

## **Exercises According to Target Time and Beet Supplement and Their Effect on Indicators of Anaerobic Capacity and Fatigue and Achievement of Running A 400m Freestyle Under 20 Years Old**

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### **Abstract**

The study aims to use exercises prepared by researchers based on codification on the target time to carry the training and according to the equation of the scientist Frank, where three distances are rationed according to the target time for running 400 m freestyle and they are (150 m, 300 m, 600 m) to develop indicators of anaerobic ability and fatigue to develop the achievement of a 400m freestyle sprint without 20 Year.

As well as the role of beet supplement in achieving the achievement of the effectiveness of 400m free, where nutrition plays an important role in raising the level of runners and performing their exercises to the fullest, and since the effectiveness of 400m is a tactical anaerobic activity where lactic acid accumulates in the muscles, hence the role of nutritional supplements in improving the runners' endurance and delivering more oxygen to the muscles during training as it is taken from natural food sources and a suitable environment for the work of the body's muscles as well as through the role of beetroot rich in nitrates, which is metabolized into nitric oxide, which in turn leads to the widening of blood vessels, which facilitates the blood flow increases endurance, improves energy and enhances the efficiency of oxygen transport, , as well as an excellent source of vitamin C and an antioxidant that supports immune health and respiratory health by producing nitric oxide, this is what researchers have proven, Where the researchers used the experimental method in the research with a design of three equivalent groups (control, first experimental, second experimental) with two pre and post tests for its suitability to the nature of the problem that it wants to solve, and the research community was chosen from the hostile activities of 400 m free in Iraq, who are (35) runners. Selecting a sample from the community in the simple way and their number reached (17) runners in the governorates of Kerbala and Baghdad, and (2) were excluded from the sample for equivalence procedures, and they were distributed into three groups in the same way (control group, first experimental, second experimental).

Where the first experimental research sample was applied exercises according to the target time according to the equation of the scientist Frank in addition to doses of beet supplement and the second experimental on exercises according to the target time according to the equation of

the scientist Frank and the control sample was limited to training the trainer only, and the researchers concluded that there are differences in indicators anaerobic capacity, fatigue, and 400m free achievement for the benefit of the sample that took exercises according to the target time according to the equation of scientist Frank and beet supplement on the control sample that applied the trainings of the trainer, and the beet supplement had the preference of the first experimental group over the second experimental group that did not give the supplement.

The researchers concluded that training according to the target time according to the equation of the scientist Frank, which was applied by the members of the second experimental group to develop indicators of anaerobic capacity and fatigue and achieve 400m freestyle is better than the group that applied trainer training.

### **Introduction:**

The research problem lies in the level of achieving the effectiveness of a 400m free sprint under 20 years that does not achieve the ambition to reach the Arab and Asian levels, as well as the lack of planning in achieving a specific number and how to achieve the target number for the runner, and this requires developing training solutions through the use of training based on the target time that is intended achieve it, therefore, the researchers decided to prepare the running exercises for this competition according to this time according to the equation of the scientist Frank in addition to taking a beet supplement, and the researchers believe that this method was not used by the trainers of this activity and could give positive responses in developing indicators of anaerobic ability, fatigue and achievement for this category .

Hence the importance of the research in directing the attention of the trainers of the 400m freestyle event to rely on the Frank formula to achieve the target time, as a major test to achieve the target time for runners and by using the beet supplement in feeding runners because of its auxiliary properties to achieve achievement, which makes the training process more successful.

### **Research objective:**

- Preparing exercises with a target time according to the scientist Frank equation to develop the anaerobic capacity and fatigue index and to achieve 400m freestyle runs under the age of 20.
- Identify the effect of prepared exercises in developing anaerobic capacity index and fatigue and achieving 400m freestyle runs under the age of 20 years.
- Identify the effect of prepared exercises in improving anaerobic capacity and fatigue index and achieving 400m freestyle runs under the age of 20 years.
- Identify the improvement in the effect of training between the experimental and control groups
- Anaerobic capacity and fatigue index and the achievement of running 400m freestyle under the age of 20 years. To identify the effectiveness of beet supplement in improving the anaerobic capacity and fatigue index and achieving 400m freestyle jogging under the age of 20 years.

