

## *Salmonella enterica* serovar Virchow in raw milk of buffalo in Bareilly

A multiple drug-resistant (amoxicillin + clavulanic acid, ampicillin, ceftazidime, ceftriaxone) *Salmonella enterica* serovar Virchow was detected in a fresh milk sample out of the 58 samples collected from different dairies in and around Bareilly. Although present only in one sample, it cannot be ignored because of zoonotic importance of the pathogen and milk being the commonest protein source to most of the Indians. Milk samples were collected from the pooled milk of 58 buffalo dairies in and around Bareilly city and brought to the laboratory aseptically. 100 ml of the milk sample was centrifuged for 20 min at 5000 g and the sediment was seeded into 30 ml tetrathionate broth, incubated at 37°C for 24 h and plated onto brilliant green agar, McConkey agar and Hektoen enteric agar for isolation of *Salmonella*<sup>1</sup>. The suspected isolates were further characterized using diagnostic polyvalent and monovalent antisera<sup>2</sup>. The isolate was tested for sensitivity using disc diffusion method against 21 antibiotic discs (Hi-Media, Mumbai), viz. amikacin (30 µg), amoxicillin + clavulanic acid (10 µg), ampicillin (10 µg), cephalexin (30 µg), ciprofloxacin (30 µg), chloramphenicol (10 µg), cephalothin (30 µg), cotrimoxazole (25 µg), cefoperazone (75 µg), ceftazidime (30 µg), doxycycline (30 µg), furazolidone (50 µg), gentamicin (10 µg), kanamycin (30 µg), nalidixic acid (5 µg), neomycin (30 µg), norfloxacin (10 µg), sulphamethoxazole (300 µg), streptomycin (25 µg), trimethoprim (50 µg) and tetracycline (10 µg) according to CLSI<sup>3</sup>.

*Salmonella* though commonly found in meat and meat products of buffalo

origin<sup>4,5</sup> has rarely been reported from buffalo milk<sup>6</sup> and never in India. Although several *Salmonella* outbreaks due to consumption of dairy milk and milk products are on record<sup>7</sup>, hardly any *Salmonella* infection outbreak has been reported from buffalo milk.

Although prevalence of *Salmonella* in buffalo milk appears to be quite low in comparison to isolation of *Salmonella* Typhimurium from 14.5% samples of buffalo milk in Egypt<sup>6</sup>, similar studies in other parts of India and buffalo-rearing regions in the Indian subcontinent have rarely shown buffalo milk positive for *Salmonella*<sup>8-10</sup>. Though the serovar has low prevalence, being resistant to multiple antibiotics, highly zoonotic in nature and a common serovar in India in human and animals<sup>5</sup>, isolation of *Salmonella* Virchow from raw milk of buffalo is of public health significance. Multiple drug resistance (MDR) in a zoonotic pathogen (*Salmonella* Virchow) might be of public health concern because it not only limits treatment options leading to treatment failure but might also be associated with increased deaths and horizontal transfer of MDR to other potential pathogens in host and in its environment<sup>11</sup>. Thus, the results indicated necessity for observing good dairy practices which are often ignored in suburban dairies.

- Holt, J. G., Krieg, N. R., Sneath, P. H. A., Staley, J. T. and Williams, T., *Bergey's Manual of Determinative Bacteriology*, Williams and Wilkins, Baltimore, 1994, 9th edn.
- Kauffmann, F., *Kauffmann White Scheme Minkagaard*, Copenhagen, Denmark, 1972.

- Clinical and Laboratory Standards Institute (CLSI), Performance standards for antimicrobial disk susceptibility tests; Approved Standard, Document M02-A9, and M100-S18, 17th Informational Supplement, Wayne, 2006, 9th edn.
- Sharma, V. D., Singh, S. P., Taku, A. and Dixit, V. P., *Indian J. Comp. Microbiol. Immunol. Infect. Dis.*, 1989, **10**, 180-185.
- Singh, B. R., Prevalence of *Salmonella* serovars in animals in India; <http://www.aclisassari.com/acli-openlearning/uploads/lectures/Methods>, accessed on 14 November 2007.
- Hassanain, N. A. and Ahmed, W. M., *Res. J. Microbiol.*, 2008, **3**, 17-23.
- Olsen, S. J. et al., *Emerg. Infect. Dis.*, 2004, **10**, 932-935.
- Vasvada, P. C., *J. Dairy Sci.*, 1988, **71**, 2809-2816.
- Ekici, K., Bouzkurt, H. and Isleyici, O., *Pakistan J. Nutr.*, 2004, **3**, 161-162.
- Aurelia, P., Vodnar, D. and Trif, M.; <http://usamvci.ro/agriculture/209.85.175.132>, accessed on 19 March 2009.
- Helms, M., Vastrup, P., Gerner-Smidt, P. and Molbak, K., *Emerg. Infect. Dis.*, 2002, **8**, 490-495.

B. R. SINGH

National *Salmonella* Centre (Vet),  
IVRI,  
Izatnagar 243 122, India  
Present address:  
Veterinary Microbiology,  
ICAR Research Complex for NEH  
Region,  
Nagaland Centre, Jharnapani,  
Medziphema 797 106, India  
e-mail: brs1762@yahoo.co.in

## Lion-tailed macaques: on the verge of extinction

*Macaca silenus* Linn. (family Cercopithecidae), commonly known as 'lion-tailed macaque', is an old world monkey which can be cited as a pertinent example in the context of biodiversity conservation. This charismatic primate's regal physical attributes are ample to fetch it considerable attention, albeit it has

gained critical focus for being classified as 'endangered' in the IUCN Red List of Threatened Species<sup>1</sup> due to its high likelihood of becoming extinct in the near future. It is also listed on Appendix I of CITES, and Schedule I (Part I) of the Indian Wildlife (Protection) Act (1972), amended up to 2002 (ref. 2).

*Macaca silenus* inhabits only the tropical rainforests (8°25'N-14°55'N)<sup>3</sup> of the Western Ghats, India, which is one among the 34 biodiversity hotspots worldwide. Endemic to this single geographical compartment, it is numerically one of the smallest among the 15 Cercopithecidae macaque species. Its habitat is