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# D W W L PRE SEN TA TION



ENG

In nature, birds are omnivorous. They spend most of their time **roaming, foraging and scratching**. The expression of this natural behaviour leads the hens to eat a considerable number of coarse particles like seeds and plant fibrous materials, all of which require grinding.

Over time, this has led the digestive tract to adapt to this unique behaviour.

This adaptation allows for the grinding of raw materials to a critical particle size (normally not larger than 1mm) before entering in the small intestine.

This demonstrates that the digestive tract can adapt to changes in the diet.



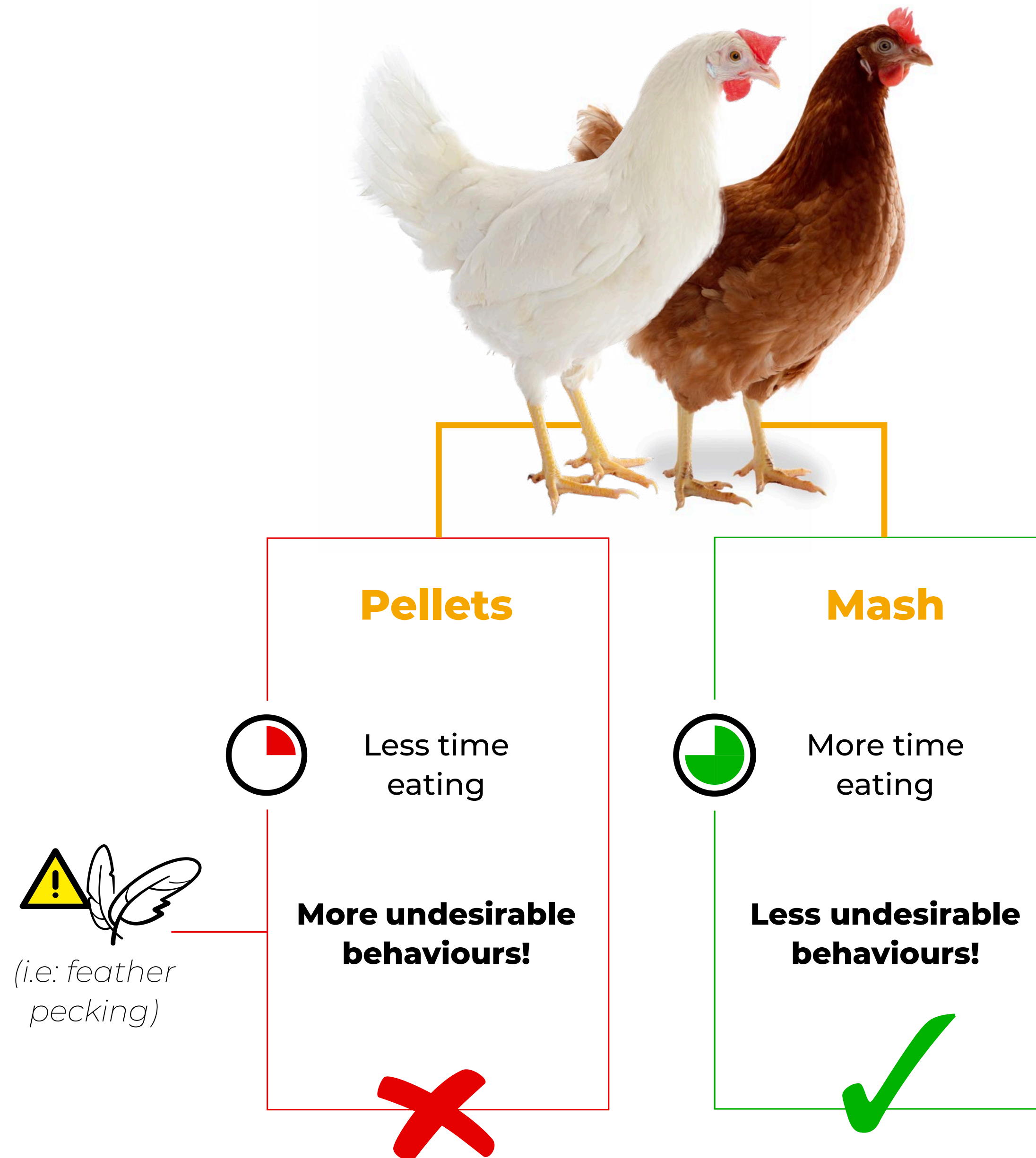
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Research has shown how, when feeding **pellets instead of mash**, birds will spend **less time eating** (*Savory et al, 1974*) leaving **more time to develop** undesirable behaviours (i.e: feather pecking).





