

DESICCATION RESISTANCE IN *ARCOBACTER BUTZLERI*

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SHORT COMMUNICATION

ABSTRACT

The desiccation resistance of *A. butzleri* was studied. Two, 3 and 4 of the strains did not resist desiccation for more than 2, 12 and 36 h, respectively. Two strains resisted desiccation for ≥ 48 h. *A. butzleri* seems to be more resistant to desiccation than the classical enteropathogenic *Campylobacter* species.

Key words: *Arcobacter butzleri*, *Campylobacteraceae*, desiccation resistance.

The genus *Arcobacter* comprises spirally, curved, Gram negative rods divided into four species (*A. nitrofrigidis*, *A. cryaerophilus*, *A. butzleri* and *A. skirrowii*) which were previously considered as members of the genus *Campylobacter* (6).

A. butzleri and *A. cryaerophilus* have been associated with infectious processes in animals and human beings. *A. butzleri* seems to be more frequent than *A. cryaerophilus*, being considered as a zoonotic and emerging bacterium that could be associated with bacteremia and human diarrheic illness. It has been also isolated from food of animal origin, especially from poultry retails, carcasses and offal, as well as from water bodies and sewage (4,6). Their growth requirements, and their viability in water are known (4,5,6). However, other characteristics related to their survival capacity under environmental conditions, such is their resistance to desiccation, remain unknown.

The aim of this study was to establish the desiccation resistance in 11 strains of *A. butzleri* isolated from commercial chicken livers. All of them were freshly isolated strains.

The desiccation resistance, in absence of organic matter, was determined by means of the method proposed by Berger and Döring to study *Neisseria* sensitivity to drying (1) and later adapted to establish *Campylobacter* desiccation resistance (3). In brief, several pieces of sterile gauze (1 cm²) were imbibed separately with 1 ml of a 48 h culture (10⁶ cfu/ml) of each strain in tryptose broth and allowed to dry at 37°C in half-opened

Petri dishes. During a first 12 h period, starting from time 0 and every 2 h, one single piece of gauze of each strain was introduced in tubes containing 10 ml of tryptose broth and incubated at 24°C for 48 h under aerobic conditions. During the second period, that ranged from 12 to 48 h, the gauze pieces were seeded into the tryptose broth tubes every 12 h. After the incubation period, the tubes were examined looking for turbidity and then, in order to confirm survival capacity and discard eventual contamination during the desiccation period, they were subcultured on blood agar plates that were incubated in the same conditions mentioned above.

As shown in Fig. 1, desiccation resistance of the 11 strains under study ranged from 2 to ≥ 48 h. The less resistant strains (2) survived for less than 2 hours, 3 strains were viable after 12 and two after 36 hours. The remaining 2 strains resisted desiccation for a period longer than 48 h. These results suggest that desiccation resistance in *A. butzleri* could be strain dependant, as it was observed in *Campylobacter jejuni* and *C. coli* (3). The phylogenetic similarities observed between *Arcobacter* and *Campylobacter* (6) suggested that a similar behaviour in resistance to desiccation would also be expected. However, since 6 of the 11 strains resisted desiccation for 12 h or more, we could conclude that *A. butzleri* seems to be more resistant than the classical enteropathogenic *Campylobacter* species, whose desiccation resistance ranged from 2 to 10 hours (3). Similar results were found by Collins et al with respect to

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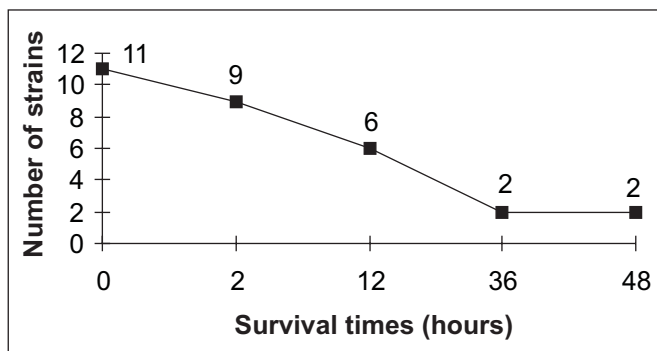


Figure 1. Survival rates of 11 strains of *A. butzleri* exposed to desiccation.

the ability of *A. butzleri* to survive irradiation under vacuum in ground pork (2). The establishment of *A. butzleri* desiccation behaviour is important in defining food handling conditions. The information presented here is also important with respect to the transport of clinical specimens and should be taken into account in the maintenance of cultures in the laboratory and while studying the epidemiology of *Arcobacter* infections in humans and animals, especially if this bacteria could be present in food of animal origin used for human consumption.

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RESUMO

Resistência de *Arcobacter butzleri* à dessecação

A resistência de *Arcobacter butzleri* à dessecação foi determinada. Duas, 3 e 4 amostras não resistiram a dessecação por mais de 2, 12 e 36 h, respectivamente. Duas amostras resistiram a dessecação por ≥ 48 h. *A. butzleri* seria mais resistente que as espécies enteropatógenicas clássicas de *Campylobacter*.

Palavras-chave: *Arcobacter butzleri*, *Campylobacteraceae*, resistência à dessecação.

REFERENCES

- Berger, U.; Döring, M.T. Zur Resistenz der humanen *Neisseria*-Arten gegen Austrocknung. *Arch. Hyg. Bakt.*, 6: 556-559, 1969.
- Collins, C.I.; Murano, E.A.; Wesley, I.V. Survival of *Arcobacter butzleri* and *Campylobacter jejuni* after irradiation treatment in vacuum-packaged ground pork. *J. Food. Prot.* 59: 1164-1166, 1996.
- Fernández, H.; Vergara, M.; Tapia, F. Desiccation resistance in thermotolerant *Campylobacter* species. *Infection*, 13: 197, 1985.
- Lastovica, A.J.; Skirrow, M.B. Clinical significance of *Campylobacter* and related species other than *Campylobacter jejuni* and *C. coli*. In: Nachamkin, I.; Blaser, M.J. (eds). *Campylobacter 2nd Edition*. ASM Press, Washington, D.C., 2000, p.89-120.
- Rice, E.W.; Rodgers, M.R.; Wesley, I.V.; Johnson, C.H.; Tanner, S.A. Isolation of *Arcobacter butzleri* from ground water. *Lett. Appl. Microbiol.*, 28: 31-35, 1999.
- Vandamme, P. Taxonomy of the Family *Campylobacteraceae*. In: Nachamkin, I.; Blaser, M.J. (eds). *Campylobacter 2nd Edition*. ASM Press, Washington, D.C., 2000, p.3-26.