IOSR Journal of Sports and Physical Education (IOSR-JSPE)
e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 8, Issue 2, (Mar. – Apr. 2021), PP 30-38
www.iosrjournals.org

Effect of Beta-Alanine associated with a training program on some physiological indicators and numerical achievement of 5000-meter runners

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Abstract
The main objective of the five-thousand-meter race in the present study is improving and developing the time taken by the runner. Beta-Alanine is highly important in reducing lactic acid during training and control muscle fatigue. Data showed that the legalized training program improves the physical and physiological abilities and the numerical achievement of 5000 meters running in accordance with the speed strategy and physiological indicators. This affects developing values of respiratory circulatory system's indicator and aerobics and nonaerobic training that improve respiratory system responses' variables by 7.49%; including maximum absolute and relative oxygen consumption. The current study also showed that no moral differences with the statistical references in liver enzymes (SGPT – SGOT- GGT) wither before or after the stress of the experimental group that received Beta-Alanine, which confirms the viability of liver enzymes. The study concluded that taking Beta-Alanine associated with the training program of the 5000 meter runners resulted in improving the physiological indicators (lactic acid and maximum oxygen consumption).

Keywords: *Beta-Alanine; Training program, Physiological indicators; Numerical achievement of 5000-meter runners.*

Date of Submission: 15-04-2021 Date of Acceptance: 29-04-2021

I. Introduction

The main objective of the training activities in long-distance running is improving and developing the time taken by the runner. It is mainly related to improving various body systems and making synchronized biological adaptations in these systems **[1].** Five-thousand-meter race is considered a growing area for researchers in the physical training physiology to conduct researches and studies contributing to develop and improve performance in this race **[2]**. The race character was directed by analyzing the energy systems subjected to it. This accelerates success and achieving the required levels with saving time and effort **[3]**.

The physiological measures, either laboratory or field measures, performed on runners are of the most important methods or techniques legalizing the training loads to know how prepared the contestant is to perform the training **[4].** One of the physiological tests that have a great effect on long-distance running, especially 5000 meter running, is the aerobic capacity and estimating the maximum Oxygen consumption VO_2 Max. It is considered one of the best physiological indicators of the respiratory circulatory system efficiency and the maximum contestant's ability to continue the physical activity **[5]**.

Metabolism of each dietetic supplement should be identified beside the time it stays in the blood and it is fitting to the purpose of taking with schedules of training or competition **[6]**. It is taken with natural food to react with natural dietary substances and interfere with them in the digestion and absorption process **[7].**

Beta-Alanine is a member of the non-essential amino acids. Its importance increases in hard training due to high lactic acid. It helps in reducing this acid during training and control muscle fatigue **[8]**. Additionally, beta-alanine has a role in formation dipeptide known as Carnosine alongside Histidine besides forming Pantothenic acid (vitamin B_5). Thus, it contributes to form proteins and thereby contributes to biological activities indirectly **[9].** Taking Beta-alanine as a dietary supplement works as a stimulus of Carnosine rates in muscles by 80%. Carnosine is stored in skeletal muscle and reduces the muscle acidity and lactic acid accumulation during training; therefore, resulting in improvement in performance and overcome the fatigue **[10, 11].**

Researchers must work on building up circulatory respiratory endurance, as well the muscle power endurance of the contestants through dietary supplements alongside the training programs **[12]**. Therefore, the

aim of the present study was identifying the effect of beta-alanine associated with training program on some physiological indicators and the numerical achievement of the 5000 meter runners.

II. Materials and Methods

The experimental method is used to design two groups; experimental and control to fit the research nature.

Experimental control:

Experimental group: it will undergo the suggested training program with Beta-Alanine.

Control group: it will undergo the same suggested training program without Beta-Alanine.

Fields of research:

Human field:

5000 meter runners in Alexandria.

Spatial field:

Alexandria University stadium arena and track.

Temporal field:

Sports season 2019/2020; during the period from 22/12/2019 to 18/2/2020.