### **Research hypotheses:**

- The exercises prepared according to the target time and beet supplement had a positive effect on the anaerobic capacity, fatigue, and achievement indicators of the three research groups (control, first experimental, second experimental).
- There is a preference in the effect between the training of the three groups in the indicators of anaerobic ability and achievement in favor of the first experimental group (which used beet supplement).

### **Research fields:**

**The human field:** Runners of 400m free in the province of (Kerbala\_ Baghdad) under 20 years old.

**Time field:** from 26/11/2020 to 5/3/2021.

**Spatial field:** The Youth Sports Stadium in Kerbala Governorate, and the Ministry of Youth and Sports Stadium in Baghdad Governorate.

### **Defining terms:**

**Indicator of anaerobic capacity and fatigue:** anaerobic capacity is the ability to produce the maximum energy or work possible in an anaerobic system. The anaerobic capacity and fatigue index is determined by the (RAST) equation by running a distance of 35 m  $\times$  6 repetitions and resting 10 seconds between one repetition and another, then we record the times of the six distances with a measurement of the weight of the runners and through an electronic equation that shows us the indicators of anaerobic ability and fatigue.

**Concentrated Beetroot Supplement:** It is a dietary supplement to enhance endurance and is made from the only beet root that uses 100% beetroot grown in the United States and is non-GMO, expertly extracted to the highest quality assurance standards. It is called (Beet Elite) in English.

**Target time:** It is the assumption of a maximum expected achievement time for the competition, which researchers work to achieve for the research sample by training with specific intensities according to this time and for training distances specific to the race stages <sup>(1)</sup>.

**The default time** for partial distances and for effectiveness is set by the coach or athlete in light of the time achieved for achievement.

### **Research methodology and field procedures:**

#### **Research Methodology:**

The researchers used the experimental approach to design the three equivalent groups (control group, experimental first, experimental second) with pre and post-test for its suitability to the nature of the research and its objectives and hypotheses.

#### **Community and sample research:**

The researchers identified the research community with Iraq's (35) club runners who participated in the official championships held by the Central Athletics Federation for the season (2020-2021) distributed among (15) clubs, and the research sample was chosen by the simple method and their number reached (17) runners. 400m freestyle under 20 years old and runners were excluded due to breaching the parity procedures, thus, the number of the sample became

(15) hostility, and thus the sample constituted (42.86%) of the research community, and they were divided into three groups (control, experimental, first, second) and divided in the same way by (5) runners for each group.

#### **Devices, tools and methods used in the research:**

##### **Methods of data collection:**

- The observation.
- The interview.
- Sources and references.
- Tests and measures.

##### **Field research procedures:**

##### **Determining the physical tests of the search variables:**

The tests were selected by examining the researchers about the specialized scientific sources and after consulting and presenting them to the experts. The test is determined for anaerobic capacity:

##### **The rapid anaerobic jogging test by the ability law (fatigue index) (RAST) to measure indicators of anaerobic ability and fatigue:**

##### **Pre-test:**

The researchers conducted the pre-tests on the two experimental research groups and the (RAST) test was performed on Saturday 19/12/2020, at 9:00 am. On the youth stadium in the holy Kerbala province, the pre-tests for the control sample were conducted on 22/21/2020, corresponding to Tuesday at nine o'clock in the morning, and on the playground of the Specialized School in the Ministry of Youth and Sports in Baghdad Governorate,

##### **Main experience:**

After completing the implementation of the pre-tests, the researchers entered the exercises that they prepared according to the target time according to the equation of the scientist Frank for the two experimental eyes of the research, and according to the following:

