

Evaluating the Effect of Some Nutritional Supplements on the Health Status of Athletes

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Abstract—This study was aimed to evaluate the effect of different four classes of nutritional supplements which was consumed by 15 Bodybuilder athletes with wight range between 67-75 kg with total of five groups of volunteers (3 replicates per group). The groups of athlete's diet included, the normal diet without supplement (T1), Whey protein (WP) at 90mg (T2), Mass gainer muscle builder (MG) at 135mg (T3), the branched amino acid group (BCAA) at 40mg (T4), and the PSYCHOTIC energy drink (PED) at 5 mg (T5). In order to detect some physiological parameters as an outcome after consumption, a specific formula has been followed by those five groups. The results of our study has been shown a non-significant effects ($p < 0.05$) on the blood picture parameters and the liver enzymes of supplements types that was consumed by treatment groups of T2, T3 and T4, while the consumption of PED by athlete donors has been significantly increased at the level of White Blood Cells (WBCs) to reach up to 12.5 compared to control group (T1) which was at 9.2 ($\times 10^3/\text{mm}^3$). Meanwhile, the effects on the hemoglobin (Hb) concentration, red blood cells counts (RBCs) and the hematocrit (Hct) was decreased while platelets counts was significantly increased to the level of 12.1, 6.3, 43.7 and 280 respectively compared to their values in the control group, which appeared at 16.6 (mg/ml), 8.4 ($\times 10^3/\text{mm}^3$), 49.4.(%) and 225($\times 10^9/\text{L}$) respectively. The results also found that the level of liver enzymes including AST, ALT and ALP of PED group was significantly increased compared including and become at 12.5, 45.1 and 11.3 (IU/L) respectively compared with the same values in control treatment T1.

Keywords—Athletes, Supplement food, Energy drink, Health stats.

I. INTRODUCTION

Nutrition is a term given to the mechanisms in which the body of human being and other creatures obtain the nutrients required for growth and survival, as well as tissue regeneration and adequate energy. Nutrition is considered one of the most important factors in raising physical efficiency, resistance to fatigue, as well as training. Therefore, the nutritional elements are the most important factors influencing sports performance, training process and the situation of athletes before, during or after training (Guleria, et al., 2018).

Dietary supplements include many nutrients that's used to improve the nutritional ingredient of the sport diet such as amino acids, vitamins, minerals, and other related products (Burke and Cort, 2006 ; John, 2003). The Dietary supplements was defined by the Dietary supplement Health and Education, as any "product" that were intended to boost the diet that used from the athletes (Masoga, et al., 2019).

The most ergogenic supplement such as energy drinks, caffeine, whey protein and creatine were the more common products that used to tolerate pain and promote the physical performance (Thomas, et al., 2016).

The intensive sports such as football and body building requiring an increase of the muscle mass and strength. The recommended amount of supplements are usually provided by the athletes' coaches or doctors (Spendlove, et al., 2015). A survey that was performed in a about 65% of the players was confirm and that the recommended usage of the of the supplements were based on nonscientific reasons, in fact, it was determined that most of the information were coming from social media .

In order to get the boost strength in intense sports activities required the supplements as a condition to improve the health, build the muscle mass, power, Injury prevention and enhanced recovery, as the regular nutrients in daily meals are considered not enough to improve the muscle requirements and the needs of the intense activities in general (Brown, et al., 2020). The number of dietary supplements consumed should be within the recommended dietary balance and must contain the optimal range of all essential ingredients (Hughesm, 2015), Therefore, it has become an essential to educate athletes through illustrated the information about the interactions and the risks of the

outcome of dietary supplements (Hespel, et al., 2006 ; Bishop, 2010).

Recently, some studies that referred for some supplements have even been implicated as the cause the harmful to the athlete and sometime death when used unsuitably (Dunn, et al., 2001).

The objective of this study was to investigate the effects of consumption of different four classes of nutritional supplements including whey protein, mass ginner, branched amino acids (BCAA) and PSYCHOTIC drink for a length period of 30 days by group the volunteers and study the outcome of the the physiological parameters at the end of the time determined on the study.

II. Materials and Methods

The supplements ingredients were purchased from different companies originated in United States . The whey protein from Bpi company, The Mass Ginner from Dymatize, the BCAA from Xtend, and PSYCHOTIC drink from Ampiberry company.

