# Viability of *Listeria monocytogenes* in water

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*Listeria monocytogenes* has been reported in dairy and vegetable products (Schlech *et al.*, 1983, Fleming *et al.*, 1985; James *et al.*, 1985; Bradshaw *et al.*, 1985; Doyle *et al.*, 1985) Recently this organism was isolated from sea foods (Weagant *et al.* 1988). But there are no reports on the survival of this organism in water. Since water is used in large quantities during different stages of seafood handling and processing, the knowledge about the survival of this organism in water is very essential to seafood processors. so this work was taken up and the results are presented in this paper.

The type culture of *L. monocytogenes* collected from the US FDA Laboratory, New York was used in this study. Young cultures of this organism in Trypticase Soy Broth were centrifuged for 15 min at 5000 rpm and the liquid was aseptically decanted off. Ten ml of sterile isotonic saline was then added to the sediment and the contents of the tube were shaken so as to get a uniform suspension of the cells in the saline and this was centrifuged again for another 15 min. The sediment was once again washed with isotonic saline, centrifuged and the cells were resuspended in 10 ml fresh saline. Aliquots were added to 3 l of public supply tap water and shaken thoroughly in order to get a uniform suspension of the organism in water. The initial number of the organism in water was determined by direct plating on "Oxoid" Listeria selective agar base (Oxford formulation) with Listeria selective supplement (Oxford formulation) SR 140 E. The inoculated water samples were stored at room temperature (28-30°C) and at refrigerated temperature (5-10°C). Samples were drawn periodically and were enriched in modified trypticase soy broth. The identification of the organism was done as per the method outlined by Lovett (1988).

The viability of *Listeria monocytogenes* in water is given in Table 1. It is evident from the Table that the organism is viable in water for 10-30 days at room temperature (28-30°C) and for 70-110 days at refrigerated temperature (5-10°C) depending upon the initial load in the water sample. The results also indicate the comparatively extended viability at refrigerated temperature (5-10°C) irrespective of the number of organisms initially present in the water. The extended viability of the organisms in water has great practical significance in the seafood processing industry. Any contamination of the product from water during processing may create public health problems. Further it is also known that *L. monocytogenes* is fairly resistant to sub-zero temperature. Hence the seafood processing industry shall regularly monitor the presence of this pathogen in process water and adopt corrective measures.

Table 1. *Viability of Listeria monocytogenes in water**

| Initial load in the sample with *L.monocytogenes* | Less than $2x10^5$/ml | $9\text{-}11\text{-}x10^5$/ml |
|---|---|---|
| Viability at room temp. (28-30°C) | 8-10 days | 27-30 days |
| Viability at refrigerated temp. (5-10°C) | 60-70 days | 105-110 days |

*Quality of water: pH = 6.5., Chlorides = 7.1 ppm
Hardness 24 ppm as $CaCO_3$

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## References

Bradshaw, J.G., Peeler, T., Corwin, J.J., Hunt, J.M., Therney, J.T.,Larkin, E.P.& Twedt, R.M,. (1985) *J.Food Prot.* **48**, 743

Doyle, M.P., Meske, L.M. & Marth, E.H. (1985) *J. Assoc. Off. Anal. Chem.* **71**, 658

Fleming, D.W., Cochi, S.L., MacDonald, K.L.,Brondun, J., Hayes, P.S., Pulikayatis, B.S., Holmes, M.B., Audurier, A., Broome, C.V. & Relingold, A.L. (1985) *N. Engl. J. Med.* **312**, 404

James, S.M., Fennin, S.L., Agee, B.A., Hall, B., Parker, E., Vogt, J., Run, G., Williams, J., Lieb, L., Salminen, C., Prendergast, T., Warner, S.B. & Chin, J. (1985) *Morbidity and Mortality Weekly Report*, **34**, 358

Lovett, J. (1988) *J. Assoc. Off. Anal. Chem.* **71**, 658

Marth, H. & Doyle, P. (1985) *J. Food Prot.* **48**, 746

Schlech, W.F., Lavigne, P.M., Hightower, A.W., Johnson, S.E., King, S.H., Nicholls, E.S. & Broome, C.V. (1983) *N. Engl. J. Med.* **308**, 203

Weagant, S.D., Sade, P.N., Colburn, K.G., Torkleson, J.D., Stanley, F.A., Krane, M.H., Shields, S.C.& Thayer, C.F. (1988) *J.Food Prot.* **51**, 655