1. The exercises were carried out in the special preparation stage.
2. The training started on Saturday 2/1/2021.
3. Plans for continuous (8) weeks of training within the training program.
4. The number of training units per week of boards (3 training units) and thus the total number of training units prepared was (24 units).
5. The training days were: Saturday, Monday and Wednesday.
6. The performance of the training unit varied according to the objectives and requirements of each unit and according to the needs of the runner.
7. A change was adopted in the athletic training load (waviness of the load) in the wave form (1-2) and by the method of high-intensity interval training and repetitive training.
8. The intensity used in the implementation of the exercises reached between (85% - 100%) of the maximum susceptibility to hostility, in light of the pre-tests that were applied to the research sample.
9. The rest periods ranged between repetitions of (1-4) minutes and between exercises and groups of (2-15) minutes.

10. The exercises prepared in the training curriculum were completed on Wednesday (24/2/2021).

**Post-test:**

The researchers conducted the post-tests after completing the exercises that they prepared and which were included in the training curriculum, and the anaerobic capacity and fatigue indicators (RAST) were tested on Saturday, 27/2/2021, at exactly 9 a.m., At the youth stadium in the holy Kerbala governorate, and the control group's test was on Tuesday (2/3/2021) and in the same order of tests, and on the stadium of the Specialized Athletics School in the Ministry's compound in Baghdad governorate.

**Statistical means:** The researchers used the SPSS statistical package and selected relevant means to compare results in pre and post- tests.

**Presentation, analysis and discussion of test results:**

This chapter includes presenting, analyzing and discussing the results of the research by conducting the pre-measurement and implementing the exercises prepared in the training program during the period of the main experiment and conducting the post measurement of the research sample.

**Presentation and analysis of the results of pre- and post-tests for indicators of anaerobic ability, fatigue, and achievement of the control group:**

Table (1) the arithmetic mean, the standard deviation, and the value (t) show the type of significance for the tribal and dimensional tests of the control group of variables:

Variables	Test	Mean	Std. Deviations	Difference of means	Standard error	T value	Sig level	Sig type
Highest capacity	pre	693.9800	46.42216	-15.84000	3.25586	-4.865	.008	Sig
	post	709.8200	49.24258					
Less capacity	pre	418.7800	43.93685	-32.46000	2.26773	-14.314	.000	Sig
	post	451.2400	42.39449					
Average capacity	pre	540.8200	34.16383	-28.96000	3.15652	-9.175	.001	Sig
	post	569.7800	40.04974					
Fatigue indicator	pre	8.6846	.43616	.36800	.13157	2.797	.049	Sig
	post	8.3166	.40771					

Below the level of significance (0.5) and the degree of freedom (4).

Table (1) shows the statistical indicators of the results of the pre and post tests for the research variables that the control group members underwent.

The results showed that the arithmetic mean values of the variables of maximum capacity, least ability and average ability were greater in the post test than the pre-test, and a significant change occurred between the two tests and in favor of the post test. The results also showed that the mean values of the variables of the fatigue index, speed endurance, strength endurance, performance endurance and achievement were less. In the post test for the pre-test, a significant change occurred between the two tests and in favor of the dimensional, since these

variables have an inverse value, that is, the lower the arithmetic mean, the better the level, because they deal with the time factor in measurement, and this is what the significance levels indicated through the use of the statistical law (T) for the interconnected samples as they were for all The variables are less than the level of significance (0.05), which indicates the existence of significant differences between the two tests.

### Discussion:

By displaying and analyzing the results in table (1) for the pre and post-tests of the research variables under study for the control group, it was revealed that there are differences between the pre and post-test and in favor of the post test, and the researchers attribute these differences to the continuation of the trainer's training within the training curriculum and this was confirmed (Mr. Bassiouni Mustafa 1996 )That the physical training organized according to a program prepared on scientific foundations leads to the development of various physical characteristics <sup>(1)</sup>. This is what was confirmed by (Hussein Ali Al-Ali and Amer Fakher Ashghati 2010), which is nothing but training for the purpose of achieving the goal of training and that is through the implementation of specific methods and methods, as well as the methods used when implementing the training program during the various preparation phase and aimed at raising the level of athletic achievement. Therefore (the TAG) refers to the contents of the training, as well as the setting and organization of the training form according to the objective set or to be achieved <sup>(2)</sup>.