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Therefore to help avoid these behaviours we need to provide a diet similar in format and composition to that which they would choose to eat in a natural environment.

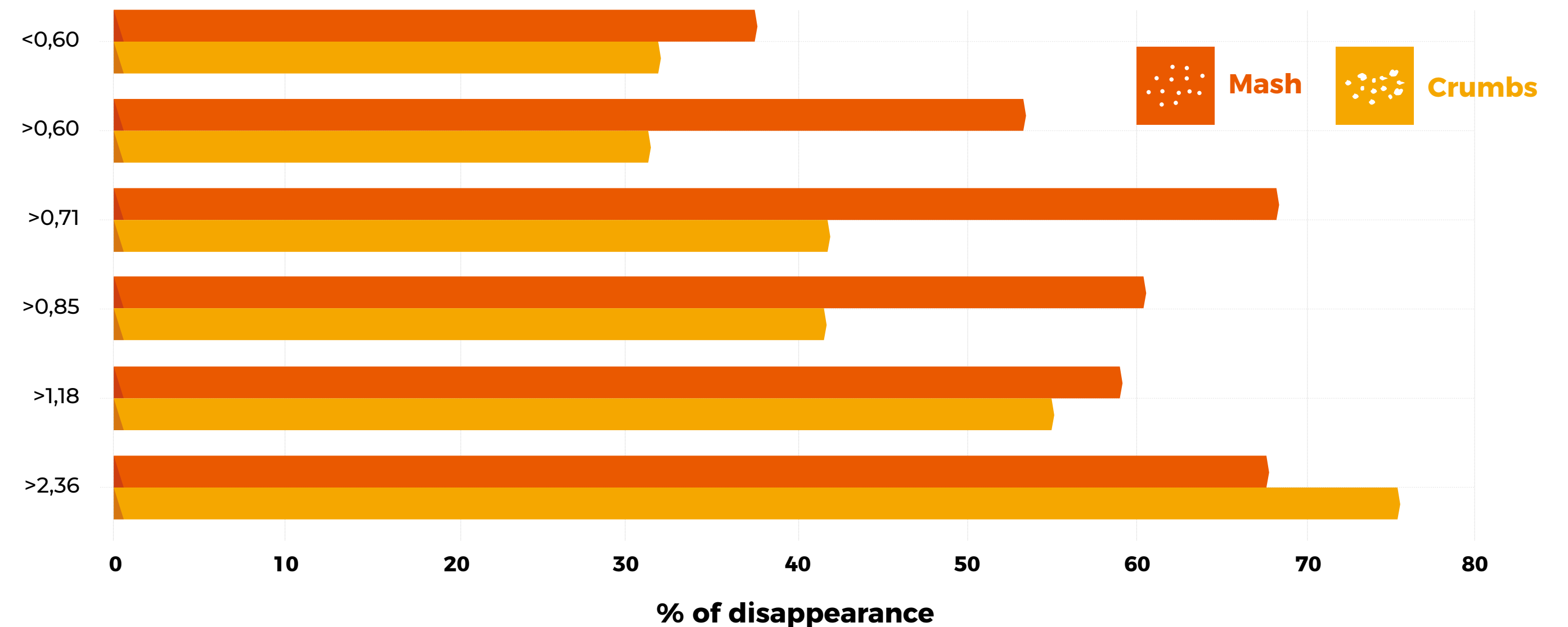
Reality is that, when given the choice, they prefer to eat more coarse particles and will generally eat a larger amount of them in comparison with finer ones (**Figure 1**. Portella et al., 1988).

