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Introduction

Antibiotic resistance is a phenomenon that occurs in bacteria when they become resistant to one or more antibiotics. This assumes importance when these antibiotics are used to treat disease (in poultry or man) caused by the bacterium which has acquired the resistance. It is wrong to talk about 'antibiotic resistance in poultry' as the phenomenon occurs in bacteria not poultry.

Testing for antibiotic resistance

When we isolate bacteria from a post mortem examination in which the cause of death was a bacterial disease, such as fowl cholera (pasteurellosis) or colisepticaemia, they can be tested in the laboratory to see which antibiotics they are sensitive or resistant to. This requires a pure growth of the causal bacterium. This is then spread over the surface of a bacteriological agar plate and on this are placed specially prepared small discs of filter paper containing the antibiotics to be assessed. The plate is then incubated for 24 hours.

Mechanics of the test

During incubation the bacterium which has been placed grows and produces a sheet of confluent colonies. The antibiotics spread out from the disc in the agar producing a circular zone of antibiotic impregnated agar around the paper disc.

Reading the result

If the bacterium is sensitive to the antibiotic in the disc it is killed off by the antibiotic in the agar leaving a zone of no growth around that disc. If the bacterium is resistant to the antibiotic in the disc this does not occur and the bacterium under test grows on the surface of the agar right up to the edge of the paper disc. Some people place significance on the diameter of the zone of bacterial kill around a paper disc as being an indication of the degree of sensitivity to that particular antibiotic. This is a dubious assumption as the rate by which the antibiotic diffuses through the agar is dependent on several factors, such as water content of the agar and the type of antibiotic being tested.

Application of the result

If we need to obtain a pure growth of the bacterium to be tested, it can take 48 hours or longer to obtain a result. Obviously, when we have a disease with high mortality we can not wait all this time to initiate treatment. In such cases we are not using this test to choose an antibiotic for treatment, but rather to confirm that our choice was the correct one. Sometimes, especially in cases of colisepticaemia, we have a situation in which the flock responds to treatment but the test shows the causal organism to be resistant to the antibiotic we used. This can occur where more than one strain of E. coli is present in the flock and causing disease because one strain is sensitive and another is resistant.