BINDING OF CONGO RED, PHENOTYPICAL MARKER FOR DISCRIMINATION OF APEC STRAINS

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Summary

Research has been performed on a total of 121 E. coli strains isolated from broilers corpses of different ages with lesions of colisepticaemia. Classification of strains in APEC pathotype was realized by identifying genes OmpA, iss and fimH by the multiplex PCR technique. The binding of Congo Red was tested on TSA agar.

The epidemiological marker followed, respectively the binding of Congo Red, was present in 112 strains, respectively 92.56% of the strains tested.

Multiplex PCR technique has allowed detection of the genes OmpA, iss and fimH, which generates the synthesis of some virulence factors specific to APEC strains, in 118 of the strains tested, respectively 97.52%.

Key words: APEC strains, Congo Red

APEC pathotype (Avian Pathogenic Escherichia coli) includes pathogenic strains for birds, causing extraintestinal infections of septicemic type, starting from the respiratory mucosa. Overwhelming majority of the strains classified in this pathotype is serogroup O78 and binding of Congo Red is an epidemiological marker that can be used for discrimination of pathogenic strains from the commensal ones, especially in the serogroup O78 (1, 2).

Materials and methods

Research has been performed on a total of 121 E. coli strains isolated from broilers corpses of different ages with lesions of colisepticaemia. Identification and classification of strains in the species E. coli was based on cultural, morphological, tinctorial and biochemical characteristics. Subsequently, the haemolytic activity was tested (3) and was established the resistance profile against 11 antibiotics most frequently used in the treatment of avian colibacillosis (3).

Classification of strains in APEC pathotype was realized by identifying genes OmpA, iss and fimH by the multiplex PCR technique (4).

The binding of Congo Red was tested on TSA agar (Trypticase Soy Agar) with addition of 0,15% biliary salts and 0,03% dye, cultivation being made by exhaustion with bacteriological dowser to obtain isolated colonies (1, 3).
Results and discussions

In the 121 strains isolated from outbreaks of avian colibacillosis, cultural, morphological, tinctorial and biochemical aspects were characteristics, thus confirming their classification in the species of *E. coli*.

Multiplex PCR technique has allowed detection of the genes *OmpA*, *iss* and *fimH*, which generates the synthesis of some virulence factors specific to APEC strains, in 118 of the strains tested, respectively 97.52%. These genes were single or associated, most strains (61.15%) having all the 3 genes. *OmpA* gene was present in 54.55% of strains, *fimH* gene was present in 54.55% strains too and *iss* gene was present in 63.64% of the strains tested.

The epidemiological marker followed, respectively the binding of Congo Red, was present in 112 strains, respectively 92.56% of the strains tested. This phenotypical feature is associated with the presence of mentioned genes and with the phenomenon of multiple resistance to antibiotics, but it is not correlated with haemolytic activity.

Analyzing the results it is observed that the binding of Congo Red is a phenotypical feature present in most strains tested, the difference between APEC strains, in which the marker is present, and APEC strains genotypic characterized being extremely single (5%).

These results are similar to data from literature (1, 2) and confirm that identification of the APEC strains on the basis of this phenotypical feature is a cheaply and quickly procedure, which can be used in diagnostic laboratories in the research on flow of these strains in broiler effectives and then their final classification can be made by methods of molecular biology.

Another feature of APEC strains, frequently reported, is the multiple resistance to antibiotics, intraspecific and interspecific transmitted via plasmid R. Antibioresistance was reported in a proportion of 80 - 100% to doxycycline, tetracycline, neomycin and erythromycin and to ciprofloxacin, spectinomycin, norfloxacin and enrofloxacin in a proportion of 60 - 70%. The studied strains were susceptible only to florfenicol.

High frequency of outbreaks of avian colibacillosis associated with high losses, by mortality and reducing of meat production and layer percentage, requires monitoring of E. coli strains isolated and the test of binding of Congo Red allows a sufficiently accurate classification of these strains in APEC pathotype.

Conclusions

Binding capacity of Congo Red represents a phenotypical feature in the discrimination of APEC strains through a bacteriological technique simple and quick.

The presence of this marker is linked consistently with the presence of genes that generate the main factors of pathogenicity of these strains.
This marker is associated with the multiple resistance to antibiotics, but is not associated with hemolytic activity in APEC strains.

References