In addition, in nature food is not continuously available. This is the reason why birds spend most of the time searching for food particles. In summary, natural feed behaviour implies **coarse particles, fibrous stuff and intermittent feeding**.

▼ **Figure 1.** Disappearance relative to initial concentration, %

Hens prefer to eat more coarse particles and will generally eat a larger amount of them in comparison with finer ones

### Disappearance relative to initial concentration, %

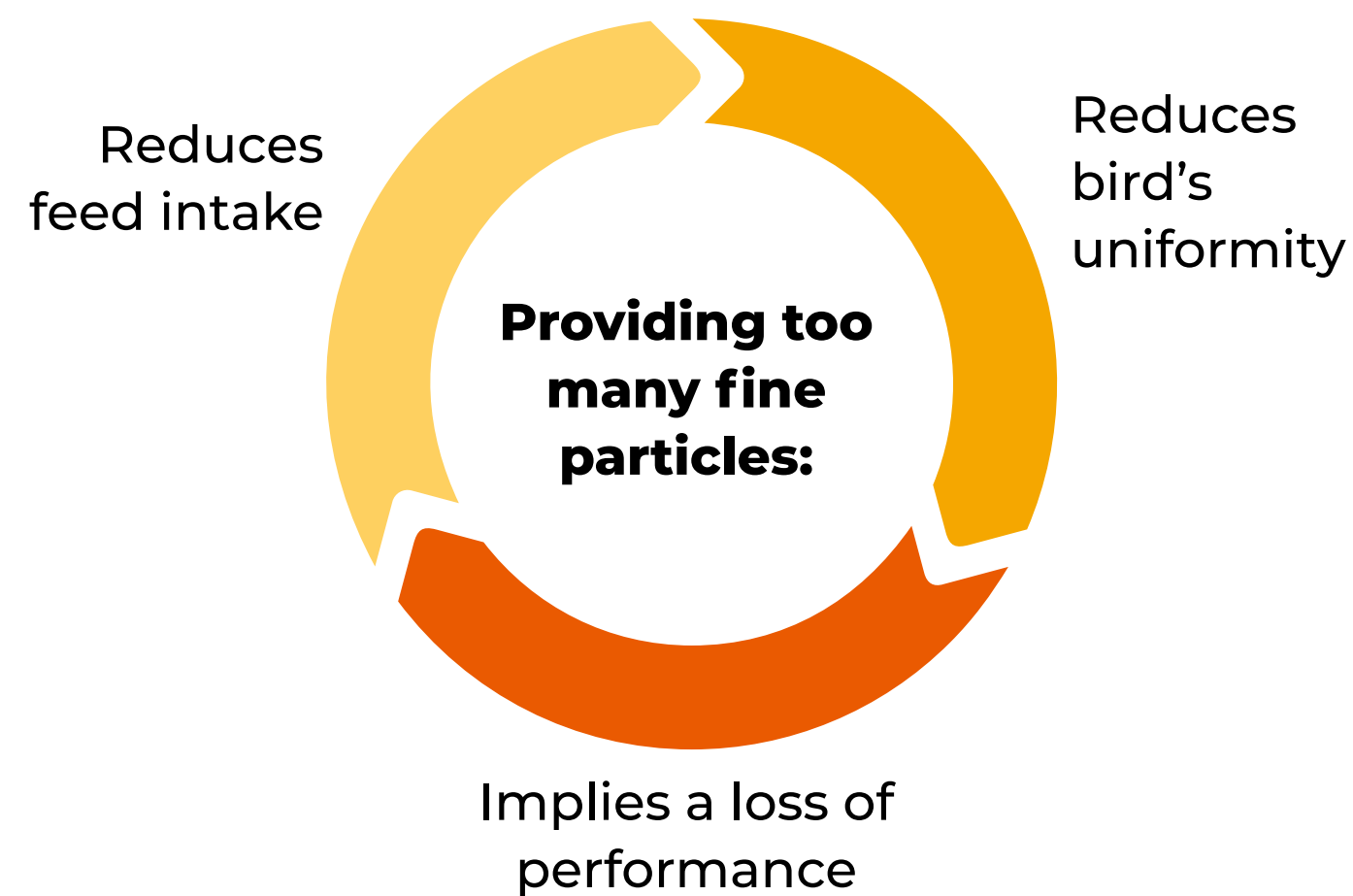




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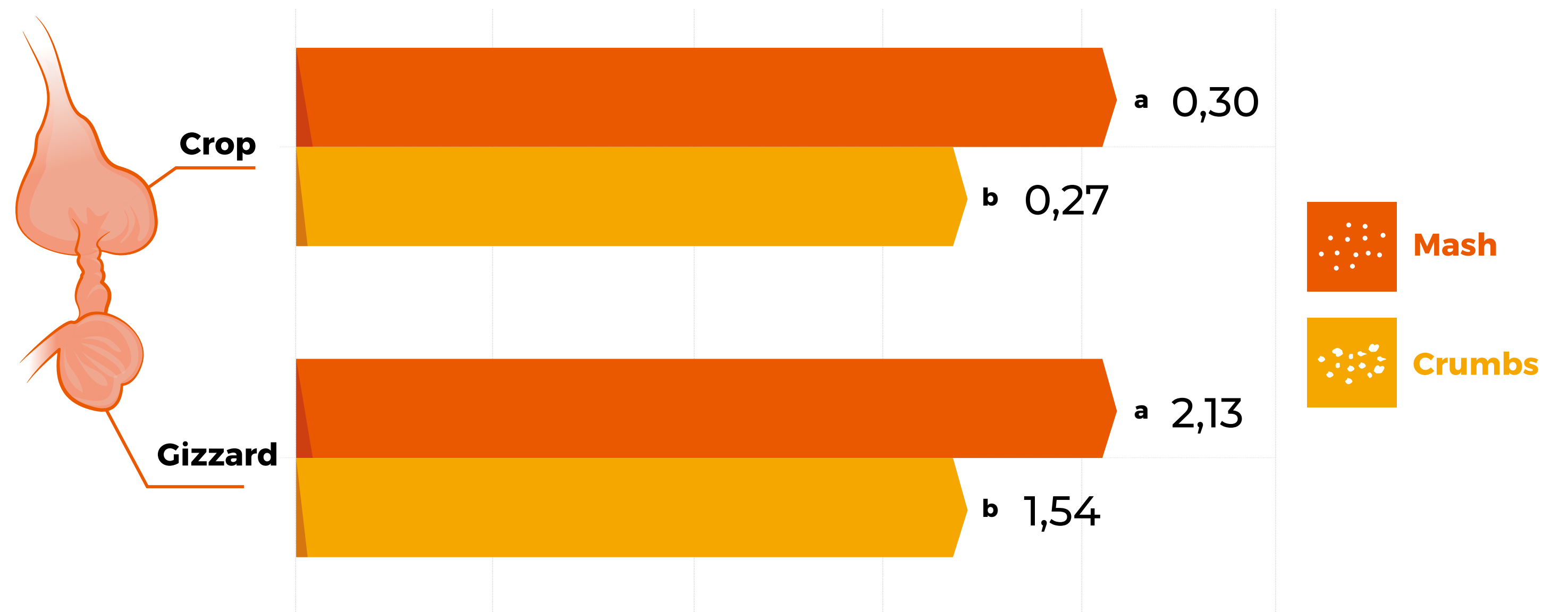
It's easy to imagine that any change in feed texture (different raw materials) and/or microstructure (particle distribution) may affect feed consumption: fine grinding increases the number of smaller particles, often seen in crumbles or pellets.



