American Science. 10(3): 154-159
4) Backhouse, S. H., Bishop, N. C., Biddle, S.J., and Williams, C., 2005, "Effect of carbohydrate and prolonged exercise on affect and perceived exertion ACSM, *Med.& Science in Sports& Exercise*, Vol. 37 (10), 1768-1773.
5) Below, P. R., Rodriguez, R. M., Alonso, J. g, and Coyle, E. F., (1995), "Fluid and carbohydrate ingestion independently improve performance during 1 h of intense exercise" ACSM, *Med.& Science in Sports & Exercise,* Vol. 27, No.2, p. 200-210
6) Bergstrom, J., Hermansen, L., Hultman, E. and Saltin, B.(1967). Diet, muscle glycogen and physical performance. Acta Physiologica Scandinavica, 71, 140–150
7) Borg, G.A.U. (1982), "Psychological bases of physical exertion", Medicine and Science in Sports and Exercise, Vol. 14, 377 – 81
8) Burke, L. M., Hawley, J. A., Schabort, E. J., Gibson, A., Mujika, I., and Noakes, T. D., (2000) Carbohydrate loading failed to improve 100-km cycling performance in a placebo-controlled trial. J Appl Physiol 88: 1284–1290.
9) Campbell, C., Prince, D., Braun, M., Applegate, E., and Casazza, G.A., (2008), Carbohydrate-supplement form and exercise performance, Int.J.Sport Nutr.Exerc.Metab. Apr., 18(2): 179-90.
10) Carter, J., Jeukendrup, T. Mundel, and D. A. Jones. (2003). "Carbohydrate Supplementation Improves Moderate and High – Intensity Exercise in the Heat" Pflugers Archives – European Journal of Physiology, Vol. 446, 211 – 219
11) Carton, R.L., and Rhodes, E.C., (1985), "A critical review of the literature on ratings scales for perceived exertion, Sports Medicine, Vol. 2: p. 198 – 222
12) Chow, R.J., and Wilmore, J.H., (1984), " The regulation of exercise intensity by ratings of perceived exertion". Journal of Cardiac Rehabilitation, vol. 4: p. 382 – 87.
13) Colombani, P. C., Mannhart, C., and Mettler, S., (2013) Carbohydrates and exercise performance in non-fasted athletes: A systematic review of studies mimicking real-life. Nutrition Journal, 12:16 http://www.nutritionj.com/content/12/1/16
14) Currell, K. and Jeukendrup, A.E. (2008) "Superior Endurance Performance with Ingestion of Multiple Transportable Carbohydrates" *Med. Sports Exerc.*, Vol. 40, No. 2, pp. 275-281
15) Daya A, Donne B, O'Brien M., (2006), Newly designed fencing face mask: effects on cardiorespiratory costs and sub-maximal performance. Br J Sports Med. (40): 6

16) Desbrow, B., Anderson, S., Barrett, J., Rao, E., and Hargreaves, M., (2004) Carbohydrate-Electrolyte Feedings and 1h Time Cycling Performance, International Journal of Sport Nutrition and Exercise Metabolism, Vol. 14, pp 541-459.
17) Dunford, M., (2010), "Fundamentals of Sport and Exercise Nutrition" Human Kinetics, Champaign, IL. USA, p.27 – 57
18) Febbraio M.A., Chiu et, al, (2000), Effects of Carbohydrate ingestion before and during exercise on glucose kissetics and performance, Journal of Applied physiology, Vol. 89, 2220 – 2226
19) Febbraio, M.A, Keenan, J, Angus D.J, Campbell, S.E, Garnham, A.P, (2000), "Preexercise carbohydrate ingestion, glucose kinetics, and muscle glycogen use: effect of the glycemic index" J Appl. Physiol. Nov; 89(5): p. 1845 – 51.
20) Foskett, A.C., Williams, C., Boobis, L., and Tsintzas, K. (2008) "Carbohydrate Availability and Muscle Energy Metabolism during Intermittent Running" *Med. Sports Exerc.*, Vol. 40, No. 1, pp. 96-103
21) Hargreaves, M., Hawley, J.A., and Jeukendeup, A., (2004) Pre-exercise carbohydrate and fat ingestion: effects on metabolism and performance, Journal of Sports Sciences, 2004, 22, 31–38
22) Ibrahim, A.M., Mohamed Nazif Hajjaj Khleif, M.N., (1997) "Date palm cultivated, produced in the Arab world", Maaref facility in Alexandria, second edition, Arab Republic of Egypt (In Arabic)
23) Jeukendrup, A. (2007), "Carbohydrate supplementation during exercise: does it help? How much is too much. "*Sports Science Exchange* 20.3: 1-6.
