

# How important is good quality drinking water?

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Water is a very important nutrient for all (production) animals. It is used as a carrier for vaccines and antibiotics/chemotherapeutics, but it can also be a source of pathogens.

Layer poultry farmers all aim for efficient production of eggs. They do their utmost to collect high numbers of eggs per hen housed, with excellent egg shell quality, against sharp feed conversion rates and low overall costs. Laying hens must be able to reach high peak production and must show excellent persistency in egg production to achieve this. In different areas in the world, birds are kept on different housing systems (traditional cages, aviary systems, low density alternative housing systems, free range farming, biological (organic) farming) under a variety of climatic conditions (hot, moderate, cold). The eggs are sold in markets with specific customer demands (white, brown, big and small eggs).

ISA breeds laying hens that are able to cope with all these different circumstances and which produce the right eggs for the market. As the world market contains different market segments, different products need to be bred to satisfy different customer requirements.

ISA is continuously improving the performance potential of its products. To achieve maximum performance with laying hens, to



enable them to fully show their genetic potential, the birds need good housing and climate circumstances, good feed and excellent management. But what about the drinking water? Do we pay enough attention to good quality drinking water?

## Good quality drinking water

Good quality drinking water is clean, clear, fresh, tasteless and free from contaminants. The birds can easily find, reach and drink it, and they can drink it as much as they need.

How can we achieve good quality drinking water?

Attention points are:

- The source of the water.
- The drinking water system in the houses (storage vessels, pipelines, drinkers).

What is the source of the drinking water? Is mains water used or water from a borehole? Is surface water used? Is the quality of the water checked before use or is it treated in any way?

Mains water is normally a safe source. Borehole water can sometimes be used as such, but sometimes it needs some treatment to make it suitable for drinking.

The quality of borehole water should always be checked on a regular basis, approximately once every year.

Surface water, in my opinion, should never be used as a source for drinking water, because of the risk of contamination with poultry pathogens. Water fowl travel freely from country to country and from continent to continent, carrying diseases with them (avian influenza) and depositing large amounts of contaminated droppings on places where they stop to eat and drink.

Once we have checked the source, we must look at the quality of the water at the point of delivery to the birds, at the end of the line, directly from the nipples or drinkers. There, the water quality also

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**Table 1. Water quality parameters (ISA management guide).**

| Parameter                        | Good quality   | Do not use     |
|----------------------------------|----------------|----------------|
| PH                               | 5.0-8.5        | <4 and >9      |
| Ammonium (mg/l)                  | <0.2           | >10            |
| Nitrite (mg/l)                   | <0.1           | >1.0           |
| Nitrate (mg/l)                   | <100           | >200           |
| Chloride (mg/l)                  | <250           | >2000          |
| Sodium (mg/l)                    | <800           | >1500          |
| Sulphate (mg/l)                  | <150           | >250           |
| Iron (mg/l)                      | <0.5           | >2.5           |
| Manganese (mg/l)                 | <1.0           | >2.0           |
| Hardness in German degrees       | <20            | >25            |
| Oxidisable organic matter (mg/l) | <50            | >200           |
| H2S                              | non-detectable | non-detectable |
| Coliform bacteria (cfu/ml)       | <100           | >100           |
| Total germ count (cfu/ml)        | <100,000       | >100,000       |

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depends on the cleanness of the water system. The water system in the houses should be regularly cleaned and disinfected. It should always be cleaned and disinfected in-between the flocks and after in-water treatments. To keep the tubes clean in longer production periods, like in parent stock flocks or commercial layers, the water system should be regularly checked and, if needed, regularly cleaned during production. Frequency of checking should be once every 3-4 months. If the system is disinfected during the production cycle, care should be taken to follow the sanitiser manufacturer's instructions, especially regarding adequate flushing and correct dosing.

Make sure the water system is closed and cannot be contaminated from the outside. Pay extra attention to storage vessels, when used. I am not in favour of water sanitation during rearing. I believe a good clean of the system in the empty period should be sufficient for the whole 16 week rearing period and the rearing birds should get the chance to build up some immunity against normal environmental bacteria like *E. coli*. Semi-continuous use of water sanitisers can interfere with this.

Different products can be used for cleaning the system, both in-between flocks, when the houses are cleaned and disinfected, and during growth or production, with the birds in the house. These products can contain

(combinations of) per acetic acid and hydrogen peroxide, chlorine, organic acids and inorganic acids.

Using these products in drinking water, we must be careful with the percentage used. We must be careful with the taste and with the acidity of the water. Using acids, pH should be below 4, to achieve the disinfecting effect and above 3.5 because otherwise it becomes corrosive and the birds stop drinking. High levels of chlorine have the same effect on the birds.

To have efficient disinfection with chlorine, we need to decrease pH, have no organic matter in the water, and low iron and manganese concentration; if not, water disinfection with chlorine is not efficient.

Using only organic acids as a water sanitiser for a longer period of time can be dangerous. You can see growth of yeast and moulds in the water. It is better to use acids and chlorine alternatively.

## Reaching the birds

So, let's say we supply the birds with good quality drinking water at the level of the birds. Does it reach the birds? Can the birds easily find and drink the water?

For day-old chickens, is there enough light to find the water from the start? Is the water fresh (was the system flushed shortly before the delivery of the day-old chickens)?

Is the height of the drinkers okay and adjusted to the age of the birds? Is the system of drinkers used the same in the different phases of production (rearing versus lay)? Are bell drinkers used or nipple drinkers? What kind of nipples? Can the small birds easily activate the nipples? What is the nipple flow rate? Are there enough drinkers/nipples per bird installed? What is the water pressure? How many hours is the water available? Most of the previous mentioned questions also apply for adult birds.

To monitor older birds, the water-feed ratio is an important parameter. Water is a very important nutrient, but it is also used as a carrier for drinking water vaccinations and for all kinds of in-water treatments.

This means that the water quality must also be suitable for that. For (modified) live vaccines, no traces of disinfectants should be in the water during vaccination.

The solubility of some antibiotics and chemotherapeutics depends on the pH of the water and can be influenced by the presence of minerals. Together with these minerals, additives can form a biofilm inside the water tubes. Large amounts of bacteria can bind on this biofilm. That is the reason why the water system must always be cleaned after in-water treatments.

To conclude, laying hens must always have easy access to good quality drinking water, the quality of the drinking water should be regularly checked and contaminated drinking water can cause serious disease problems.

When laying hens don't drink, they won't eat and cannot produce. ■