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Short communication

Isolation of various *Arcobacter* species from domestic geese (*Anser anser*)

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Abstract

In this study, the prevalence and distribution of various *Arcobacter* spp. were investigated in samples taken from the cloacae of healthy domestic geese raised in Turkey. A membrane filtration technique with a non-selective blood agar was employed after enrichment in Arcobacter enrichment broth (AEB) to isolate a wide range of *Arcobacter* spp. In addition, the isolates were characterized phenotypically and identified at species level using a multiplex-PCR assay. A total of 90 cloacal swab samples taken from geese, collected on three farms (18, 25, 47 samples, respectively), were examined. Of the samples examined, 16 (18%) were found positive for *Arcobacter*. One *Arcobacter* species was isolated from each bird. Of the 16 *Arcobacter* isolates, 7 (44%), 7 (44%) and 2 (12.5%) were identified by m-PCR as *A. cryaerophilus*, *A. skirrowii* and *A. butzleri*, respectively. The present study indicates that domestic geese can harbour a variety of *Arcobacter* spp. in their cloacae. The presence of *Arcobacter* in geese may be of significance as reservoirs in their dissemination. Detailed research is needed for better understanding of the epidemiology and zoonotic potential of this emerging pathogen.

Keywords: *Arcobacter*; Geese; Poultry; Multiplex-PCR; Prevalence

1. Introduction

The genus *Arcobacter* that presently includes six species: *Arcobacter butzleri*, *A. cryaerophilus*, *A. skirrowii*, *A nitrofigilis*, *A. cibarius* and *A. halophilus* was first proposed by Vandamme et al. (1991, 1992).

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Furthermore, an autotrophic, obligate microaerophile sulfide-oxidizing *Arcobacter* (*Candidatus Arcobacter sulfidicus*) has been described from coastal seawater (Wirsen et al., 2002). Another possible species, detected in aborted pig fetuses and ducks, awaiting for formal description has also been reported by On et al. (2003).

Arcobacter spp. were first isolated from aborted fetuses of livestock (Ellis et al., 1977). The organisms have also been associated with a range of other animal diseases such as reproductive disorders, mastitis and gastric ulcers (Logan et al., 1982; Suarez et al., 1997; de Oliveira et al., 1997). Clinically healthy farm animals were also found to harbour *Arcobacter* (Van Driessche et al., 2005; Aydin et al., 2007). *Arcobacter* spp. have also been associated with diarrhoea and occasionally septicemia in humans (Lastovica and Skirrow, 2000; Woo et al., 2001). *A. butzleri* is the species most often isolated from humans, but *A. cryaerophilus* and more recently *A. skirrowii* have also been associated with human diseases (Wybo et al., 2004; Prouzet-Mauleon et al., 2006).

Arcobacter spp. have been isolated from a variety of foods comprising poultry, pork and beef (Collins et al., 1996; de Boer et al., 1996; Atabay et al., 2006; Aydin et al., 2007) and water (Rice et al., 1999). Although arcobacters are commonly detected on poultry carcasses, different isolation rates were reported from live birds (Wesley and Baetz, 1999; Kabeya et al., 2003; Atabay et al., 2006). In some studies, no *Arcobacter* isolation was achieved from the intestines of chickens (Gude et al., 2005) but from 4 to 15% prevalance rate were reported from different studies conducted in the US (Wesley and Baetz, 1999), Japan (Kabeya et al., 2003) and Denmark (Atabay et al., 2006). Atabay et al. (2006) determined that of the chickens, turkeys and ducks examined in their study, ducks had the highest prevalence of the three poultry species examined. Thus, live birds are considered to have a significant role for the dissemination of *Arcobacter* spp. A recent study carried out by Dogan and Atabay (2006) demonstrated that domestic geese also harbour *Arcobacter* spp. However, in the latter study the *Arcobacter* spp. could not be identified to the species level. So far four *Arcobacter* spp., *A. butzleri*, *A. cryaerophilus*, *A. skirrowii* and *A. cibarius*, have been isolated from chickens, ducks and turkeys (Kabeya et al., 2003; Atabay et al., 2006; Houf et al., 2005).

The current study was undertaken to determine the carriage rate and distribution of various *Arcobacter* spp. in domestic geese raised in Turkey.

2. Materials and methods

2.1. Samples from geese

A total of 90 cloacal swab samples taken individually from free range clinically healthy domestic geese (*Anser anser*), collected on three different farms (18, 25, 47 samples, respectively) in Kars, Turkey, were examined.

2.2. Isolation of Arcobacter by use of membrane filtration technique

This technique was previously used to isolate arcobacters from various sources. It depends on the ability of arcobacters, but not competitors, to pass through a membrane filter. Five or six drops (ca 100–120 μl) from enriched samples were inoculated onto a 47 mm diameter 0.45 μm pore size nitrocellulose membrane filter (HAWG047S1, Millipore, Billerica, MA, USA) placed on the surface of a non-selective blood agar plate as described earlier (Atabay and Corry, 1997).

2.3. Isolation media and method of examination

Arcobacter enrichment broth (AEB) was prepared in 10 ml quantities using arcobacter enrichment basal medium (Oxoid CM965) incorporating cefoperazone, amphotericin, teicoplanin (CAT) selective supplement (Oxoid SR174E) as described previously (Atabay and Corry, 1998). Blood agar comprised 5% (v/v) defibrinated sheep blood in blood agar base No. 2 (Oxoid CM271).

Sterile cotton-tipped swabs were employed to take samples from the cloacae of domestic geese (*Anser anser*). Each swab was moistened with AEB before the sample was taken from the cloaca and put into AEB (10 ml) immediately after the sample collection. The samples were transported to the laboratory. Each inoculated enrichment medium was agitated using a vortex mixer for approximately 1 min to release bacteria attached to swabs, and incubated microaer-