Also, sudden changes in availability of raw materials can also provoke a reduction in feed consumption.

▼ **Figure 2.** Bozkurt et al., 2019.

Influence of feed form on relative weight (g/100g BW) of 112d of age of pullets.



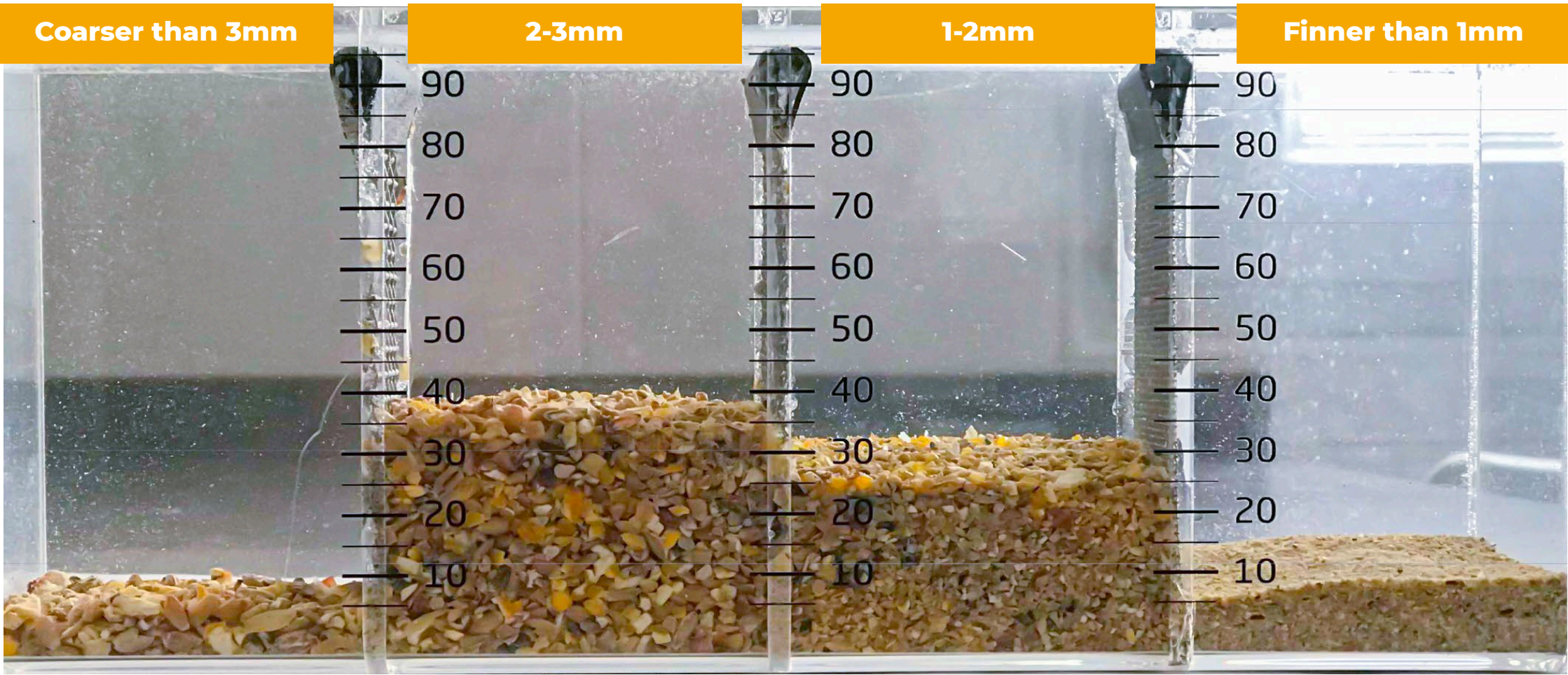
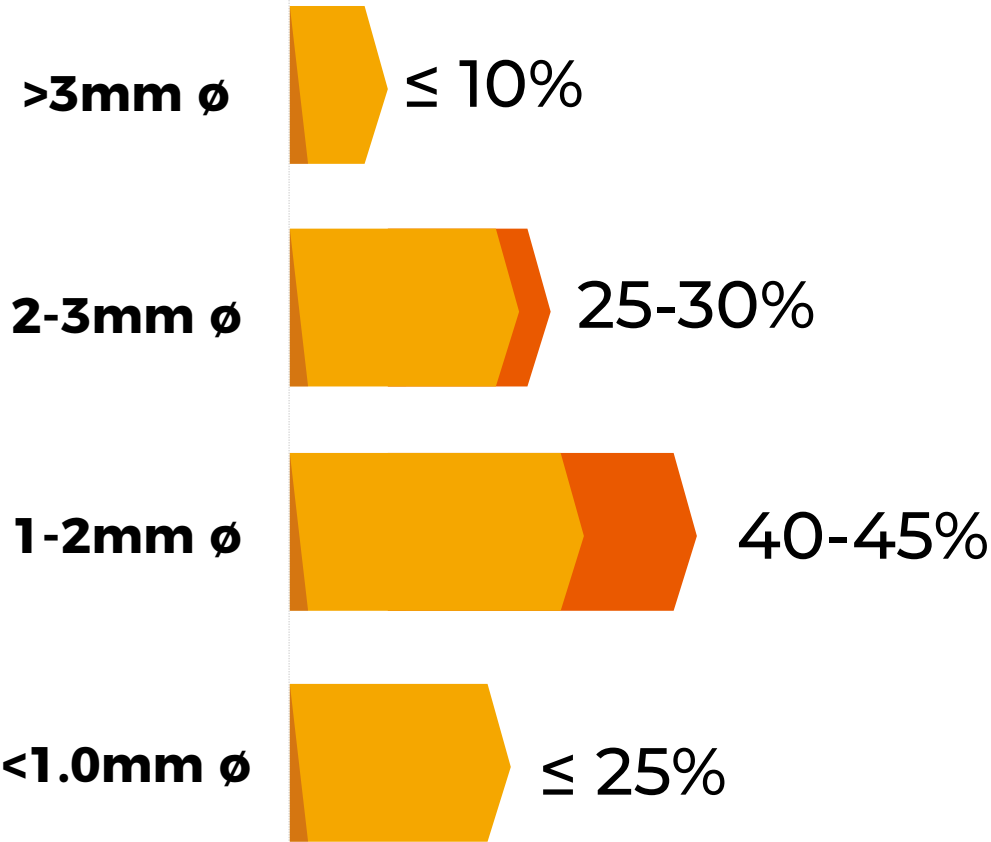


