Trop Anim Health Prod (2009) 41:1605–1606
DOI 10.1007/s11250-009-9353-4

Salmonella Umbadah: A new *Salmonella* serovar isolated from cattle in Sudan

H. E. H. Hag Elsafi · M. M. Nor Elmadiena · A. A. El Hussein · M. A. M. Siddig · C. A. Muckle · L. Cole · E. Wilkie · K. Mistry

Accepted: 8 April 2009 / Published online: 28 April 2009

Keywords *Salmonella* · Cattle · *Salmonella* Umbadah · New serovar · Sudan

Introduction

Salmonellosis is a significant foodborne zoonosis and public health issue worldwide (Berndt et al. 2007). In Sudan, the prevalence of *Salmonella* serovars in humans and animals is not well documented, as *Salmonella* are not routinely isolated and identified. Only a few studies of *Salmonella* isolates from animals in Sudan have been published (Soliman and Khan 1959; Khan 1961; 1962; 1970; 1971; Khogali et al. 1973; Yagoub et al. 1987; Mamoun et al. 1992; El Tom et al. 1999). AbdelRahman et al. (1995) reported the isolation of *Salmonella* serovars Dublin and I:13, 23:b:- ; a monophasic variant, from cattle. Yagoub et al. (2006) reported the isolation of *Salmonella* Paratyphi A and *Salmonella* Paratyphi B from cheese in Khartoum, Sudan.

During the time period October 2004-May 2005, we conducted a study to determine the occurrence, distribution, and antimicrobial resistance patterns of *Salmonella* serovars isolated from cattle in the Khartoum State, Sudan.

Materials and methods

A total of 119 cattle faecal samples were collected for isolation of *Salmonella* species. Salmonellae were isolated from faecal samples and identified following conventional standard methodology previously described (Molla et al. 2006).

Salmonella isolates were tested by the disc diffusion method for antimicrobial susceptibility following the guidelines of the National Committee for Clinical Laboratory Standards (National Committee for Clinical Laboratory Standards, NCCLS, 2000). The antimicrobial drugs tested were amikacin, amoxicillin-clavulanic acid, ampicillin, apramycin, chloramphenicol, cefoperazone, ceftazidime, cefotaxime, colistin, furazolidone, gentamicin, nalidixic acid, ciprofloxacin, norfloxacin, neomycin, streptomycin,

H. E. H. Hag Elsafi
Ahfad Centre for Science and Technology,
Ahfad University for Women,
Omdurman, Sudan

M. M. Nor Elmadiena · A. A. El Hussein (✉) ·
M. A. M. Siddig
Department of Botany, Faculty of Science,
University of Khartoum,
Khartoum, Sudan
e-mail: adilelhussein@hotmail.com

C. A. Muckle · L. Cole · E. Wilkie · K. Mistry
OIÉ Reference Laboratory for Salmonellosis, Laboratory for foodborne Zoonoses, Public Health Agency of Canada,
Guelph, ON, Canada

sulfamethoxazole-trimethoprim, compound sulfonamide and tetracycline.

Salmonella isolates were shipped for serotyping to the OIE Reference Laboratory for Salmonellosis, Public Health Agency of Canada. Serotyping was performed as previously described (Molla et al. 2006).

Results and discussion

Four *Salmonella* isolates were recovered from 119 cattle faecal samples (3.4%) collected in Khartoum State. Two isolates were serotyped as *Salmonella* Drogana. Serotyping of the other two *Salmonella* isolates resulted in the antigenic formula 1,3,19:d:1,2 which was not listed in the 8th Edition of the Antigenic Formulas of the *Salmonella* Serovars (Popoff 2001) at the time of testing. These two *Salmonella* isolates were shipped for confirmation to the WHO collaborating Centre for Reference and Research on *Salmonella*, Institut Pasteur, Paris, France. The serological designation was also confirmed by the National *Salmonella* Reference Laboratory at the Centers for Disease Control and Prevention (CDC) Atlanta, GA, USA, and the Institut für Hygiene und Umwelt, Hamburg, Germany. The new serovar was named *Salmonella* Umbadah and assigned as *Salmonella enterica* subspecies *enterica* on the basis of its biochemical characteristics. *Salmonella* Umbadah is now listed in the 9th Edition of the Antigenic Formulae of the *Salmonella* Serovars (Grimont and Weill 2007).