As these exercises that were applied by members of this group have influenced the development of these abilities, which are among the basic capabilities that short (fast) distance runners need in high performance and achievement in races.

### Presentation and analysis of pre-test results for indicators of anaerobic ability, fatigue, and achievement for the first experimental group:

Table (2) shows the arithmetic mean, standard deviation, mean of differences, standard error of differences, calculated t value, level of significance and type of statistical significance for the pre and post- tests of the first experimental group of the listed research variables:

Variables	Test	Mean	Std. Deviations	Difference of means	Standard error	T value	Sig level	Sig type
Highest capacity	pre	690.5000	57.02100	-162.8400	28.11316	-5.792	.004	Sig
	post	853.3400	14.10720					
Less capacity	pre	426.4000	60.35864	-229.9600	28.19909	-8.155	.001	Sig
	post	656.3600	17.55030					
Average capacity	pre	560.7600	62.07377	-182.4000	26.18118	-6.967	.002	Sig
	post	743.1600	13.31927					
Fatigue indicator	pre	8.3834	.32962	1.46980	.36553	4.021	.016	Sig
	post	6.9136	.51277					

Table (2) shows the statistical indicators of the results of the pre and post tests for the research variables that the members of the first experimental group underwent.

The results showed that the arithmetic mean values of the variables of maximum capacity, least ability and average ability were greater in the post test than the pre-test, and a significant change occurred between the two tests and in favor of the post test. The results also showed that the mean values of the variables of the fatigue index, speed endurance, strength endurance, performance endurance and achievement were less. In the post test for the pre-test, a significant change occurred between the two tests and in favor of the dimensional, since these variables have an inverse value, that is, the lower the arithmetic mean, the better the level, because they deal with the time factor in measurement, and this is what the significance levels indicated through the use of the statistical law (T) for the interconnected samples as they were for all the variables are less than the level of significance (0.05), which indicates the presence of significant differences between the two tests.

**Presentation and analysis of the results of the tests of the anaerobic ability, fatigue, and achievement indicators for the second experimental group.**

Table (3) shows the arithmetic mean, standard deviation, mean of variances, standard error of differences, calculated t value, level of significance, and type of statistical significance for the pre and post-tests of the second experimental group of the listed research variables.

Variables	Test	Mean	Std. Deviations	Difference of means	Standard error	T value	Sig level	Sig type
Highest capacity	pre	697.0200	68.58022	-105.7400	23.54673	-4.491	.011	Sig
	post	802.7600	29.00298					
Less capacity	pre	428.3600	74.08112	-154.1400	27.70003	-5.565	.005	Sig
	post	582.5000	25.86184					
Average capacity	pre	559.3600	71.11778	-128.0000	25.09998	-5.100	.007	Sig
	post	687.3600	17.31020					
Fatigue indicator	pre	8.4842	.36682	.99480	.17730	5.611	.005	Sig
	post	7.4894	.18935					

Table (3) shows the statistical indicators of the results of the pre and post tests for the research variables that the members of the second experimental group underwent.

The results showed that the arithmetic mean values of the variables of maximum ability, least ability and average ability were greater in the post test than in the pre-test, and a significant change occurred between the two tests in favor of the post test. The results also showed that the mean values of the variables of the fatigue and achievement index were lower in the post test than the pretest, a significant change occurred between the two tests and in favor of the dimensional, since these variables have an inverse value, that is, the lower the arithmetic mean, the better the level, because they deal with the time factor in measurement, and this is what the significance levels indicated through the use of the statistical law (T) for the interconnected

samples as they were for all the variables are less than the level of significance (0.05), which indicates the existence of significant differences between the two tests.

