Supplementation with athletic performance formula decreases lactate concentrations in trained athletes after exhausting incremental cycle ergometer test

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INTRODUCTION

Intense and prolonged physical exercise cause lactic acidosis via accumulation of intramuscular hydrogen ions (1). Skeletal muscles „go acid", a condition which creates fatigue and decreased exercise performance (2). Thus, a lot of sport nutrition supplements focus on buffering lactic acidosis but scientific evidence ist still scarce. In this study we hypothesized that supplementation with a Nano Absorption Formulation® (NAF, Extreme Endurance, Euronutrition BV, Netherlands) attenuates lactate concentration after exhaustive exercise.

METHODS

19 male athletes joined this placebo-controlled, double-blind, cross-over study and conducted incremental cycle ergometer step tests until individual exhaustion. The 1st ergometer test (day 0) was conducted to determine performance (P) data (VO2, lactate, Pmax). Then, subjects were randomly assigned to placebo or NAF tablets. After 10 days of NAF or placebo treatment the 2nd test was performed (day 10), followed by a 10 days wash-out. On day 20 the groups exchanged the treatments from the first 10 days. Finally, on day 30, the 3rd test was conducted. The provided dosage was 2 x 4 tablets for the 1st 2 days (load dosage) and then daily dosage was calibrated to subject´s body weight. The NAF tablets provided a.o. minerals, antioxidants and protease enzyme papain. To determine lactate, capillary blood from earlobe was collected before exercise, at every step of the incremental test, at the end of exercise (Pmax lactate) and 5 min post exercise (recovery lactate).

Subject´s characteristics

Variable name	mean	± SD
Age; yr	33,8	12,5
Weight; kg	73,3	9,8
Hight; cm	178	7
BMI	23,1	3,2
HF_{max}	185	12
VO_{2max}; mL/kg/min	53,8	6,8
P_{max}; W	330	50
P_{AT}; W	200	40
P_{ANT}; W	260	40
P_{RQ1}	210	80

Table 1: Mean values and standard deviations of 19 male athletes: BMI = body mass index, HF_{max} = maximum heart rate, VO_{2max} = maximum oxygen uptake capacity, P_{max} = maximum performance capacity, P_{AT} = performance at aerobic threshold, P_{ANT} = performance at anaerobic threshold, P_{RQ1} = performance at a respiratory exchange rate of 1,0.

RESULTS

We analyzed a significant difference in Pmax lactate concentrations between treatments ($p < 0.05$). With NAF, Pmax lactate was attenuated by a trend compared to placebo ($p = 0.062$). There were no differences between treatments concerning recovery lactate ($p > 0.05$).

CONCLUSIONS

The NAF treatment decreased lactate concentrations at exhaustion (Pmax) compared to placebo indicating a substantial buffer capacity of the applied nutraceutical at high intense exercise.
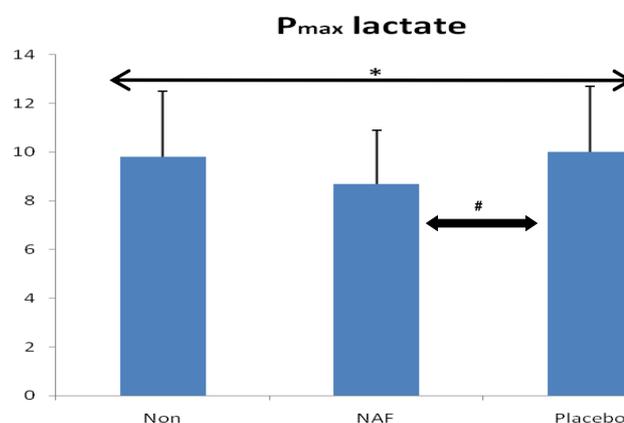

Figure 1: Lactate concentrations after incremental cycle ergometer test at the end of the last step (at maximum performance capacity = Pmax lactate). NAF (Nano Absorption Formulation) compared with placebo treatment and baseline-test concentrations (non). Data are presented as mean values ± SD. Statistical analyses via ANOVA and Tukey´s post-hoc test ($p < 0.05$). N = 19. * = significant difference between Non, NAF and Placebo treatment ($p = 0.049$). # = difference by a tendency to decreased lactate concentrations after NAF supplementation compared to Placebo ($p = 0.062$).
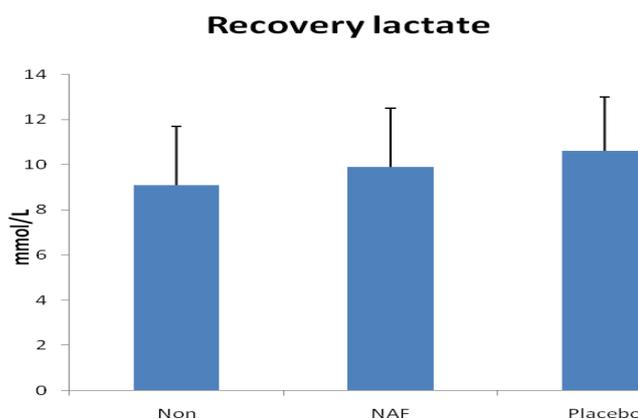

Figure 2: Lactate concentrations 5 min after the end of the incremental cycle ergometer tests (Recovery lactate). NAF (Nano Absorption Formulation) compared with placebo treatment and baseline-test concentrations (non). Data are presented as mean values ± SD. Statistical analyses via ANOVA and Tukey´s post-hoc test ($p < 0.05$). N = 19. No statistical differences observed.

REFERENCES

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