Research sample:

The research sample was selected using non-random method among the 5000 meter runners from some sports club in Alexandria. Their total number is 16 players, which were divided into two equal groups (eight for each; experimental and control).

Terms of choosing sample:

1. The player should be registered in the Egyptian Athletic Federation for the sports season 2019/2020 and he participated before in Federation Regional Championships of 5000 meters running.
2. The research sample should be subjected to a medical examination to make sure they are free of diseases that could affect the results of the research variables and the ability to practice activity and proceed with the training program.

Measurements used in the study:

The main measurements:

Age in years – the total length of the body in cm – the weight of the body in kg – the training years.

Physiological indicators:

- Liver enzymes: SGOT enzyme, SGPT enzyme, GGT enzyme (before and after stress)
- Lactic acid rate before stress and after stress by 7 minutes.
- Maximum of oxygen consumption (VO2 Max), absolute and relative.

Numerical level:

- 5000 meters running time

Tools applied in measurements:

First: preparation of all special tools of drawing blood samples as follows:

Test tubes to preserve blood samples preparing for its separation and analysis, plastic tubes, tube holder, alcohol for cleansing, plastic syringes, cotton, ice tank, centrifuge to separate blood samples, plastic syringes 10cm, Anticoagulants, Antiseptic Solution, plasters.

Second: running tools:

Athletic Track, a stopwatch to measure time, register forms)

Basic study:

1. Pre-measurement:

The researchers conduct the pre-measurement on the main research sample in the main variables, physiological indicators and the numerical level of 5000 meters running. This will be conducted in 22/12/2019 according to specifications and performances terms specific to each test with the unification of measures and performers of measurements.

2. Suggested training program:

a) Scientific basis of the training program:

Researchers define the basis and standards of developing the training program through views of some specialized scientific references in physical training and previous studies. They dealt with training basis and used it in accordance with the training program status and its goals**;** including **[13, 14, 15, 16]** The authors found the following:

- Define the program's objective and the objectives of every phase of the implementation.
- Define the most important training duties taking into account order and gradual of increasing load, proper progress and dynamics of training loads.
- Consider the unification of all variables of training loads between the experimental and control groups in terms of size, intensity and intervals resting.

b) Suggested training program objectives:

The training program aims to improve some physiological indicators and the numerical achievement level of 5000 meter runners.

c) Contents of the suggested training program:

The suggested training program includes a set of special training of warm-up, flexibility and stretching. Similarly, training of respiratory circulatory endurance and special endurance. Muscle power training to develop power endurance and power in addition to stretching training.

d) Application of the suggested training program:

The suggested training program is applied to the research sample individuals in the period between 23/12/2019 and 17/2/2020 (for 8 weeks). It contains 48 training units; 6 units per week.

3. The used dose of Beta-Alanine in the experimental group:

According to the referential studies related to dietary supplements, the dose of Beta-alanine is set by (8 g) daily distributed as follows:

Post measurements:

After finishing the specified period of implementing the suggested training program for the experimental and control groups, the researchers conducted the post measurements in the same terms and specifications that were done in the pre-measurement. In order to ensure the accuracy and integrity of data on 18/2/2020.

Statistical analysis:

The statistical program SPSS is used in conducting the following statistical operations:

Arithmetic mean, Standard deviation, Coefficient of Skewness, Coefficient of Kurtosis, Coefficient of variation, T-Test of difference, independent Samples T-Test, Improvement percentage, ETA2 coefficient, Cohen's impact factor.

III. Results

Data in **Table 1** showed that the Coefficient of Skewness of all variables was closer to zero. The value of modulus of torsion values was between (-1.88) and (0.20). This shows that all values are between (±3) which confirms that the sample is free from asymmetric distribution defects. In addition, all values of Coefficients of variation for the main and physiological variables as well as the numerical level of the main study sample before the experiment are between 3.5 and 22.55% (below 25%) indicating non-dispersal of the sample under study for these variables.

Table 1. Statistical profile of the main and physiological variables and the numerical level of the main study sample before the experiment, N=16.

