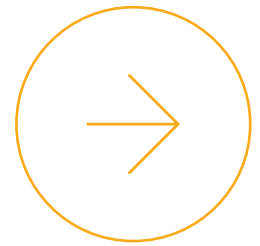


Dry litter and ventilation



Introduction to drying litter

The need to evaporate and remove water from the shed

Meat chicken droppings contain between 70% and 90% water. The amount of water the chickens add to the litter varies depending on partial-shed brooding practices, chicken growth and pickups, but averages about 1 L per square meter per day (L/m²/day) and reaches a maximum of about 2 L/m²/day (see figure below).

These are 'average' amounts across the shed floor, but extra water is added under the drinkers due to spillage and areas where chickens congregate (such as near migration fences) have more droppings. These areas get wetter and are usually where caking starts. In a mid-sized commercial shed (150 x 15 m), this equates to an average of 2250 L per day, up to a maximum of 4500 L per day.

Over the course of a grow-out, it is estimated that the litter absorbs just over 60 L of water per square meter, which is the same as having a water depth of 6 cm across the shed floor. We know this doesn't happen but it is a great way to demonstrate that evaporating water from the litter is much more important than using litter to absorb the water. No litter material or depth of litter could possibly absorb 6 cm of water and still remain 'dry and friable'.

Evaporating water from the litter is much more important than trying to use more absorbent litter materials

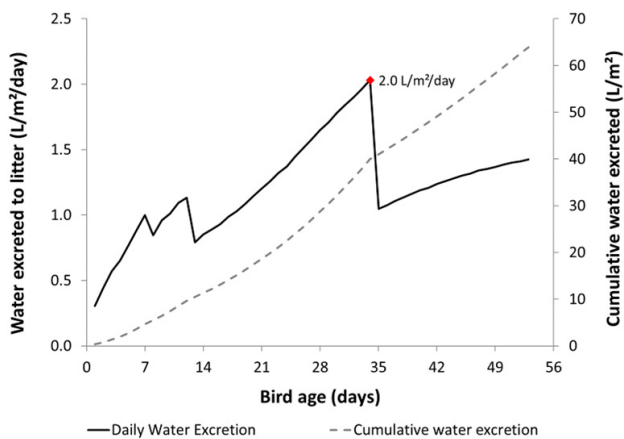


Figure1: Amount of water excreted to the litter during a grow-out

Evaporation is the key to keeping litter dry and friable to reduce ammonia production, contact dermatitis, pathogen growth and ensure chickens can work in fresh droppings.

There are four critical elements to evaporating water from litter:

1. Moisture at the litter surface
2. Warm litter
3. Warm, dry air that can remove more water
4. Air speed at the litter surface.

For more information, refer to fact sheet *The elements of drying litter*.

There is no single solution to improving evaporation of water from the litter. Growers need to consider their own situation and choose which of the elements is likely to give them the most cost-effective improvement in litter conditions.



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Litter will dry more quickly when

- moisture is at the litter surface, where it can be removed by ventilation. Once the litter surface dries, it acts like a barrier, preventing water from escaping from the surface.
- heat is added to both the air and litter. Increasing the litter temperature adds energy to the water, which makes it easier for it to turn into water vapour.
- warm, dry air is moving across the litter surface and removing water. Heating the air lowers the relative humidity and allows it to hold more water. In poultry sheds, this requires getting incoming air to pick up heat near the ceiling before it circulates down to the litter surface. After removing moisture from the litter, the moist air needs to be removed from the shed and replaced with fresh, dry air to repeat the cycle of heating, circulating, water collecting and being exhausted.
- air speed at the litter surface increases 'stripping' of water from the litter surface. The more air speed there is, the more water will be freed from the litter surface.

If a grower regularly experiences damp litter (especially in the first 2 to 3 weeks of each grow-out), it might be a sign that their shed design, ventilation system or management practices aren't effectively supporting the elements required for evaporating water.

Adding circulation fans will enhance litter drying by continually bringing down more of the heat that is in the shed, improving litter warming, reducing relative humidity and increasing air speed at the litter surface. Circulation fans preserve heat in the shed while moving air rather than exhausting it out, as is the case with ventilation fans. However, some air exchange is still required to remove moisture and prevent the relative humidity in the shed from becoming excessive. For more information on circulation fans, refer to fact sheet *Circulation fans*.

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Water will not evaporate from the litter at the same rate throughout the entire day. Generally speaking, the evaporation rate will be slower at night and early morning due to cooler conditions, higher relative humidity and lower ventilation rates. Also, when the lights are off and chickens are resting, their bodies cover the litter surface and prevent water from escaping. The opportunity to dry the litter is greatest from late morning to early evening. With only a limited opportunity or time in which to dry litter each day, taking action that improves one or more of these elements will dry the litter more quickly. The same might apply to areas in a shed that regularly become damp and slow to dry. Taking action that address these elements in that area of the shed may be beneficial and result in having consistently drier litter.

There is no single solution to improving evaporation of water from the litter. There will be limitations on which evaporation element can be improved depending on:

- chicken age
- shed and ventilation design and features
- cost of utilities (electricity and gas)
- labour availability.

Growers need to weigh up the specific need to address litter drying, limitations that might exist and available resources in order to choose which of the elements is likely to give them the most cost-effective improvement in litter conditions.

More resources

- Litter playlist on the Chicken Meat RD&E YouTube site has videos and webinar recordings.
https://www.youtube.com/playlist?list=PLxHH9eLA4tnaEroY1TucFldUZL0RMpB_Y
- Poultry411 App – Litter Drying Time Calculator
<https://www.poultryventilation.com/wp-content/uploads/vol34n13.pdf>

Available on Apple and Google Play

Circulation fans

- Using circulation fans to keep litter dry – webinar with Connie Mou <https://www.youtube.com/watch?v=oX2AKsZL4Pg>

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