

Wood lignans are bioactive substances

The ban on antibiotic growth promoters creates a market for natural alternatives and wood lignans are promising candidates.

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The subtherapeutic use of antibiotics as growth promoters (AGP) has been practiced for decades to improve performance and to reduce the incidence of certain diseases. Due to the problem of increasing resistance, which massively impairs the effectiveness of therapeutic antibiotics in humans and animals, many countries have banned antibiotic performance enhancers. Restrictions in the use of AGPs have led to an increased incidence of diseases which are associated with considerable economic losses, e.g. necrotic enteritis (NE) in broilers. So the global trend is to find alternatives; several substances such as phytochemicals, essential oils, enzymes, organic acids, and pre- and probiotics are being explored for this purpose. This article presents wood lignans as an interesting natural alternative to AGPs. Wood lignans – a new class of active substances for feed purposes – have delivered remarkably positive effects on the performance of broilers and weaning pigs in various

experiments (product agromed® ROI, Agromed Austria GmbH). Wood lignans are bioactive substances with strong antioxidative, anti-inflammatory and antimicrobial properties. In scientific studies supplementation of lignans modulates inflammatory events in the small intestine of animals with endotoxin (LPS)-induced inflammation. Various factors such as NE or weaning lead to subclinical inflammation in the gut. These symptoms are associated with energy consumption and protein loss at the expense of the animal's performance. The consequence is unsatisfactory weight gain and feed conversion.

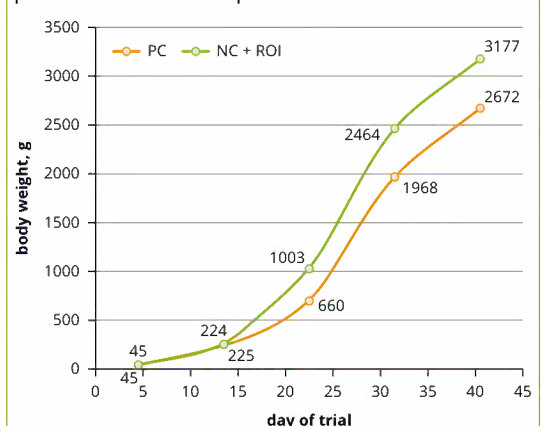
Wood lignans for broilers

Current trial results focus on these relationships. A trial with total 416 male broilers (Cobb 500) compared the effects of a wood lignan product (agromed ROI) either to a negative control (NC) or a positive control (PC) with the commonly used AGP Virginiamycin in a corn/soybean diet. The wood lignans had a significant positive influence on performance data in terms of weight gain, feed conversion, carcass and breast muscle percentage. Positive effects were also recorded for some parameters of intestinal health. Villus height in the ileum increased significantly in the lignan groups and consequently also the mucosal surface available for nutrient

Table 1 – Trial design, performance data and faecal bacterial counts.

	NC negative control	PC positive control	NC + wood lignans	PC + wood lignans
Virginiamycin	---	16.5 ppm	---	16.5 ppm
agromed® ROI	---	---	400 ppm	400 ppm
Feed intake d 1-42, g	4,348 ^d	4,328 ^c	4,511 ^b	4,621 ^a
End weight d 42, g	2,626 ^c	2,627 ^c	3,132 ^a	3,076 ^b
FCR d 1-42	1.71 ^d	1.68 ^c	1.46 ^a	1.52 ^b
Carcass, %	67.8 ^d	68.6 ^c	68.9 ^b	69.6 ^a
Breast, %	31.7 ^c	31.1 ^d	33.5 ^a	32.5 ^b
Thigh, %	31.9	31.9	32.0	31.7
E. coli, log ₁₀ CFU/g	6.58 ^a	5.21 ^{bc}	4.74 ^c	4.96 ^{bc}
Clostridium, log ₁₀ CFU/g	8.57 ^a	7.74 ^a	6.47 ^{bc}	6.53 ^c
Lactobacillus, log ₁₀ CFU/g	4.29 ^c	6.98 ^b	7.94 ^a	7,31 ^{ab}

Figure 1 - Curves of weight developments for the AGP supplemented group (PC) and the wood lignan supplemented group (NC + wood lignans) show the clear difference in performance development.





The difference in development between the experimental groups is clearly visible on day 19; left photo: PC positive control with Virginiamycin; right photo: negative control with wood lignans

absorption. The lymphocyte count was reduced in the experimental groups, indicating a reduced need for immune defence and thus a healthier gut flora. This thesis is also supported by measurable changes in the intestinal flora: the incidence of pathogens (*E. coli* and *Clostridium*) in faeces was reduced, while the growth of desirable lactobacilli was promoted (sampling on day 21). See the trial design and results in *Table 1*. A closer look at the performance data shows a clear growth advantage for broilers supplemented with wood lignans compared to the positive control with Virginiamycin, especially from day 9 to day 22 (PC 660 g body weight vs. NC + wood lignans 1003 g body weight); afterwards the difference remained constant until the end of the fattening period on day 42 (*Figure 1*).

Wood lignans for piglets

The weaning phase for piglets is also a challenge for the GI tract. In this case, too, the positive effect of wood lignans has been shown. In a feeding trial with weaning pigs (FI – German Large White, German Landrace, Piétrain) the trial group received 500 g per ton of the wood lignan product (agromed ROI) with the prestarter and starter diet. See the trial design and results in *Table 2*. The animals in the trial group had better growth and feed conversion throughout the entire experimental period. This effect is due to stable gut health during the physiologically challenging weaning period.

This article presents trial results for broilers and weaning pigs in which wood lignans are shown to have positive effects on performance. The broiler trial also shows the benefits for intestinal health and can even demonstrate advantages over AGPs. Wood lignans offer a natural alternative to AGPs, as they are able to improve pathogen counts, strengthen the immune response and gut structure while delivering positive results in terms of performance.

Table 2 – Feeding trial with weaning pigs, negative control (NC), trial group supplemented with a wood lignan product (agromed® ROI, 500 g per ton).

	NC	NC + wood lignans
Number of animals	47	47
Weaning age (d)	28	28
Weaning weight (kg)	8.27	8.27
Weaning phase d 28-42		
Daily weight gain (g)	136	165
FCR	2.07	1.90
Starter phase d 42-71		
Daily weight gain (g)	619	680
FCR	1.52	1.45
Total trial period d 28-71		
Daily weight gain (g)	462	513
End weight (kg)	28.1	30.3
FCR	1.57	1.49