

HorizonScan Occasional Articles

13 Reduced use of DDAC and BAC disinfectants: no evidence of increased *Listeria* risk

Introduction

Quaternary ammonium disinfectants such as benzylammonium chloride (BAC) and didecyldimethylammonium chloride (DDAC) were, until a few years ago, some of the most common sanitizers used in the food manufacturing and preparation industry. They can be used on machinery, food-contact surfaces, and to directly wash the food itself. As well as use in the food manufacturing industry, they continue to be widely used for disinfecting food-contact surfaces in shops, delicatessens, restaurants and catering establishments, and in household washing up liquids and cleaners.

BAC and DDAC disinfectants are most effective against bacteria when they are left in contact; they then may or may not be rinsed off with water. Not rinsing (“leave-on” use) is particularly advantageous for control of *Listeria* in the chilled food industry, as *Listeria* is a bacteria that will multiply in cold and wet conditions. BAC/DDAC use was ubiquitous in the UK dairy industry, and in preparation of foods such as prepared fruit pots, bagged salads, stir-fry mixes, delicatessen products, sandwiches and other ready-to-eat food-to-go.

DDAC/BAC residues in food – the EU legal position

It is a longstanding gap in European Union risk assessment and food legislation that there has been no approval system for food-contact disinfectants, and no limits set for residues in food. This situation is gradually improving with the EU Biocides Directive, but there is a backlog of routine disinfectants in food-contact use which remain unassessed. This includes BACs and DDACs.

However, DDAC did also have an obsolete historical use as a pesticide on ornamental plants, and there were reports of similar pesticide products being marketed that contained BAC. Because these pesticides had no approved use on food-producing plants, a “default” maximum residue limit of 0.01 mg/kg was set in the pesticides regulations for their residues in foods; effectively, a prohibition of residues. This regulation took no account of the fact that DDAC and BAC residues could also arise from legal disinfectant use.

The switch away from DDAC/BAC in EU food manufacturing

In 2014 and 2015, European testing laboratories added BAC and DDAC to their multi-residue test suites for pesticide residues in food. And, unsurprisingly, found residues. These foods were legally non-compliant with the pesticides regulations.

This prompted a rapid change of practice amongst European food manufacturers, concerned that their own products should be legal. Some looked at rinsing-off disinfectants that were previously leave-on, but most switched to other disinfectants.

At the time, some food safety professionals raised concerns. Chief amongst this was that changing disinfectants could be a knee-jerk reaction, before there had been any risk assessment of BAC/DDAC residues in food (or, indeed, of residues of any alternate disinfectant used as a replacement), and that the residues risk needed to be balanced against the risk of controlling bacterial contamination, particularly *Listeria*. There was a real concern that there could be unintended consequences, and an increase in *Listeria* outbreaks, if manufacturers stopped using DDAC/BACs without verifying the efficacy of the alternatives. *Listeria* in food that will not be cooked by the consumer (“ready-to-eat”) is particularly serious in pregnant women, older adults and individuals with a weak immune system, and one outbreak can cause multiple deaths.

The evidence: trends in *Listeria* reports

Fortunately, despite the 2018 high-profile incidents of *Listeria* in frozen sweetcorn (Hungary) and processed meats (South Africa), there is no evidence of an increase in reported *Listeria* incidents; either in absolute numbers, or as a percentage of the total reported bacterial incidents (as presented here, to normalise for any improved data-collection by Horizonscan over the three year period, making the assumption that legal requirements have not changed in terms of *Listeria* testing frequency relative to other microbiological testing frequency). A systematic examination of the data in Horizonscan shows no increased risk, and suggests that EU food manufacturers have managed to switch away from DDAC and BAC disinfectants whilst maintaining the efficacy of their sanitary controls.

Figure 1 – Dairy products: Quarterly *Listeria* reports, as % of total bacterial incidents



EU+ = EU member states plus Norway, Sweden, Switzerland
 Excludes unpasteurised milk and cheese

Figure 2 – Ready-to-Eat meat and fish: Quarterly *Listeria* reports, as % of total bacterial incidents



Includes dried continental meats, smoked meat and fish, cooked and chilled meat and fish

Figure 3 – Ready-to-Eat prepared fruit and vegetables: Quarterly *Listeria* reports, as % of total bacterial incidents



Includes fruit pots, pre-washed salads, prepared salads, stir-fry mixes, bagged prepared vegetables, sandwiches and similar chilled food-to-go