

## **Towards the replacement of antibiotics growth promoters in chicken: meta-analysis approach.**

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The development and the transfer of antibiotic-resistance genes from animals to humans have led many countries to reduce their use, and even ban them as preventive use as growth factors in the diet (e.g. European Union, 2006). Consequently, research effort has been done to find alternatives. In order to quantify the effect of these alternatives and to identify factors of success to maintain growth performance while removing antibiotic growth factors, meta-analysis tool has been chosen in first approach. This is a relevant method for summarizing and quantifying the knowledge acquired through previously published research. The objectives of this work was to identify the main alternatives studied and when possible to quantify their effects in comparison to an antibiotic-free control diet. Publications were retained only if growth performance has been measured, the diet composition provided, as well as the dose. This results in four sub-databases, namely organic acids (OA; 32 trials), prebiotics (45 trials), probiotics (34 trials), and essential oils (64 trials). Level of energy and protein has been recalculated based on feedstuff composition tables and tested as X variables as well as the dose of alternatives. For OA, butyric acid was the most studied (78%), followed by blend with formic acid (24%) and blend without formic acid (8%). For prebiotics manna-oligosaccharides was the most studied (76%), followed by fructo- oligosaccharides (22%). Only negative control without antibiotics and alternatives treatments were kept for this work and they has been compared within treatment with the random effect of the trial added in the models. Results for OA showed no effect on ADFI while ADG was increased linearly ( $P<0.01$ ) leading to a linear ( $P<0.001$ ) and quadratic ( $P=0.04$ ) decreased of FCR. Results for prebiotics, showed a linear ( $P<0.001$ ) and quadratic ( $P<0.001$ ) increase of both ADFI and ADG with increasing the dose. For FCR, there was a linear ( $P=0.02$ ) and quadratic ( $P=0.03$ ) decrease with increasing prebiotic dose, but the linear response of FCR depends of the level of ME (interaction ME x Dose,  $P = 0.03$ ) showing that decrease of FCR with prebiotic addition is more marked when ME was limiting. Maximum effects for FCR are of 3% for OA and up to 9% for prebiotics.

**Key words:** broiler, organic acid, prebiotic, antibiotic, meta-analysis.