

What causes secretory or nutritional diarrheas in piglets?

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Pathogenic diarrheas are quite common, but they are often confused with non-pathogenic secretory diarrheas, which can be avoided by correct feed formulation design.

Pathogenic diarrhea is the most common cause of depressed performance in [recently weaned piglets](#). Interestingly, the [origins of piglet diarrhea](#) can be not only from pathogenic causes but also from faulty feed design. Usually, nutritional diarrheas lead to secondary complications through pathogenic agents. Pathogenic scours (e.g., *Escherichia coli*, *Salmonella*), as identified by proper diagnostics, require veterinary intervention to cure symptoms and eliminate the source of offending microorganisms. Usually a medication regimen along with changes in biosecurity, animal flow and husbandry procedures are required to eliminate pathogenic diarrheas. On the other hand, nutritional diarrheas usually follow or precede pathogenic complications, and, thus, a combination of nutritional and medical interventions is often required.

Nutritional diarrheas originate from three main faults in the design of a feeding program:

1. First, diets that fail to initiate vigorous feed intake immediately post-weaning cause hunger, followed by over-eating when pigs finally associate dry feed with nourishment. Even short-term starvation is capable of diminishing the digestive and immune capabilities of the gastrointestinal system. Thus, when pigs over-eat after a period of malnutrition, digestion is incomplete, resulting in excess amounts of substrate (energy and protein) available for proliferation of opportunistic pathogenic microorganism (e.g., *Escherichia coli* or *Salmonella*).
2. Second, diets of relatively low quality employing second-rate ingredients to reduce feed cost not only discourage the development of an early appetite, but their intrinsic low digestibility result in even more undigested material becoming available for bacterial proliferation in the lower gastrointestinal tract. This is why a high quality "first" diet is a must for a successful weaning.
3. Third, certain ingredients (e.g., soybean meal and most protein sources of vegetable origin) contain anti-nutritional factors (e.g., storage proteins glycin and beta-conglycin in soybean) that may cause gastrointestinal inflammation. When this problem is combined with low-feed intake and excess undigested feed, it is only natural to expect pigs to develop diarrheas.

It is also suggested that diets with a high concentration of simple sugars and minerals may disturb the osmotic balance across the enteric epithelium, causing excessive water secretion in the lumen and loose stools. This is commonly called secretory diarrhea and usually leads to no pathogenic complications through secondary infection. In a trial, for instance, by changing the amount of sugars (sucrose and corn syrup solids), dietary osmolality was manipulated between 250 and 700 mOsm/kg. As a result, absorption of water and carbohydrates from the

small intestine in piglets increased, and thus chances for diarrhea were minimized, as osmolality increased, at similar dietary electrolyte balance.

Secretory diarrhea may not be detrimental to animal performance and health as pigs are able to compensate by drinking more water. Nevertheless, it is a disturbing sight for human operators and it should be prevented, as it is rather difficult and expensive to differentiate from other forms of diarrhea. For this purpose, the addition of water absorbing materials in feed, or reformulation to avoid sugar and mineral excesses is often recommended.

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