Statistical significances / Variables		Measure unit	Arithmetic mean	Standard deviation	Coefficient of Skewness	Coefficient Of Kurtosis	Coefficient of variation(%)
Main variables	Age	Year	21.31	2.06	-0.06	-0.70	9.65
	Length	cm	173.69	6.20	0.20	-1.24	3.57
	Weight	kg	69.19	6.06	-0.22	-1.03	8.76
	Training age	Year	9.31	1.92	0.01	1.02	20.64
Physiological indicators	SGPT enzyme (ALT) before stress	(U/L)	28.00	5.30	-0.08	-1.16	18.94
	SGPT enzyme (ALT) after stress	(U/L)	30.44	3.79	-0.06	0.17	12.47
	SGOT enzyme (ALT) before stress	(U/L)	29.63	4.75	-1.88	4.03	16.02
	SGOT enzyme (ALT) after stress	(U/L)	30.00	3.86	-0.26	-1.12	12.88
	GGT enzyme before stress	(U/L)	16.69	3.84	-0.24	-1.52	23.02
	GGT enzyme after stress	(U/L)	17.25	3.89	0.06	-1.33	22.55
	Lactic acid before stress	(mg/di)	17.47	1.05	-0.65	0.83	5.99
	Lactic acid after stress	(mg/di)	109.51	6.70	0.12	-0.25	6.12
	Maximum oxygen consumption VO2	ml	3081.25	171.15	0.08	-0.76	5.55
	Relative oxygen consumption VO2	Ml/kg	44.85	4.63	0.18	-0.22	10.33
Numerical level		minute	18.25	1.03	-0.04	-1.33	5.63

The equality between the experimental and control groups in all the main variables (age – length – weight), the physiological indicators and the numerical level under study are achieved in **Table 2.** This equality offers the opportunity to identify the effect of the suggested experimental variables. Particularly, as the same

conditions and factors provide a suitable environment for all individuals in the study sample. Therefore, the researchers could check their developed assumptions related to the experimental variable from the moral differences between the experimental and control groups in the main variables, physiological indicators and numerical level before the program application. It shows there are no differences with a statistical significance on the level 0.05 between the two groups. As the calculated values of (T) was ranged between 1.21 and 0.00. These values are below the tabular value of (T) at the level 0.05 (2.14) which confirms the equality of the two groups.

Table 2. Statistical profile of the main variables, physiological indicators and the numerical between the two search groups before experiments, N=16.

Statistical significances / Variables		Measure unit	Experimental group N=8		Control group N=8		The difference between the two means		(T) Value
			S	±E	S	±E	S	±E	
Main variables	Age	Year	21.25	2.49	21.38	1.69	0.13	1.06	0.12
	Length	cm	173.75	6.56	173.63	6.28	0.13	3.21	0.04
	Weight	kg	69.25	7.07	69.13	5.36	0.13	3.13	0.04
	Training age	Year	9.63	1.92	9.00	2.00	0.63	0.98	0.64
Physiological indicators	SGPT enzyme (ALT) before stress	(U/L)	27.88	5.25	28.13	5.72	0.25	2.74	0.09
	SGPT enzyme (ALT) after stress	(U/L)	29.38	4.14	31.50	3.34	2.13	1.88	1.13
	SGOT enzyme (ALT) before stress	(U/L)	29.13	6.71	30.13	1.64	1.00	2.44	0.41
	SGOT enzyme (ALT) after stress	(U/L)	29.25	3.65	30.75	4.17	1.50	1.96	0.77
	GGT enzyme before stress	(U/L)	17.25	4.06	16.13	3.80	1.13	1.97	0.57
	GGT enzyme after stress	(U/L)	17.00	4.63	17.50	3.30	0.50	2.01	0.25
	Lactic acid before stress	(mg/di)	17.44	1.33	17.50	0.76	0.06	0.54	0.12
	Lactic acid after stress	(mg/di)	109.20	6.47	109.83	7.36	0.63	3.46	0.18
	Maximum oxygen consumption VO2	ml	3087.50	170.61	3075.00	183.23	12.50	88.51	0.14
	Relative oxygen consumption VO2	Ml/kg	44.95	4.81	44.75	4.78	0.20	2.40	0.08
Numerical level		minute	18.25	1.13	18.25	1.00	0.00	0.53	0.00

