

Adaptation of goats to saline drinking water

Abstract

Due to climatic changes, increased water and soil salinity in many countries in the world has been creating new threats for farm animal production. The present study was conducted to investigate the individual sensitivity and adaptation capacity of goats towards sodium chloride (NaCl) in drinking water. Twelve non-pregnant Boer goats aged between 1.5 to 7.5 years with an average body weight of 50.5 ± 9.0 kg were kept in individual experimental pens under controlled stable conditions. A two choice preference test was used as the principal method. The study was conducted in four phases. After the control phase, when only fresh water was supplied in two buckets, water with different salt concentrations (0.25, 0.5, 0.75, 1.0, 1.25 and 1.5%) was offered in one container and tap water in the other (phase 2). During the third phase, only saline water with different concentrations, between 0% and 1.5% NaCl, was offered in both buckets. Subsequently, in phase 4 the same treatment as in phase 2 was repeated. Goats had access to hay and water *ad libitum* throughout the experimental period. Individual feed and water intake, respiration rates, ambient temperature and relative humidity were recorded daily, while body weight and body condition score were measured biweekly. During the control phase, goats showed sidedness in their choice of drinking water buckets. Hence, during treatment phases, positions of buckets were changed randomly in order to avoid a bias. When comparing phases 2 and 4, significant differences ($P < 0.0001$) were found for feed intake (1.4 ± 0.3 vs. 1.2 ± 0.3 kg), salt water intake (2.1 ± 1.6 vs. 0.9 ± 1.0 kg), total water intake (3.4 ± 1.3 vs. 2.5 ± 0.8 kg) and respiration rate (34 ± 7 vs. 28 ± 4 breath/min). During the second phase, goats preferred 1% salt water (2.5 ± 1.6 kg), whereas in the fourth phase, goats chose a lower concentration of 0.75% (1.3 ± 1.2 kg). During the third phase, concentrations of 0.25% and 0.5% were most frequently consumed. Goats rejected 1.5% salt in drinking water. It is concluded that goats reacted more sensitively with regard to salinity of drinking water after prolonged exposure to saline water.

Key words: Goats, climate change, adaptability, salt tolerance, drinking water

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