



BIOCHEMICAL MESURMENTS IN SPORTS

Chethan Ram P.

Assistant Hockey Coach , Sports Authority of India , NSNIS, Patiala, Punjab.

ABSTRACT:-

Biochemistry plays a vital role in the advanced level of training. Biochemical parameters are also important to analysis in sports to achieve high performance and it helps to set the training load. Biochemical parameters also give guidelines to the nutritionist to prepare a



nutrition chart for athletes depend upon their sports. The study focus to provide useful information to the coaches, research scholars and athletes related to biochemical parameters need to asses in sports to improve the performance at elite level.

KEYWORDS: Biochemistry plays ,

Biochemical parameters, Lactate threshold.

INTRODUCTION :

Biochemicals are Enzymes, hormones, etc., which either occur naturally or are manufactured to be identical to naturally occurring substances.

Which are biochemical variables can assess in sports? Which are related to performance of an athlete?

Blood Lactate, Lactate threshold, Haemoglobin, Glucose, serum urea, serum uric acid, Total cholesterol, Triglycerol, lipids and lipoproteins, HDL-C (high density lipoprotein-cholesterol) and LDL-C (low density lipoprotein-cholesterol).

MEASUREMENT OF BIO-CHEMICAL PARAMETERS:

After twelve hours of fasting and after twenty four hours of last training, the 5ml of blood from venous was drawn to find out the level of HB-hemoglobin, uric acid, blood urea, TC- Total cholesterol, triglycerol, HDL- high density lipoprotein cholesterol and LDL- low density lipoprotein cholesterol.

[Antecubital vein: In human anatomy, the Cephalic vein (also known as the antecubital vein) is a superficial vein in the arm. It is located in the superficial fascia along the anterolateral surface of the biceps brachii muscle].

ADMINISTRATING METHODS:

- Estimation of Hemoglobin concentration - estimated using colorimetric procedure by Cyanmethaemoglobin method.
- By using standard procedure blood urea and serum uric acid is determined.
- By using enzymatic method the Serum total cholesterol, triglycerol and high density lipoprotein cholesterol.
- By using standard equation the low density lipoprotein cholesterol is assessed.

EFFECT OF TRAINING ON BIOCHEMICAL VARIABLES

Effect of training on blood lactate, haemoglobin, urea and uric acid levels of elite athletes:

BLOOD LACTATE:

During exercise of increasing intensity there is a rise in blood lactate concentration resulting from increased glycogenolysis. This increase in blood lactate concentration has been interpreted as a reflection of the onset of hypoxia in skeletal muscles and the exercise intensity at which anaerobic metabolism generate ATP is known as the anaerobic threshold.

LACTATE THRESHOLD:

Training types: The lactate threshold is a useful measure for deciding exercise intensity for training and racing in endurance sports (e.g. long distance running, cycling, rowing, swimming and cross country skiing), but varies between individuals and can be increased with training.

Measuring lactate threshold:

Muscles were producing lactate even in a rest condition, usually about 0.8-1.5 mmol/L. When the lactic acid starts to accumulate is called lactate threshold, some scientists approximate this by crossing the lactate threshold, and using the point at which lactate reaches a concentration of 4 mmol / L of lactate. Lactate Measurement of Aerobic and Anaerobic Thresholds: The aerobic threshold (AeT or AerT) is sometimes defined as the exercise intensity at which blood lactate concentrations rise above resting levels.

HAEMOGLOBIN:

Oxidative potentiality of an athlete is dependent on his hemoglobin level. Increase in VO₂max demands higher rates of oxygen supply. Oxygen is transported to muscle primarily by hemoglobin (Hb), and it is suggested that hemoglobin mass and/or concentration is related to VO₂max.

Studies on professional athletes showed that hemoglobin values were higher at the beginning of the competition season, and then declined in well-trained athletes. It can be suggested that the decline in hemoglobin level might be due to haemolysis and hemodilution which are common physiological effects of endurance training also exist among the well trained athletes.

UREA AND URIC ACID LEVELS:

When there is an over training and protein catabolism play as an indicator in considering the blood urea and serum uric acid level.

Actual Effect:

The highest levels of urea and uric acid were noted in the competitive phase when the training load and stress of competition was highest. Strenuous training sessions or increase breakdown of proteins are also depends to increase the level of urea and uric acid. The increased urea and uric acid level are indicates the strong influence of training sessions.

Training effect on lipids and lipoproteins levels of elite athletes:

Lipids and lipoprotein profiles indicate the cardiovascular and metabolic status of athletes. Activity levels have significant impacts on the lipids and lipoprotein levels of athletes

In the study:

There is a significant elevation in high density lipoprotein cholesterol (HDL-C) level in preparatory and competitive phases when compared to the data taking at beginning of the training. On the other hand, significant reduction in total cholesterol (TC), triglyceride (TG), low density lipoprotein cholesterol (LDL-C),

Actual Effect:

Increase in HDL-C level and decrease in triglyceride level after exercise.

A recent study showed significant increase in HDL-C and decrease in LDL-C level, with no change in triglyceride after 9 weeks of training.

MEASURING ACETYLCHOLINE:

Acetylcholine is an essential neurotransmitter in the central nervous system as it has an effect on alertness, memory and learning. Techniques such as microdialysis are routinely employed to measure acetylcholine levels in living brain systems and the microdialysis sample volumes are usually less than 50 microL.

(Microdialysis is a minimally-invasive sampling technique that is used for continuous measurement of free, unbound analyte concentrations in the extracellular fluid of virtually any tissue. Analytes may include endogenous molecules (e.g. neurotransmitter, hormones, glucose, etc.) to assess their biochemical functions in the body, or exogenous compounds (e.g. pharmaceuticals) to determine their distribution within the body.)

CONCLUSION

As other parameters the Biochemical measurements are also important to analysis in sports to achieve high performance and also it helps to set the training load. Even though the measuring technology may lead to harm the human body, But also measuring the biochemical parameters are highly necessary to assess in advanced level of sports. And it also provide guidelines to the nutritionists to prepare diet plan for athletes.

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