The amounts of supplements for athlete's donor consumption were calculated according to the recommendation of company manufacturers. Athletes' donors were distributed to five group, including three for each group and the consumed of each supplement were continuous for one month, as follows: Group1: Control, nutrition without supplement, Group2: Athletes consumed whey protein at 90 mg/kg/day, Group3: Athletes consumed Mass Ginner at 135 mg/kg/day, Group4: Athletes consumed BCAA at 40 mg/kg/day, Group5: Athletes consumed PSYCHOTIC drink at 5 mg/kg/day. Before they were to start given the supplements or PSYCHOTIC (energy drink), a blood sample was taken from each one of the volunteers at two different points before and after consumption.

Intravenous blood withdrawal of each donor in the health clinic by a specialist in two tubes, 4 ml in the first one that containing EDTA to detect the blood picture parameters used the Hematology auto-analyzer system (Mind ray, England). The other tubes of EDTA free were used to 4 ml of blood collect, then centrifuged used the Centrifuge system (Kokusan, Japan) at 3000 cycle/mint., for 15 minutes to obtains the blood serum which storied at -20 °c tell in order to use for the analysis which was running according to (Burtis, et al., 2012).

Data were analyzed by the ANOVA analysis, using the general linear model of the Statically Analysis System (SAS, 2012). Significant treatment differences were evaluated using Duncan's multiple-range test (Duncan, 1955). All statements of significance are based on the 0.05 level of probability.

III. Results and Discussion

Effect of supplements consumption on some blood picture parameters of athletes': The results in table (1), showed the effect of consumption of each supplement as Whey Protein WP (T2), Mass ginner MG (T3), Branching Amino Acid BCAA (T4) and Psychotic Energy Drink PED (T5) compared with the control group (T1) on some blood picture parameters after 30 days of supplements consumption .the consumption of supplements. On the other side , our data indicated that the results from the group of athletes of T2, T3 and T4 were showing statistically non -significant different ($p < 0.05$) of white blood cell counts (WBCs) while, the T5 treatment was significantly increased and appeared at $12.5 (\times 10^3/\text{mm}^3)$ compared with control group (T1) which was at $9.2 (\times 10^3/\text{mm}^3)$.

Additionally The hemoglobin (Hb) concentration, red blood cells counts (RBCs) and the hematocrit (Hct) was showing no significant differences for all supplements consumed except the group of PED (T5) which has been shown significant decrease of the Hb, RBCs and Hct that become at 12.1, 6.3 and 43.7 respectively compared with the same values in control group T1 which appeared at 16.6 g/dl, $8.4 (\times 10^6/\text{mm}^3)$ and 49.4% respectively. The platelets value was increased significantly in the treatment from all supplement consumed from athletes at T2, T3, T4 and T5 that appeared at 250, 274, 267 and 280 ($1/10^9$) respectively when compared with the value in T1 which at 225 ($1/10^9$).

The Supplements types which was consumed by the groups T2, T3, T4 and T5 were showing no significant differences in each of the WBCs, Hb, RBCs and Hct which refer to the structure of this substance from essential amino acids that have a role in the construction of cells and body fluids, which has kept the level of the parameters above within normal range (Milanese et al., 2018). The level of WBCs which was significantly increased in the group of PSYCHOTIC drink (T5) which may be leading to some pathological changes related to gut as well as urinary tract infection (Conway et al., 2019), while the increase of platelet counting may be referred to shortness of breath symptoms, that obtained within the exercise stress (Levine et al., 2005).

TABLE 1. EFFECT OF SUPPLEMENT CONSUMED FROM ATHLETES ON SOME BLOOD PARAMETERS AFTER ONE MONTH.

