TRENDS IN ESBL/AMPC/CARBAPENEMASE PRODUCING E. COLI IN FOOD PRODUCING ENVIRONMENTS IN BELGIUM, 2017-2020.

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INTRODUCTION

The specific monitoring of ESBL, AmpC and carbapenemase producing E. coli from caeca from broilers, fattening pigs and veal calves at slaughterhouses and from fresh meat derived therefrom at distribution has been implemented in Belgium on a yearly basis since 2014. Comparison in terms of prevalence and antimicrobial resistance profile has been carried out in both food producing environments in order to identify the risk for public health.

METHODOLOGY

300 samples per animal production population/food matrix and environmental site (slaughterhouse and distribution) per year have been analysed in order to detect E. coli ESBL, AmpC and carbapenemase production. The selective monitoring has been carried out following the EURL-AR protocol (https://www.eurl-ar.eu/protocols.aspx). In brief, 1 g of faeces was immersed in 9 ml of buffered peptone water (BPW) and incubated at 37 ± 1°C for 20 ± 2 h. A total of 10 µl was then streaked onto MC+cefotaxime (MC+CTX 1 mg/l) and incubated at 37 ± 1°C for 20 ± 2 h. Meat samples were processed using a 25 g sample immersed in 225 ml BPW. This was incubated at 37 ± 1°C for 20 ± 2 h and subsequently streaked on MC+CTX and incubated under the same conditions as the caeca samples. One typical colony was transferred onto nutrient agar for identification by MALDI-TOF MS. Antimicrobial susceptibility testing was performed by microbroth dilution using the EUVSEC and EUVSEC2 panels in parallel (Treck ThermoFisher™). Interpretation was performed following Commission Implementing Decision 2013/652/EU.

RESULTS

In general, the prevalence of E. coli ESBL and/or AmpC over the four years varied according to the animal population and food matrix, the highest prevalence at slaughterhouse being seen in broilers (78.48 %) followed by bovines (67.41 %) and fattening pigs (55.24 %). As regards fresh meat, the highest prevalence was detected in poultry (59.24 %) followed by beef (4.33 %) and pork (2.59 %). An important decrease in prevalence has been observed in broilers from 2017 to 2019. Yet, in 2020, an increase was observed again. This trend has also been observed in bovines. However, in fattening pigs, a steady decrease in prevalence is reported from 2017 to 2020. Prevalence in fresh meat from poultry and bovines showed a

continuous decline during the same period. Regarding the antimicrobial profile, almost all of the isolates (>85 %) from all combinations of food producing animals/environments were multidrug resistance. Furthermore, the rate of co-resistance to ciprofloxacin was very high in isolates recovered from broilers and bovines and high for fattening pigs. Interestingly, on average, the rate of co-resistance to ciprofloxacin in isolates from fresh pork meat was much higher (63.3 %) than in fattening pigs at slaughterhouse (24.3 %).

DISCUSSION

The monitoring of the food chain of food producing animals in different environmental sites is of great relevance in order to identify potential sources of contamination and implement interventions. We have reported that the prevalence of E. coli ESBL/AmpC in caeca samples at slaughterhouse is much higher than that found in fresh meat at distribution, particularly as regards fresh meat derived from fattening pigs and bovines. This is very reassuring since a large proportion of the bacteria is effectively eliminated during processing. Despite these positive results, antimicrobial susceptibility testing showed that a high proportion of the ESBL/AmpC isolates from all matrices/environmental sites were multidrug resistant, and the rate of co-resistance to ciprofloxacin was very high. Fortunately, resistance to the last resort antibiotics, carbapenems, was not observed over the 2017-2020 period.