

Propionic acid for animal feed

Feed preservation and improving animal nutrition



Key features

- Can protect against broad range of bacteria, mold, and fungi
- Promotes animal growth by promoting nutrient intake and improved digestive health
- Manufactured to cGMP

Experimental evidence supports Propionic Acid being a cost-effective choice for feed preservation. Below is a table comparing the minimal inhibitory concentration (MIC) of different organic acids. Although formic acid can be more effective, it has been shown to promote the growth of alpha-toxin producing bacteria, which can contaminate feedstuffs with neurotoxins.

Table 2. Minimal inhibitory concentration (MIC) of organic acids

Bacteria	Formic acid (wt%)	Propionic acid (wt%)	Lactic acid (wt%)
Salmonella typhimurium	0.10	0.15	0.30
Escherichia coli	0.15	0.20	0.40
Campylobacter jejuni	0.10	0.20	0.25
Staphylococcus aureus	0.15	0.25	0.40
Clostridium botulinum	0.15	0.25	0.30
Clostridium perfringens	0.10	0.25	0.30

(Strauss and Hayler, 2001)

Improving animal health without antibiotics

Antibiotics have been commonly used to prevent disease and improve weight gain. With the rise of antibiotic resistant bacteria, regulators and end-use consumers are demanding lower antibiotic usage. Organic acids, in particular the short chain fatty acids (SCFA), have been shown to improve weight gain and overall health of animals.

Protecting the harvest with naturally occurring products

Propionic Acid occurs naturally in a wide range of animals, most notably in the stomachs of ruminants, and is produced by certain healthy bacteria. In either acid or salt form it offers cost-effective, excellent protection against a broad spectrum of bacteria, mold, and fungi.

Based on the anti-bacterial mechanism, one of the leading indicators of organic acid preservative efficiency is a higher dissociation constant (pKa). This indicates the acid will be undissociated in the feedstuff and more effective. Propionic Acid has a higher pKa than other organic acids used in feed.

Table 1. Organic acids and their pKa's

Acid	Physical state (@25°C)	pKa
Citric	Solid	3.1*
Formic	Liquid	3.75
Lactic	Liquid	3.75
Acetic	Liquid	4.76
Sorbic	Solid	4.76
Propionic	Liquid	4.88

*dissociation of first carboxylic acid group (Kirsch, 2010)

Health benefits of propionic acid in:

Pig feed

- Additional weight gain and improved feed conversion ratio (FCR)
- Better digestive balance (constipation relief and diarrhea prevention)
- Improved digestion, absorption and retention of organic and inorganic nutrients

Poultry feed

- Improved FCR in poultry
- Reduced growth of pathogenic intestinal bacteria
- Increased digestibility and availability of nutrients (such as Ca and P)



The right grade for the right application

Dow offers a range of propionic acid grades based on the various requirements for food and feed safety throughout the value chain.

Propionic acid grade	Manufactured to cGMP	Meets US EPA FIFRA requirements	Complies with EU FAMI-QS	Complies with US FDA FSMA	Approved for animal feed preservation	Approved for human food preservation
Grain preserver grade	X	X			X	
Formulating grade	X	X			X	
FAMI-QS grade	X		X		X	
FCC grade	X			X	X	X
Industrial grade						

Contact your regional Dow Technical Service and Development Specialist for further questions or grade recommendations.

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