The four *Salmonella* isolates were susceptible to all the antimicrobial drugs tested. This could reflect animal husbandry in remote areas within Khartoum State, Sudan, where antibiotic usage is limited and indigenous cattle do not come into contact with animals from outside sources. Further surveillance is underway to isolate and characterize *Salmonella* serovars at both the phenotypic and genotypic levels from different animals, food, water and human sources in Khartoum, Sudan.

Acknowledgements We are grateful to Professor P.A.D. Grimont, WHO Collaborating Centre for Reference and Research of *Salmonella*, Institut Pasteur, Paris, France, for the serological confirmation and biochemical testing of the isolates. The further assistance of the National *Salmonella* Reference Laboratory at the Centers for Disease Control and Prevention (CDC) Atlanta, GA, USA, and Institut für Hygiene und Umwelt, Hamburg, Germany, is also gratefully acknowledged.

References

AbdelRahman, S.M.,Yassin, T.E.M. and Bagadi, H. O. 1995. Bovine salmonellosis in the Sudan. *Sudan Journal of Veterinary Science and Animal Husbandry*, **34**, 78–81

Berndt, A., Wilhelm, A., Jugert, C., Pieper, J., Sachse, K. and Methner, U. 2007. Chicken cecum immune response to *Salmonella enterica* serovars of different levels of invasiveness. *Infect. Immun*, **75**, 5993–6007. doi:10.1128/IAI.00695-07

El Tom, G.M., Abdel Rahman, S.M., Elamin, E.D.M. and Yassin, T.E., 1999. Isolation of *Salmonella* serotype San-Diego from lymph nodes of slaughtered goats. *The Sudan Journal of Veterinary Research*, **16**, 61–65

Grimont, P.A.D. and Weill, F.X 2007. Antigenic Formulae of *Salmonella* Serovars, 9th edn (WHO Collaborating Centre for Reference and Research on *Salmonella*, Institut Pateur, Paris, Fracne)

Khan, A.Q., 1961. *Research Veterinary Science*, **2**, 130

Khan, A.Q., 1962. Salmonellosis in the Sudan. *Sudan Journal of Veterinary Science and Animal Husbandry*, **3**, 89–84

Khan, A.Q., 1970. *Salmonella* infections in dogs and cats in the Sudan. *British Veterinary Journal,* **126**, 607–611

Khan, A.Q., 1971. *Bulletin of epizootic diseases of Africa*, **18** (2),117–122

Khogali, A.R., Sanousi, S.M. and Obeid, H.M. 1973. Isolation of *Salmonella* Typhimurium var Copenhagen from pigeons in Sudan. *Sudan Journal of Veterinary Science and Animal Husbandry*, **14**, 71–74

Mamoun, I.E., Khalafalla, A.I., Bakhiet, M.R., Agab, H.A., Sabiel, Y.A. and Ahmed, J., 1992. *Salmonella* Enteritidis infections in the Sudan. *Revue d Elevage et de Medecine Veterinaire des Pays Tropicaux*, **45**(2), 137–138

Molla, W., Molla, B, Alemayehu, D., Muckle, A., Cole, L., Wilkie, E. 2006. Occurrence and antimicrobial resistance of *Salmonella* servovars in apparently healthy slaughtered sheep and goats in central Ethiopia. *Tropical Animal Health Production*, **38**, 455–462. doi:10.1007/s11250-006-4325-4

National Committee for Clinical Laboratory Standards (NCCLS), 2000. Performance standards for antimicrobial disc susceptibility tests, 7th edition, vol. **17**, no.2. (Approved Standard M2-A7. NCCLS, Wayne, PA)

Popoff, M.Y., 2001. Antigenic Formulas of the *Salmonella* Serovars, 8th edn, (WHO Collaborating Centre for Reference and Research on *Salmonella*, Institut Pasteur, Paris, France)

Soliman, K.N. and Khan, A.Q., 1959. A note on *Salmonella* infection of livestock in Upper Nile Province, Sudan. *Bulletin of Epizootic Diseases of Africa*, **7**, 371–377

Yagoub, I.A., Mohamed, T.E. and Bagadi, H.O., 1987. Biochemical reactions and sensitivity to antibiotics of *Salmonella* isolated in Sudan. *Sudan Journal of Veterinary Science and Animal Husbandry*, **26**(1), 21–27

Yagoub, S.O., Oshi, N.A.M. and El Zubeir, I.E. M., 2006. Isolation and susceptibility to antimicrobial agents of *Salmonella* Paratyphi from cheese in Khartoum (Sudan). *Research Journal of Microbiology*, **1**(2), 110-114