The statistical significances of the physiological indicators and numerical level of the control group before and after experiment are listed in **Table 3.** There are no statistically significant differences at the level 0.05 between pre and post measurements of the studied variables. The values of T were ranged between 0.20 and 1.23. It is smaller than the tabular T value at the level 0.05 (2.37). The improvement percentages ranged from 0.62 to 4.00%. Likely, the statistical significances of the physiological indicators and numerical level of 5000 meters running of the control group shows there are no moral differences with statistical significance between pre and post measurements of all variables. Improvement percentages was ranged from 0.62 to 4.00%. It indicates the effect of the suggested training program on the variables' percentages.

Table 3. Statistical significances of the physiological indicators and numerical level of the control group before and after the experiment N=8.

Statistical significances / Variabsles		Measure unit	Pre measurement		Post measurement		Difference between means		T value	Significance level	Improvement percentage
			S	±E	S	±E	S	±E			
Physiological indicators	SGPT enzyme (ALT) before stress	(U/L)	28.13	5.72	29.25	6.02	1.13	2.95	1.08	0.32	4.00
	SGPT enzyme (ALT) after stress	(U/L)	31.50	3.34	30.88	4.22	0.63	4.96	0.36	0.73	1.98
	SGOT enzyme (ALT) before stress	(U/L)	30.13	1.64	30.88	3.44	0.75	3.73	0.57	0.59	2.49
	SGOT enzyme (ALT) after stress	(U/L)	30.75	4.17	30.13	4.70	0.63	3.07	0.58	0.58	2.03
	GGT enzyme	(U/L)	16.13	3.80	16.25	4.03	0.13	1.73	0.20	0.84	0.78

	before stress										
	GGT enzyme after stress	(U/L)	17.50	3.30	17.88	2.53	0.38	1.51	0.70	0.50	2.14
	Lactic acid before stress	(mg/di)	17.50	0.76	17.13	1.13	0.38	1.51	0.70	0.50	2.14
	Lactic acid after stress	(mg/di)	109.83	7.36	110.83	5.59	1.00	5.41	0.52	0.62	0.91
	Maximum oxygen consumption VO2	ml	3075.00	183.23	3106.25	186.01	31.25	79.90	1.11	0.31	1.02
	Relative oxygen consumption VO2	Ml/kg	44.75	4.78	45.18	4.46	0.43	1.15	1.07	0.32	0.97
Numerical level		minute	18.25	1.00	18.14	0.97	0.11	0.26	1.23	0.26	0.62

*moral at level (0.05) (2.37)

Table 4 confirms that by the effect size of these variables; which indicated the increase of all values of the effect size of the training program. This is due to the program's content of various training and legalizing training loads in the light of individual differences of runners and depending on the training pulse levels. ETA2 coefficient and Cohen's size effect of the physiological indicators and the numerical level of the control group before and after the experiment was increased as it ranged between 0.78 and 13.29.

Table 4. ETA2 coefficient and Cohen's size effect of the physiological indicators and the numerical level of the control group before and after experiment N=8.

