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Antimicrobial drug resistance of *Pasteurella multocida* isolated from pigs in North Eastern Hilly region of India

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In the present study, an attempt was made to record the antibiotic resistance pattern of 72 porcine *Pasteurella multocida* isolates from Mizoram and to select a suitable combination of drugs for effective treatment of porcine pasteurellosis in this region.

All the 72 strains of *P. multocida* were isolated, identified and characterized in the Department of Microbiology, CAU, Aizawl, from nasal swab of pigs of different age groups of either sex from different parts of Mizoram. The isolates were serogrouped using capsular group specific multiplex PCR assay (Townsend *et al.* 2001). All the strains were tested for their antimicrobial sensitivity against 13 commonly used antimicrobial agents. Muller Hinton (MH) agar plates were prepared and incubated overnight to avoid any possibility of contamination. Two hundred micro liters of 18 h-old culture of each strain was spread evenly on MH agar plates. The culture was allowed to absorb on plate for 10 min and then microbial discs were placed at an appropriate distance from each other. The plates were then incubated at 37°C for 24 hours.

Diameter of clear zone surrounding the disc was measured and matched with respective standard zone diameter to interpret the test culture as resistant, intermediate or sensitive.

Out of 72 isolates tested for their capsular groups using capsular type specific multiplex PCR, 47 were serogroup D, 22 were serogroup A and 3 were serogroup F. But no co-relation was observed between different serogroups of *P. multocida* and the drug resistance patterns against different antimicrobial agents used in this study.

The drug resistance patterns of 72 *P. multocida* strains against 13 antimicrobial drugs are presented in Table 1. A total of 12 types of resistance pattern had been observed. It is interesting to note that all strains exhibited 100% drug resistance against sulphadiazine, a drug of choice for pasteurellosis. The resistance percentage indicates that *P. multocida* strains were most sensitive to gentamicin followed by lincomycin, ampicillin, oxytetracycline, nitrofurantoin and co-trimexazole. The resistance percentage against amikacin, streptomycin, spectinomycin, penicillin-G and vancomycin was more than 70% and considered to be non-effective against animal pasteurellosis.

Table 1. Antimicrobial resistance patterns of *Pasteurella multocida* strains isolated from pigs in NEH region of India

Antibacterial agents	No. of isolates sensitive	No. of isolates resistant	Per cent sensitive	Per cent resistant
Amikacin	20	52	27.78	72.22
Ampicillin	58	14	80.56	19.44
Ciprofloxacin	61	33	54.17	45.83
Co-trimoxazole	46	26	63.89	36.11
Gentamicin	64	8	88.89	11.11
Lincomycin	59	13	81.94	18.06
Nitrofurantoin	53	19	73.61	26.39
Oxytetracyclin	57	15	79.17	20.83
Penicillin-G	11	61	15. 28	84.72
Streptomycin	13	59	18.06	81.94
Sulphadiazin	00	72	00	100.00
Vancomycin	9	63	12.50	87.50

From the present study, it can be said that the drug of choice in the field, sulphadiazine and streptopenicillin may not work against animal pasteurellosis in near future because of the development of gradual resistance towards these antimicrobial drugs. Moreover, gentamycin, ampicillin, lincomycin, oxytetracyclines, nitrofurantoin and co-trimexazole can be used for the treatment of pasteurellosis because of the low resistance per cent of these drugs. The injudicious use of the antibiotics is leading to the severe problem of antibiotic resistance, the gene for which is plasmid borne, this also reflects the fact that these strains used in the present study may have plasmids encoding for drug resistance. Drug resistance plasmids have been studied in

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the various strains of *P. multocida* by other workers (Jonas *et al.* 2001).

In the last two decades, shift in antibiotic sensitivity spectrum of pasteurellae is well evident and conventional antibiotics had shown more resistance that is posing problems in treating the animals suffering from pasteurellosis. Therefore it is necessary to have a check on the indiscriminate use of antibiotics in treatment of pasteurellosis. This warrants the need for pre-testing of antibiotic sensitivity against pasteurellae so as to find out an effective antimicrobial agent to be used by veterinarian.

SUMMARY

Antimicrobial resistance patterns were studied using 72 *Pasteurella multocida* isolated from swines in North Eastern Hilly (NEH) region of India against 13 commonly used antimicrobial drugs. All the 72 isolates exhibited complete resistance against sulfadiazine. The calculated resistance pattern revealed that organisms were most sensitive to gentamicin followed by lincomycin, ampicillin, oxytetracyclin, nitrofurantoin and co-trimoxazole but none of the drugs exhibited 100% sensitivity. The resistance percentage against amikacin, streptomycin, spectinomycin, penicillin-G and vancomycin was more than 70% and considered to be non-effective against animal pasteurellosis.

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REFERENCES

Jonas M, Morishita T Y, Angrick E J and Fahya J. 2001. Characterization of nine *Pasteurella multocida* isolates from avian cholera outbreaks in Indonesia. *Avian Diseases* **45**: 34–42.

Townsend K M, Boyce J D, Chung J Y, Frost A J and Adler B. 2001. Genetic organization of *Pasteurella multocida cap* loci and development of a multiplex capsular PCR typing system. *Journal of Clinical Microbiology* **39** (3): 924–29.