Type of supplements	Parameters tested				
	WBCs ($\times 10^9/\text{mm}^3$)	Hb (g/dl)	RBCs ($\times 10^9/\text{mm}^3$)	Hct (%)	Platelets ($L/10^9$)
T1	9.2b \pm 1.42	16.6a \pm 1.74	8.4a \pm 0.78	49.4a \pm 1.06	225e \pm 7.63
T2	10.0 \pm 1.88	16.1a \pm 1.97	9.1a \pm 0.92	50.5a \pm 1.32	250d \pm 6.34
T3	9.7 b \pm 2.25	16.3 \pm 1.08	8.7a \pm 0.41	51.2 \pm 2.89	274 \pm 5.11
T4	10.16 \pm 1.2	17.1a \pm 3.41	8.9 a \pm 0.7	51.0 \pm 3.53	267 \pm 6.89
T5	12.5 a \pm 1.6	12.1 \pm 1.12	6.3 b \pm 0.41	43.7c \pm 3.41	280a \pm 5.41

T1: Control, nutrition without supplement, T2: Athletes consumed whey protein at 90 mg/kg/day, T3: Athletes consumed Mass Ginner at 135 mg/kg/day, T4: Athletes consumed BCAA at 40 mg/kg/day, T5: Athletes consumed PSYCHOTIC drink at 5 mg/kg/day.

-Different letters on the averages in each column indicate significant differences at probability 0.05.

-Means values were taken from three replicates. \pm standard error.

Effect of supplements consumption on liver enzymes of athletes: The liver is considered one of the most important organs of the body that capable to produce many enzymes that play an active role in stimulating and regulating many chemical reactions in the body, including Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST) and Alkaline phosphatase (ALP) that are estimated in athletes whom taking the supplement types. The results in table (2), illustrated the effect of consumption of each WP (T2), MG (T3), BCAA (T4) and PED (T5) compared with the control group (T1) on the liver enzymes concentration for athletes after 30 days of consumption. Our data indicated that

These results were consistent with Kutia, et al., (2019), whom their found that the energy drink was able to cause a negative effect on the groups they consume it. These negative effects levels were depended on the ingredients contained of energy drinks which almost main components are caffeine, L-carnitine, D-glucuronolactone, taurine and some vitamins, It should be noted that but. Some of these substances have hepatotropic activity which could lead to hepatotoxic effects especially during the excessive using of these compounds (Higgins, et al., 2010). The other supplements that have been used in this study where components from the essential and non-essentials amino acids has not been shown any effect even though it was consumed within the optimal levels.

Conclusions

In a conclusion, the data obtained from this study indicated the safety of consumption of Whey protein, Mass ginner, BCAA, while at same time our data have shown the negative effect of the energy drink of PSYCHOTIC energy

the consumption of each supplement by T1, T2, T3 and T4 didn't show to cause a significant ($P < 0.05$) effects in all liver enzymes as ALT, AST and ALP compared with the values in T1 treatment which appeared at 9.8, 30.2 and 6.4 (IU/L) respectively. While, the consumption of the PED (T5) found to cause a significant increase of the liver enzymes values and become at 12.5, 45.1 and 11.3 (IU/L) respectively compared with the same values in control treatment T1.

Table 2. Effect of supplement consumed from athletes on liver enzymes after one month.

Type of supplements	Liver enzyme value (IU/L)		
	ALT	AST	ALP
T1	9.8 b \pm 1.42	30.2 b \pm 3.7	6.4 b \pm 0.71
T2	10.1 b \pm 1.88	29.6 b \pm 2.9	7.0 b \pm 1.2
T3	10.2 b \pm 2.25	29.4 b \pm 2.0	6.7 b \pm 0.42
T4	9.7 b \pm 1.2	31.2 b \pm 2.4	7.3 b \pm 0.70
T5	12.5 a \pm 1.6	45.1 a \pm 3.1	11.3 a \pm 0.81

(ALT)=

Alanine Aminotransferase, (AST)= Aspartate Aminotransferase, (ALP)= Alkaline phosphatase.

T1: Control, nutrition without supplement, T2: Athletes consumed whey protein at 90 mg/kg/day, T3: Athletes consumed Mass Ginner at 135 mg/kg/day, T4: Athletes consumed BCAA at 40 mg/kg/day, T5: Athletes consumed PSYCHOTIC drink at 5 mg/kg/day.

-Different letters on the averages in each column indicate significant differences at probability 0.05.

-Means values were taken from three replicates. \pm standard error.

drink on the health of the athlete's donors based on the consumed amount that was recommended by the manufacturer.

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Ethics

The authors declare their responsibility for any of the ethical issues that may arise after the publication of this manuscript.

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