227 Effect of probiotics and essentials oil on growth performance of broilers: Meta-analysis approach. Amal Rouissi*[1], Frederic Guay[1], Martine Boulianne[2], and Marie-Pierre Létourneau-Montminy[1], *[1]Laval University, QC, Quebec, Canada, [2]Faculty of Veterinary Medicine, University of Montreal, Saint-Hyacinthe, Quebec, Canada.*

The development of antibiotic resistance has led many countries to reduce their use, and even ban them as growth promoters in animal production. Consequently, research has been done to find alternatives to antibiotic growth promoters. The objective of this study was to quantify the effects of probiotics and essentials oil (EO) in comparison to an antibiotic-free control diet by compiling the relevant literature data in a database and study it with meta-analysis tool. Publications were retained only if growth performance has been measured, the diet composition provided, as well as the dietary dose of alternatives. The range of doses used for probiotics were from 10^4 to 10^9 cfu / g and for EO from 50 to 1000 mg / kg. Thirty-six publications for probiotics and 79 for EO published between 2000 and 2017 were included in the database. For EO, the database included supplements of oregano oil (21.5%), thyme (20.5%), blends with oregano oil (20.5%), blends without oregano (10.5%) and other essential oil (27%). For probiotics, only 2 supplements were included Bacillus (67%, from 10^4 to 10^9 cfu/g) and Lactobacillus (33%, from 10^6 to 10^8 cfu/g). Dietary level of metabolizable energy (ME) and crude protein (CP) has been recalculated based on feed composition and expressed relative to the requirement of the genetic line and tested as X variables as well as the dose of alternatives. Only negative control without antibiotics and alternative treatments were used. All statistical analyses were carried out using the MIXED procedure of SAS 9.4 software with the random effect of the trial. All variables found significant ($P < 0.05$) were retained and the interactions between these variables were tested. Neither CP nor ME showed significant effect on the response of growth performance to EO and probiotics. Also, for both databases, the effect of EO type or the type of probiotic was never significant. Results for EO, showed no effect on ADFI, while ADG increased (quadratic effect, $P < 0.001$) ($R^2 = 0.998$) with increasing the dose. Similarly, FCR also decreased (quadratic effect, $P < 0.001$ $R^2 = 0.936$) with doses of essential oils. Results for probiotics showed no effect on ADFI while ADG linearly increased ($P < 0.01$; $R^2 = 0.997$) and FCR linearly decreased ($P = 0.04$; $R^2 = 0.979$) with doses of probiotics. Models for FCR, showed maximum reduction of 4% (300–400 mg / kg for EO) with EO considering the quadratic effect while that of probiotic evolve linearly leading to 8% (10^6 and 10^8 cfu/g) effect at the maximal dose tested. This meta-analysis helps to quantify the effects of antibiotic alternatives on broiler growth performance.

Key Words: broiler, essential oil, probiotics, meta-analysis