### **Discussion The results of tribal and dimensional tests of the search variables for the two research groups (the first experimental and the second experimental):**

#### **First: Discussion of the results of anaerobic capacity indicators:**

By presenting and analyzing the results in Tables (1) and (2) for the pre and post- tests of the two experimental groups, it becomes evident that there are differences between the pre and post tests for the variables of the anaerobic capacity indicators (highest capacity, least ability, average ability) and in favor of the post test. The researchers attribute this development to the exercises. Developed by the researchers according to the target time according to the Frank equation, which lasted for two months with three training units per week to develop anaerobic capabilities, as the gradual increase in training loads according to the scientific foundations will ensure the occurrence of physiological adaptations of the body's functional organs that led to an increase in the efficiency of the runner by increasing the endurance, this was confirmed by (Abu Al-Ela Ahmed Abdel-Fattah), "In order for the training effect to be effective, specialized and of high quality, the training loads must be shaped in light of the performance requirements in terms of energy and its source" <sup>(3)</sup>, (Magelshaw) points out that training at speeds that are consistent with the anaerobic differential threshold is often an effective way to develop anaerobic capacity (anaerobic) and he adds that they must train using three levels of training: basis endurance training and threshold endurance T. And overload endurance T <sup>(4)</sup>.

In addition to the role of beet supplement in providing members of the first experimental group with the necessary elements to complete the exercise to the fullest end, and the leftover oxygen in the exercises and the accompanying accumulation of lactic acid during the performance of exercises or competitions, it helps in the development of anaerobic abilities. This is what Jabbar Rahima confirmed, "The increase in the body's various ability to withstand the lack of oxygen during performance and the accompanying accumulation of lactic acid and high concentrations in the muscles and blood and a change in the value of (ph) blood that becomes more acidic and thus increases the body's ability to tolerate lactic acid." All this contributed to the development of anaerobic ability in the first and second experimental groups.

#### **Discuss the indicators of fatigue:**

Table (2) and (3) for presenting and analyzing the results of the pre and post- test for the first experimental group and the second experimental group shows that there is a significant difference between the pre and post tests and in favor of the post test. 300 m / 600 m) according to the equation of the scientist Frank and the codification of the time of the three distances to achieve the target time of hostility for the two experimental groups. Where the lower the arithmetic mean indicates the development or increase of the runner's ability to resist fatigue and make a longer effort, and the lower the fatigue index of 10, the better, and (Mehdi Kadhim and others 2010) points out, "The main cause of fatigue is the accumulation of lactic acid in the muscles and blood and its negative effect on the nervous system". Here, the researchers see that

anaerobic exercise with doses of beet supplement according to a well-studied scientific program led to an improvement in the ability of the first experimental group to tolerate high levels of lactic acid. On the nitrates that are metabolized to nitric oxide in the body by bacteria present in the mouth, (nitric oxide expands blood vessels, which creates performance efficiency and increases the delivery of nutrients and oxygen to the muscles) <sup>(5)</sup> .

### **Presentation, analysis and discussion of the post-test results of the research variables under study for the three research groups.**

Table (4) shows the values of the source of variance, the sum and the mean of the squares between and within the totals, the calculated F value, the level of significance, and the type of significance for the dimensional tests of the three groups.

Variables	Variance	Sum of squares	Degrees of freedom	Average of squares	F value	Sig level	Sig type
Highest capacity	Between groups	52990.284	2	26495.142	22.939	.000	Sig
	Within groups	13860.072	12	1155.006			
Less capacity	Between groups	107931.169	2	53965.585	58.359	.000	Sig
	Within groups	11096.564	12	924.714			
Average capacity	Between groups	78332.201	2	39166.101	56.462	.000	Sig
	Within groups	8324.112	12	693.676			
Fatigue indicator	Between groups	4.974	2	2.487	16.044	.000	Sig
	Within groups	1.860	12	.155			

Table (4) shows the statistical indicators of the results of the dimensional tests of the variables under study that the members of the research sample (the three groups) underwent to find the differences between the three groups in the post tests, as the results showed through the use of the statistical law (F) for the independent samples that the levels of significance for all the variables were less than the level of significance (0.05), which indicates the existence of significant differences between these three groups in the results of the post-tests.