24) Jeukendrup, A., Brouns, F., Wagenmarkers, A. J., and Saris, W. H., (1997), "Carbohydrate-electrolyte feedings improve 1 h time trial cycling performance. "*International journal of sports medicine*18.02 : 125-129.
25) Leelayuwat, N., Tsintzas, K., Patel, K., and Macdonald, I. A., (2005), "Metabolic responses to exercise after carbohydrate loads in healthy men and women" ACSM, *Med.& Science in Sports& Exercise*, Vol. 40, No. 2, p. 275-281
26) Li J.X., So R.C.H., Yuan Y.W.I., et al. (1999), Muscle strain and cardio-vascular stress in fencing competition. Proceedings of the 5th IOC World Congress on Sport Sciences; Oct.31 - Nov.5 Sydney: 222
27) Mohammad, H. S, (2000): Comparison of Aerobic and Anaerobic Physiological Responses to Assess Training Response in Competitive Fencers. Doctoral dissertation, University of Minnesota.
28) Nasir MU, Hussain S, Jabbar S, Rahid F, Khalid N, Mehmood A.(2015) A review on the nutritional content, functional properties and medicinal potential of dates. Sci Lett.; 3(1):17-22.
29) Nyström, J., Lindwall, O., Ceci, R., Harmenberg, J., Swedenhag, J., and Ekblom, B., (1990), Physiological and morphological characteristics of world class fencers, Int.J.Sports Med., 11: 136-139.
30) Ostojic, S.M., and Mazic (2002), Effects of a Carbohydrate – electrolyte drink on specific soccer tests and performance, Journal pf Sports Science and Medicine 1: pp 47 – 53.
31) Phillips, S.M., Turner, A.P., Sanderson, M.F.*et al.* (2012), Carbohydrate gel ingestion significantly improves the intermittent endurance capacity, but not sprint performance, of adolescent team games players during a simulated team games protocol. *Eur J Appl Physiol.*112, 1133–1141.

32) Porzio, L, Mele G. Arte gladiatoria dimicandi.(2002), 15th century swordsmanship of master Filippo Vadi. Highland Village, (TX): Chivalry Bookshelf.
33) Rock, W., Rosenblat, M., Borochov-Neori, H., Volkova, N., Judeinstein, S., Elias, M., and Aviram, M., (2009), Effects of date (phoenix dectylifera L., Medjool or Hallawi Variety) consumption by healthy subjects on serum glucose and lipid levels and on serum oxidative status: a pilot study, J. Agri. Food Chem. Vol. 57, 8010-8017.
34) Roi, G.S, Pittaluga, I., (1997), Time-motion analysis in women's sword fencing. Proceedings of the Fourth IOC Congress on Sport Sciences; Oct 22-25; Monaco: 66
35) Roi, G.S., and Bianchedi, D., (2008), The science of fencing implications for performance and injury prevention, Sports Med. 38 (6): 465-481.
36) Rowlatt, G., Bottoms, L., Edmonds,C.J., and Buscome, R., (2017), 'The effect of carbohydrate mouth rinsing on fencing performance and cognitive function following fatigue-inducing fencing', European Journal of Sport Science, Vol. 17 (4): 433-440, April
37) Sadiq, I., Izuagie, T., Shuaibu, M., Dogoyaro, A., Garba, A., and Abubakar, S., (2013), The Nutritional Evaluation and Medicinal Value of Date Palm (Phoenix dactylifera). International Journal of Modern Chemistry, Vol. 4(3), 147-154.
38) SarDesai V. (2011), Introduction to clinical nutrition: CRC Press.
39) Singh, A., Chaudhary, S., Sandhu, J.S., (2011), Efficacy of per exercise carbohydrate deink (Gatorade) on the recovery heart rate, blood lactate and glucose levels in short term intensive exercise, Serb. J. Sports Sci. 5(1): 29-34.
40) Wallis, G. A., Yeo, S. E., Blannin, A. K., and Jeukendrup, A. E., (2007), "Dose – response effects of ingested carbohydrate on exercise metabolism in women", ACSM, *Med.& Science in Sports& Exercise*, Vol. 39(1), 131 – 138
41) Wu, L. C., William, C., (2006), "A low glycemic index meal before exercise improves endurance running capacity in men" *International Journal of Sport Nutrition and Exercise Metabolism*, Vol. 16(5), 510-527