Statistical significances / Variables		**Measure unit**	**(T) value**	**Significance level**	**ETA2 coefficient**	**Cohen's size effect**	**Effect size amount**
Physiological indicators	**SGPT enzyme (ALT) before stress**	(U/L)	1.08	0.32	0.14	6.10	Big
	SGPT enzyme (ALT) after stress	(U/L)	0.36	0.73	0.02	0.78	Medium
	SGOT enzyme (ALT) before stress	(U/L)	0.57	0.59	0.04	1.17	Big
	SGOT enzyme (ALT) after stress	(U/L)	0.58	0.58	0.05	2.39	Big
	GGT enzyme before stress	(U/L)	0.20	0.84	0.01	1.32	Big
	GGT enzyme after stress	(U/L)	0.70	0.50	0.07	4.43	Big
	Lactic acid before stress	(mg/di)	0.70	0.50	0.07	1.63	Big
	Lactic acid after stress	(mg/di)	0.52	0.62	0.04	1.85	Big
	Maximum oxygen consumption VO2	ml	1.11	0.31	0.15	7.23	Big
	Relative oxygen consumption VO2	Ml/kg	1.07	0.32	0.14	12.71	Big
Numerical level		minute	1.23	0.26	0.18	13.29	Big

* The effect (weak) less than 0.5
* The effect (medium) from 0.5 to less than 0.8
* The effect (big) 0.8 and more

The statistical significances of the physiological indicators and the numerical level of the experiment group before and after the experiment show statistically significant differences at the level (0.05) between the pre and post measurements in some variables of the study **(Table 5)**. The (T) value differences ranged from (3.17, 6.79). It is bigger than the tabular (T) value at the level 0.05 (2.37). The improvement percentages were ranged from 0.43 to 8.60%.

Table 5. Statistical significances of the physiological indicators and numerical level of the experimental group before and after the experiment N=8.

Statistical significances / Variables		**Measure unit**	**Pre measurement**		**Post measurement**		**difference between means**		**T value**	**Significance level**	**Improvement percentage**
			S	**±E**	**S**	**±E**	**S**	**±E**			
Physiologi	**SGPT enzyme (ALT) before stress**	(U/L)	27.88	5.25	28.13	3.60	0.25	4.46	0.16	0.88	%0.90
	SGPT enzyme (ALT) after stress	(U/L)	29.38	4.14	29.50	4.24	0.13	4.22	0.08	0.94	%0.43

	SGOT enzyme (ALT) before stress	(U/L)	29.13	6.71	28.63	4.93	0.50	6.99	0.20	0.85	%1.72
	SGOT enzyme (ALT) after stress	(U/L)	29.25	3.65	29.00	3.74	0.25	5.85	0.12	0.91	%0.85
	GGT enzyme before stress	(U/L)	17.25	4.06	16.00	3.63	1.25	3.45	1.02	0.34	%7.25
	GGT enzyme after stress	(U/L)	17.00	4.63	17.25	3.69	0.25	3.54	0.20	0.85	%1.47
	Lactic acid before stress	(mg/di)	17.44	1.33	15.94	1.86	1.50	1.34	*3.17	0.02	%8.60
	Lactic acid after stress	(mg/di)	109.20	6.47	118.30	4.49	9.10	7.04	*3.65	0.01	%8.33
	Maximum oxygen consumption VO2	ml	3087.50	170.61	3318.75	103.29	231.25	148.65	*4.40	0.00	%7.49
	Relative oxygen consumption VO2	Ml/kg	44.95	4.81	48.30	4.52	3.35	2.09	*4.53	0.00	%7.46
Numerical level		minute	18.25	1.13	17.20	0.90	1.05	0.44	*6.79	0.00	%5.75

*moral at level (0.05) (2.37)

The ETA2 coefficient and Cohen's effect size of the physiological indicators and numerical level of the experimental group before and after the experiment shows increasing in some values of the effect size of the program **(Table 6)**. The values ranged from 0.71 to 1.62.

Table 6. ETA2 coefficient and Cohen's effect size of the physiological indicators and numerical level of the experimental group before and after the experiment N=8.

