

Factors Influencing Consumption of Water from Different Sources In Different Swine Exploited Intensively

Cornelia PETROMAN, Ioan PETROMAN

Agricultural and Veterinary University of the Banat, Timișoara, ROMÂNIA
email: c_petroman@yahoo.com

Abstract

For well-balanced feed ratios and in conditions of good thermal neutrality, consumption of water from underground water sources has values between 1.0-1.5 l/kg of dry matter if it meets minimal potability conditions. When surface water sources are used, particularly during hot weather when water temperature reaches 15°C, water consumption reaches 2.5-3.2 l/kg of dry matter in suckling piglets or 4.0-6.0 l/kg in fattening pigs. No matter the water source, water consumption decreases with weight gain and with live weight. No matter the weight category, the physiological state, and the administration way, the quality of water from different sources has the highest impact on water consumption per kilogram, with important effects on the economic efficiency of increase and on the animal species.

Key words: water consumption, sources, water quality, weight categories, swine

Introduction

Water is the main indispensable element for any kind of life form, representing the substratum of all bio-chemical reactions and constituting the main solvent of intra- and extra-cellular organic and inorganic substances (3).

From a quantitative point of view, water is the most important constituent of the animal body; it decreases steadily, starting from the first stages of development of the embryo until birth, then it decreases with animal age (4, 1).

The fact that during ontogenesis the share of water is larger in embryos and newly-born, decreasing with the age and reaching minimal values at the age of 2 in swine, allowed the assumption that life development took place in an aquatic environment (3, 5). Even more, according to some authors, the two chemical elements of the cellular balance – potassium and sodium – that separated from the aquatic environment and located one outside and the other inside the cellular membrane is a life enigma.

There are numerous and varied factors that influence the daily necessary water consumption; some of them depend on the animal, others depend on the environment, on the water sources – underground and surface (2, 3), and on water quality (5).

Material and Method

We have carried out the analysis of the factors depending on the animal and that influence the daily necessary water consumption in swine, depending the weight category and on the productive level, as well as on the water supply source, with focus on water quality, on its physical and chemical and organoleptic qualities depending the water supply source on a farm where water supply is from surface waters (water plant) and from underground sources (drill); we measured water consumption depending on its quality and on the amount of in-taken dry matter.

Results and Discussion

Water consumption in swine is between 49 and 104 litres per day, the water: in-taken dry matter ratio being 4: 1 during the first week of life and of 3: 1 at the age of 30 days, with values of 2: 1 in

commercial pigs up to the age of 8 months (3). Water consumption is influenced both by factors depending on the animal and by the exploitation technology used to get the main production.

Suckling piglets take their necessary water mainly through the milk they suck during the first 7 days of life. If rations are well-balanced and the water comes from deep drills and the temperature in the sheds is below 18-22°C, the necessary water is 1.0-1.5 l per kg of dry matter ingested.

When using water from surface sources at a temperature of 16.5°C, water consumption increases to 2.5-3.2 l per kg of dry matter as shown in Table 1.

Table 1 – Water consumption in suckling piglets depending on the water supply source and on water quality

Water supply source	Consumption		Water quality				
	Water (l)	Ingested dry matter (kg)	pH	Temperature (°C)	Colour	Smell	Turbidity
Surface water	2.5-3.2	1	8.2	16.5	-	-	4
Ground water	1.0-1.5	1	7.1	8.5	-	-	2

Water consumption in this age category was higher for water from surface water because of its higher temperature (16.5°C), which resulted in a water consumption per kg of ingested dry matter of 2.5-3.2 l/kg compared to only 1.0-1,5 l/kg in the case of ground water. Though surface water was processed in a water plant to improve its potability and to diminish the number of germs, because of the high temperature it resulted in an increase of the water consumption per kg of dry matter ingested though the conditions in the shed were the same for all the animals under study.

Water consumption increases to 4.0-6.0 l/kg of dry matter in fattening pigs when the water comes from surface sources and to 3.5-4.0 l/kg of dry matter when water comes from ground sources. When we need to get gains of above 600 g/day through the use of rations with a higher mineral content (particularly potassium and sodium) at environmental temperatures higher than 22°C, water consumption increases no matter the water supply source (surface or ground water) (4).

We can see that the more pigs gain in weight, the less water consumption is depending on live weight.

Sows represent the swine category with the highest demands as far as water is concerned (Table 2).

Table 2 – Water consumption in sows depending on their physiological state and on water supply source

Water supply source	Water supply ratio	Physiological state	Water consumption (l/kg of dry matter)
Surface water	At leisure	Lactation	4.5-5.5
		Gestation	3.5-4.0
Ground water	At leisure	Lactation	4.0-4.5
		Gestation	3.0-3.5

One should pay particular attention to water quality so that from the point of view of soluble salts the total amount does not overrun 5000 ppm/l; sulphites should reach values below 3000 ppm, and nitrates values below 100 ppm. Disrespecting potability standards in water no matter the water supply source corroborated with influence factors depending on the animals or on the technology determine

water consumptions that are from far more than those stipulated by the standards with negative effects on the economy of the exploitation in breeding and fattening swine.

The presence of nitrates and nitrites in the water in areas of intensive agriculture is generalised on the exploitation under study, constituting the main problem of water quality and hygiene because of the use of animal wastes as fertilisers and projecting a morbid entity called "water sickness" besides other unfavourable consequences.

Conclusions

When well-balanced feed ratios are supplied, when proper micro-climate conditions are ensured, and when ground water sources are used to supply good-potability water, suckling piglets and fattening pigs consume lower amounts of water per kg of dry matter.

When using water from surface water sources in hot weather, when the temperature of the water is raised, water consumption per kg of dry matter is higher no matter the weight category and the physiological state.

Weight category, physiological state, conversion capacity, the way water is supplied, as well as organoleptic and physical and chemical characteristics influence water consumption with negative effects on the economic efficiency of the agricultural exploitation.

References

- Draghici, C. (1982). Influenta factorilor atmosferici asupra animalelor domestice. Bucuresti, Editura Ceres, pp. 91-92.
- Lixandru, B. I. Virag, I. Petroman. (1998). The protection of natural rivers against accidental spills of waste waters. International Symposium, Timisoara, pp. 420-424.
- Man, C. (1989). Apa, sanatatea si productiile animalelor. Bucuresti, Editura Ceres, pp. 106-112.
- Petroman, I., M. Nicolae. (2002). Cresterea porcinelor. Timisoara, Editura Mirton, pp. 159-164.
- Pujin, Vlasta, Slobodanka Stojkovic. (1998). Phytoplankton and zooplankton as indicators of water quality. International Symposium, Timisoara, pp. 333-334.