

Thesis Title            Changes in plasma enzymes and electrolytes of long distance runners after 10,000 M competition.

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#### ABSTRACT

Investigation of hepatic (glutamic oxaloacetic transaminase, GOT and glutamic pyruvic transaminase, GPT) and muscular (total creatine phosphokinase, T.CPK; total lactate dehydrogenase, T.LDH and lactate dehydrogenase isoenzymes, LDH-1 to LDH-5) enzymes and electrolytes ( $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{++}$  and  $\text{Cl}^-$  and plasma concentration) of long distance runners was carried out before and after 10,000 m competition during National Games of College of Physical Education, 1989. A total of 10 sedentary subjects volunteered to participate as control group to 6 long distance runners. All subjects had a range in age of 18-22 years, weight of 49.0-69.0 kg and height of 156-182 cm. There were significant difference in physical characteristics;  $\dot{V}\text{O}_2\text{max}$  ( $38.48 \pm 1.40$  ml/kg/min), % Fat ( $18.07 \pm 0.95\%$ ), vital capacity ( $3237.53 \pm 110.71$  ml), forward flexibility ( $7.60 \pm 2.27$  cm), vertical jump ( $51.80 \pm 2.18$  cm),

and heart rate ( $80.60 \pm 2.23$  beats/min) of the control group compared with the athletic group;  $\dot{V}O_2$  max ( $57.36 \pm 3.60$  ml/kg/min), % Fat ( $7.78 \pm 0.61\%$ ), vital capacity ( $2871.63 \pm 66.71$  ml), forward flexibility ( $16.25 \pm 0.92$  cm), vertical jump ( $45.75 \pm 2.05$  cm), and heart rate ( $56.33 \pm 3.85$  beats/min),  $P < 0.001$  and  $P < 0.05$ . No change in grip strength, leg strength, and averaged blood pressure between the control group and the athletic group.

These results suggest that 10,000 m competition during 7.00-8.00 pm in ambient temperature of  $27.5^\circ\text{C}$  and relative humidity of 59% induces no significant change in activity of GPT, LDH-1, LDH-2 and plasma concentrations of  $\text{Na}^+$ ,  $\text{Ca}^{++}$  and osmolarity between pre-race of athletic group ( $24.50 \pm 2.11$  SFU/L,  $57.96 \pm 9.58$  U/L,  $67.92 \pm 7.50$  U/L,  $172.33 \pm 3.94$  mEq/L,  $5.45 \pm 1.26$  mg/dl, and  $318.58 \pm 2.90$  mOsmol, respectively) and post-race of athletic group ( $27.17 \pm 2.65$  SFU/L,  $76.69 \pm 8.26$  U/L,  $90.83 \pm 9.20$  U/L,  $163.34 \pm 10.13$  mEq/L,  $3.51 \pm 0.33$  mg/dl, and  $321.58 \pm 9.40$  mOsmol, respectively). Significant rises were noted in T.CPK, T.LDH, LDH-3, LDH-4, LDH-5,  $\text{K}^+$  and  $\text{Cl}^-$  in the pre-race of athletic group ( $219.17 \pm 40.48$  U/L,  $211.33 \pm 20.93$  U/L,  $24.66 \pm 2.78$  SFU/L,  $42.10 \pm 3.40$  U/L,  $24.00 \pm 1.89$  U/L,  $19.36 \pm 1.54$  U/L,  $4.26 \pm 0.41$  mEq/L, and  $93.56 \pm 1.80$  mEq/L, respectively) compared with the post-race of athletic group ( $354.50 \pm 79.52$  U/L,  $305.67 \pm 28.16$  U/L,  $43.17 \pm 2.04$  SFU/L,  $67.13 \pm 7.76$  U/L,  $41.82 \pm 3.31$  U/L,  $29.16 \pm 3.77$  U/L,  $5.92 \pm 0.22$  mEq/L, and  $109.85 \pm 2.40$  mEq/L, respectively)  $P < 0.001$  and  $P < 0.05$ . This finding shows that increase leakage of certain muscular enzymes such as T.CPK,

T.LDH, LDH-3, LDH-4, and LDH-5 , and general tissues such as GOT which may probably due to dysfunction of plasma membrane and/or damage of muscle cells.