Statistical significances / Variables		**Measure unit**	**T-value**	**Significance level**	**ETA2 coefficient**	**Cohen's effect size**	**Effect size amount**
Physiological indicators	**SGPT enzyme (ALT) before stress**	(U/L)	0.16	0.88	0.00	0.05	weak
	SGPT enzyme (ALT) after stress	(U/L)	0.08	0.94	0.00	0.03	weak
	SGOT enzyme (ALT) before stress	(U/L)	0.20	0.85	0.01	0.08	weak
	SGOT enzyme (ALT) after stress	(U/L)	0.12	0.91	0.00	0.05	weak
	GGT enzyme before stress	(U/L)	1.02	0.34	0.13	0.32	weak
	GGT enzyme after stress	(U/L)	0.20	0.85	0.01	0.06	weak
	Lactic acid before stress	(mg/di)	3.17	0.02	0.59	0.88	Big
	Lactic acid after stress	(mg/di)	3.65	0.01	0.66	1.62	Big
	Maximum oxygen consumption VO2	ml	4.40	0.00	0.73	1.55	Big
	Relative oxygen consumption VO2	Ml/kg	4.53	0.00	0.75	0.71	medium
Numerical level		minute	**6.79**	**0.00**	**0.87**	**0.89**	**big**

* The effect (weak) less than 0.5
* The effect (medium) from 0.5 to less than 0.8
* The effect (big) 0.8 and more

Table 7 showed that the statistical references of the physiological indicators and numerical level of the search groups after experiments was significance at level 0.05 in some measures. The T value ranged from 2.82 to 2.95 which is bigger than tabular T value at the level 0.05 (2.14) and with differences ranged from 1.54 to 7.29.

Table 7. Statistical significances of the physiological indicators and the numerical level of the search groups after the experiment N=16.

Statistical significances / Variables		**Measure unit**	**Experimental group N=8**		**Control group**		**The different between the two means**		**(T) Value**	**Significance level**	**Differences percentage %**
			S	**±E**	**S**	**±E**	**S**	**±E**			
Physiological	**SGPT enzyme (ALT) before stress**	(U/L)	28.13	3.60	29.25	6.02	1.13	2.48	0.45	0.66	3.85
	SGPT enzyme	(U/L)	29.50	4.24	30.88	4.22	1.38	2.12	0.65	0.53	4.45

	(ALT) after stress									
	SGOT enzyme (ALT) before stress	(U/L)	28.63	4.93	30.88	3.44	2.25	2.12	1.06	0.31	7.29
	SGOT enzyme (ALT) after stress	(U/L)	29.00	3.74	30.13	4.70	1.13	2.13	0.53	0.60	3.73
	GGT enzyme before stress	(U/L)	16.00	3.63	16.25	4.03	0.25	1.92	0.13	0.90	1.54
	GGT enzyme after stress	(U/L)	17.25	3.69	17.88	2.53	0.63	1.58	0.39	0.70	3.50
	Lactic acid before stress	(mg/di)	15.94	1.86	17.13	1.13	1.19	0.77	1.54	0.14	6.93
	Lactic acid after stress	(mg/di)	118.30	4.49	110.83	5.59	7.47	2.54	*2.95	0.01	6.74
	Maximum oxygen consumption VO2	ml	3318.75	103.29	3106.25	186.01	212.50	75.22	*2.82	0.01	6.84
	Relative oxygen consumption VO2	Ml/kg	48.30	4.52	45.18	4.46	3.12	2.25	1.39	0.19	6.91
Numerical level		minute	17.20	0.90	18.14	0.97	0.94	0.47	2.00	0.06	5.17

*moral at level (0.05) (2.14)

IV. Discussion

The results of the present study are in consistence with those obtained by **Birhanu [17]** that the legalized training program improves the physical and physiological abilities and the numerical achievement of 5000 meters running in accordance with the speed strategy and physiological indicators. It complies too with the results of **Khalyfa [18]** that confirms that improvement in the enzyme and functional responses of the aerobics activities (respiratory and circulatory endurance) is achieved by various loads during the suggested training loads. That was what taken into account and the researchers pointed to during defining basis and standards of the training program.

The statistical significances of the physiological indicators and numerical level of 5000 meters running of the experimental group before and after the experiment shows there are moral differences with statistical significance in the physiological indicators (lactic acid before and after stress- maximum absolute and relative oxygen consumption). In addition to the numerical level. This complies with the effect size that was high in the previously mentioned indicators. These findings were similar with the results of **Ahmed [19]** showing that taking dietary supplements before stress results in an improvement in the disposal of lactic acid. Besides, it helps the Auxiliary and Catalytic enzymes to produce energy, improve functional and physiological responses, delay fatigue, and improve the numerical level.