In order to identify the preference for the differences between the three groups, researchers resorted to using the law of L. S. D, the least significant difference to extract this preference.

### **Presenting, analyzing and discussing the results of the significant differences of the three groups to demonstrate the preference of the groups for the research variables under study:**

Table (5) the L. S and D significant difference is shown to obtain the best groups:

Variables	Variance	Sum of squares	Degrees of freedom	Average of squares	

Highest capacity	Group 1- Group2	709.8200 - 853.3400	-143.52000-	.000	Sig for 2
	Group 1- Group3	709.8200 - 802.7600	-92.94000-	.001	Sig for 3
	Group 2- Group3	853.3400 - 802.7600	50.58000	.037	Sig for 2
Less capacity	Group 1- Group2	451.2400 - 656.3600	-205.12000-	.000	Sig for 2
	Group 1- Group3	451.2400 - 582.5000	-131.26000-	.000	Sig for 3
	Group 2- Group3	656.3600 - 582.5000	73.86000	.002	Sig for 2
Average capacity	Group 1- Group2	569.7800 - 743.1600	-173.38000-	.000	Sig for 2
	Group 1- Group3	569.7800 - 687.3600	-117.58000-	.000	Sig for 3
	Group 2- Group3	743.1600 - 687.3600	55.80000	.006	Sig for 2
Fatigue indicator	Group 1- Group2	8.3166 - 6.9136	1.40300	.000	Sig for 2
	Group 1- Group3	8.3166 - 7.4894	.82720	.006	Sig for 3
	Group 2- Group3	6.9136 - 7.4894	-.57580-	.039	Sig for 2

Table (5) shows the arithmetic mean of the three groups, the mean differences between these groups, the level of significance of the LSD statistical test, and the statistical significance of the research sample members (the three groups) to find the preference for the differences between them in the post-tests, as the results were shown through the use of the statistical law (L. S. D) The significance levels of all variables were less than the level of significance (0.05), which indicates the existence of a preference among these groups with the results of the post-tests, as the first experimental group was better than the second experimental group and the control group, and the second experimental group preference over the control group.

#### **Discussion The results of the dimensional tests for the three groups of the variable indicators of anaerobic capacity: -**

Through Table (4) and (5) for the results of the dimensional tests for the three control and experimental groups (first and second) for the research variables from the anaerobic capacity indicators (highest capacity, least ability, average ability) that the researchers obtained. It appears that there are significant differences between the research groups and in favor of the first experimental group, and the researchers attribute the preference of the first experimental group over the control group to the application of the members of this group to the training prepared by the researchers according to the target time to run a free distance of 400 meters through the equation of the scientist Frank by predicting the time of achieving the three distances (150 m, 300 , 600 m) and in doses of supplement (beets). In a way that serves the set goal and by using exercises in a modern style aimed at running at a rhythm and at a constant speed, because the runner has trained at the distances specified by the researchers in his exercises in order to develop the rate of running speed, which led to the creation of functional adaptation and its conformity with the capabilities of the members of the first experimental group that applied the method in addition to doses of beet supplement, as the members of the first experimental group were able to reduce the completion time of a 400-meter free run and reach the target time that the researchers set with the trainer for the runner, as well as determine the time of each of the three distances that the runner must reach and be carried out according to high intensity so that the

runner can run at a steady pace something without a major decline in the level, and this is what (Ali Nuri, 2008) indicates, citing (Shapieolm), "The increase in the intensity of training may show a high degree of physical adaptation". This would help the runner improve the completion time of a 400m freestyle run, as the runner's ability to distribute his speed and effort is important in the success of a 400m freestyle competition. Therefore, the runner cannot complete the race distance at a single speed from start to finish, so controlling his running speed is a guaranteed and thoughtful rhythm and distribution. Effort are two important factors " <sup>(6)</sup> .