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► **Figure 3.** Optimum particle size distribution for lay.

A coarse particle mash diet is therefore most suited to matching a hens natural eating behaviour.  
When feed is homogenous in its distribution, (60-70% of the particles are between 1-2.5mm of diameter) hens don't show preferences for any particle size thus ensuring a homogenous intake.



Lohmann	> 3.0mm	3.0-2.0mm	2.0-1.5mm	1.5-1.0mm	< 1.0mm	< 0.5mm
*Starter, %	–	≤ 20	20-30	30-40	≤ 15	≤ 5
Pullets, %	–	≤ 20	15-25	25-35	≤ 15	≤ 10
Layers, %	≤ 10	25-30	25-30	15-25	≤ 25	≤ 10





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An optimal functioning gastrointestinal tract is key to reaching and maintaining maximum performance.

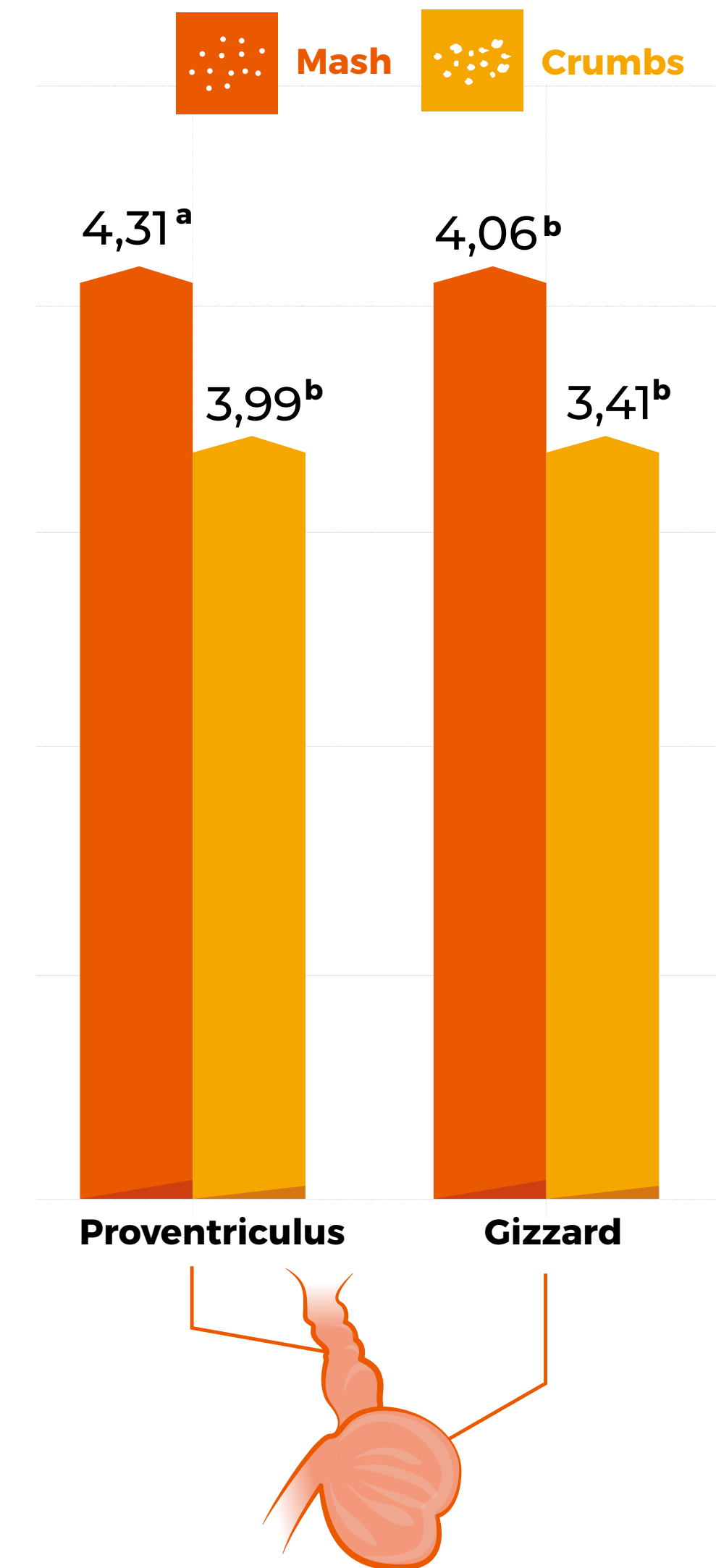
Feeding a coarse and homogenous feed structure stimulates the gizzard leading to a higher retention time in the upper part of the digestive system.

The combination of providing a coarse mash feed alongside insoluble crude fibre has been associated with **improving gut motility** (reverse peristalsis), **reducing pH** and **improving nutrient digestibility**, *Bozkurt et al. (2019)*.

Also, feeding mash diets has also reported higher counts of **Lactobacilli spp** at ileum level compared with pellet diets (*Engberg et al., 2002*).

▼ **Figure 4.** Influence of feed form on the pH of the proximal part of the gastrointestinal tract of pullets at 112 d of age.

*Ege et al., 2019*





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In conclusion, particle size and feed form have a major influence on gizzard development meaning a functional GIT which has been associated with healthier birds.

Feeding birds with appropriate mash diets have an advantage being key on the way to achieve maximum performance.

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