Culbertson *et al.* [10] and **Farsi *et al.* [20]** reported that taking Beta-Alanine as dietary supplement enhances muscle Carnosine levels. It is the main factor to control fatigue in addition to its important role in fixing the PH in the blood (the acidity and alkaline degree); thus it works as prohibitive and barrier in muscle acidity and reducing lactic acid formation. The improvement in physiological efficiency is due to the effect of taking Beta-Alanine associated with the suggested training program and its included training loads based on a scientific basis. This affects developing values of respiratory circulatory system's indicator and aerobics and nonaerobic training that improve respiratory system responses' variables; including maximum absolute and relative oxygen consumption **[21 ,22].** This follows too with what was referred by **Salama [23]** who postulates that the maximum oxygen consumption increases with physical training from 8 to 12 weeks, five training units per week. Especially, in the training program depending on endurance. This complies with what researchers do when developing the training program of 5000 meters running regarding week numbers and training units. In addition, improving the physiological variables including the maximum absolute and relative oxygen consumption that improved by 7.49%.

The current study showed that no moral differences with the statistical references in liver enzymes (SGPT – SGOT- GGT) wither before or after the stress of the experimental group that received Beta-Alanine, which confirms the viability of liver enzymes. As the high liver enzymes result in braking and damaging liver cells. This similar with the results of **Ahmed [24]** and **Eliwa [25]** showed that taking dietary supplements results in producing the required energy for continuing to exert stress and viability of liver functions and improving physiological variables and numerical levels.

The researchers in the present work thought that the effect of takings Beta-Alanine by the experimental group on the physiological parameters was significant. **Eliwa and Ali [26]** suggested that taking dietary supplement associated with the training program is better in the improvement percentage than just the training

program in the physiological variables, delaying fatigue and the numerical level. This also complies with the studies of **Jaffe *et al.* [11]** and **Farid *et al.* [27]** that shows that taking Beta-Alanine as a dietary supplement helps in improving exercising through increasing the organizing ability and improving performance by delaying fatigue. Other studies performed by **Tomlin and Wenger [28]** and **Mohamed [29]** shows that aerobics load training reducing the benefit of carbohydrates and the content of muscle increases with Mitochondrion and increasing the enzyme activity in the muscle. As it is responsible for the low rate of glucose and Glycogen metabolism after training. Thereby producing a smaller amount of lactic acid in muscle and reducing the link between the aerobics fitness and quick disposal of lactic acid after training.

The researchers suggest that the lack of moral differences between the post measurements of blood serum enzymes of the two search groups is due to the convergence of the exerted physical effort during physical loads. This is due to the adaptive nature of these enzymes resulted from the effect of the applied training program. Therefore, the enzymes achieve an optimal state by increasing efficiency of stimulation biochemical operations of producing the required energy for continuing performing during running. In addition, reducing the harmful effects associated with muscle training and some internal organs of the runners. The above mentioned results were in agreement with those previously obtained by **Ahmed [24]** and **Khalyfa *et al.* [18].**

V. Conclusions:

- Taking Beta-Alanine associated with the training program of the 5000 meter runners resulted in improving the physiological indicators (lactic acid and maximum oxygen consumption)
- Taking Beta-Alanine associated with the training program resulted in improving the numerical achievement of 5000 meter runners.

Recommendations:

- Taking Beta-Alanine as a dietary supplement with the training program of the 5000 meters running contestants
- Conducting more studies about the effect of having some dietary supplements on some other races and following the results.

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Wael Yousef Ahmed, et. al. "Effect of Beta-Alanine associated with a training program on some physiological indicators and numerical achievement of 5000-meter runners." *IOSR Journal of Sports and Physical Education (IOSR-JSPE,) 8*(2) (2021): 30-38.