It turns out that there are significant differences between the three groups and in favor of the first experimental group, and the researchers attribute the preference of the first experimental group over the control group to the exercises developed by the researchers according to the target time for distances (150 m / 300 m / 600 m) according to the equation of the scientist Frank and the standardization of the time of the three distances to achieve the target time of the hostility and doses of beet supplement. Where the lower the arithmetic mean indicates the development or increase of the runner's ability to resist fatigue and make a longer effort, and the lower the fatigue index of 10, the better.

And (Mahdi Kadhim and others) refer to the main cause of fatigue, which is the accumulation of lactic acid in the muscles and blood and its negative effect on the nervous system <sup>(7)</sup> . Here, the researchers see that anaerobic exercise with doses of beet supplement, according to a well-studied scientific program, increased the fatigue tolerance of runners resulting from the accumulation of lactic acid. Nitric oxide expands blood vessels, which creates efficient performance and increases the delivery of nutrients and oxygen to muscles <sup>(8)</sup> .

The beet supplement had a role in the preference of the first experimental group over the second experimental group. Now both groups applied exercises according to the target time, but the first group took beet supplement doses with the exercises, while the second experimental group was limited to exercises only. All this gave preference to the first experimental group, because of the a role for a beet supplement, as it improves endurance, increases blood supply and expands blood vessels, allowing an increase in the proportion of oxygen reaching the muscle mass, providing energy sources for performance for the longest period possible, and ridding the muscles of lactic acid, which is the cause of fatigue.

As for the members of the control group, a slight development occurred that did not lead to the achievement of achievement, as in the first and second experimental group, due to the trainer exercises in terms of the components of the training load and its methods, and the researchers believe that fatigue is a sign of good training pregnancy where the athlete must reach a state of fatigue in the exercises The body's adaptation process takes place, leading to delaying fatigue for as long as possible.

All of the above is clear that the exercises according to the target time, which were carried out in a high-intensity and repetitive interval method, which were carried out by the first experimental group, each of the exercises and supplementation of beets had a significant impact on the development and indicators of anaerobic ability and fatigue, this is what led to the preference of the two experimental groups over the control group, as the second experimental

group had the exercises prepared by the researcher a role in developing indicators of anaerobic capacity and fatigue, and the control group did not use these exercises and even if some of them were used, the method and method in which the exercises were carried out remains the two experimental groups (first and second). In addition to the role of beet supplement that was given to the first experimental group, and this is what led to the preference of the first experimental group over both the second experimental and control in achieving the 400-meter freestyle run.

### **Conclusions and recommendations:**

#### **Conclusions:**

- The exercises prepared by the researchers according to the target time had a great impact in improving the indicators of anaerobic capacity and fatigue, and this was proven by the results obtained.
- An improvement in the anaerobic capacity and fatigue indicators of the first experimental group was seen due to training according to target time and doses of beet supplement.
- The emergence of an improvement in the level of completion of 400-meter freestyle runs due to the exercises according to the target time according to the equation of the scientist Franck for each of the first and second experimental samples, better than the training of the control group.
- A variation in achievement appeared. He ran the 400-meter freestyle in preference to the first experimental group that was given exercises with a beet supplement over the second experimental that applied only exercises and the control applied to the trainer's approach through the significance of the post-test.
- The results of this study demonstrated the effectiveness of training according to the target time with beet supplement, a clear effect on the development of anaerobic capacity indicators and the achievement of running 400 meters under 20 years

#### **Recommendations:**

- Adopting the exercises prepared by the researchers according to the target time according to the equation of the scientist Frank with taking a beet supplement and according to the approved doses in preparing a program to develop and indicators of anaerobic capacity and fatigue for running 400m freestyle.
- Researchers recommend using beetroot supplement to runners because of its benefit to help runners complete their workouts to the fullest and with the intensity required to improve achievement.
- Conducting experimental research on taking beet supplement to medium-distance runners (800 meters, 1500 meters) and even long distances (3000 meters free, including 3000 meters, 5000 meters, 10,000 meters), in order to correlate its achievement with achieving the shortest time possible.
- Use of beet supplement on other age groups than under 20 years of age, with other efficacy and on another gender.

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