



## Red Tractor Fresh Produce Guidance Notes on Microbial Routes of Water Contamination - February 2016

### 1. Water Uses – for irrigation, spraying, cooling (including ice) and cleaning

Water is used in numerous field, packing and glasshouse operations including:-

- Irrigation (in glasshouse and field)
- Mixing and application of fertilisers
- Crop protection sprays - **Where possible water used for spraying should be of potable quality or at least free from faecal coliforms.**
- Cooling systems - **Water for cooling and ice making must be potable quality.**
- Cleaning food contact surfaces - **must be potable quality.**

Water is a potential source of food borne pathogens; therefore practices or processes involving water should be evaluated in terms of potential sources and routes of contamination, e.g. animal and human waste.

**Measures should be put in place to limit the possibility for waterborne contamination and to ensure that water quality is appropriate for its intended use.**

### 2. Water - Source and Storage

In general, the risk of contamination is greatest for surface water supplies, less for ground water supplies, and significantly less for mains water supplies.

- **All water sources and extraction points must be known and mapped (including internal pipe work).**
- The microbial and chemical quality of the water should be assessed together with its suitability for the intended use and measures to prevent or minimise contamination implemented (e.g. from livestock, other animals, run-off from heavy rainfall and excess irrigation).
- **Water from sewage effluent (animal or human) must never be used in any aspect of crop production.**

#### Examples of Relative Risks of Various Water Sources

Water Source	Relative Risk
<b>Surface</b> - Rivers, lakes, ponds, reservoirs, uncovered storage tanks etc where the water source is open to the environment.	Highest
<b>Ground</b> - Water that has percolated through the soil from the surface	↓
<b>Municipal (Potable)</b> - Water that is of drinking water standard as defined in the legislation European Communities (Quality of Water Intended for Human Consumption) Regulations 1998.	↓
	↓
	Lowest

### 3. Water - Application Timing and method

**The time gap between irrigation and crop harvesting should be maximised.**

The potential for contaminated water to come into contact with the edible portion of the product should be minimised by good practice, such as drip, furrow or underground irrigation where this is agronomically and economically practical

Crops with a relatively large surface area that have leaves which can trap water, can accentuate water quality effects.

Water quality may need to be greater for overhead spray irrigation than for drip irrigation for high risk crops or an increase time between application and harvest applied.

#### **Examples of Relative Risks – Irrigation Method**

<b>Irrigation Method</b>	<b>Relative Risk</b>
Overhead spray	Highest  ↓  Lowest
Drip	
Furrow	
Underground	

### 4 Water - Quality

*(It should be noted that testing only reflects water quality at the time of sampling. Water sampling procedures are laid out below)*

**Growers should arrange for periodic testing of water for microbial contamination, the frequency based on risk assessment.**

**Testing for total *E. coli* is recommended.**

Additional micro-organisms, such as pathogens of major concern (Salmonella, faecal streptococci, some protozoa etc.), may be tested for if there is a potential or suspected hazard.

- Suggested minimum testing frequencies are: *Annually with mains water, Quarterly with groundwater. Test surface water for quality assurance (3 times during season)*
  - a) at planting (high flow)*
  - b) at peak use (low flow)*
  - c) at harvest*

#### Interpretation of results:

Most water analysis results measure the level of E.coli as cfu/100ml (colony forming units per100ml). Currently there are no legislative standards for irrigation water quality but the generally accepted level

is that water used for irrigation should have levels of E.coli less than 1000 cfu/100ml. Where water is used to irrigate the higher risk crops (i.e. Cat 0 or Cat 1) some customers are now requiring more stringent testing and producers should be aware of the critical values expected by their customers. Sources for ice making, pesticide application, cooling should be potable or at least free of faecal coliforms if routine monitoring of microbial water quality reports consistently high levels of E.coli growers should consider the following actions:

- Increase testing frequency
- Take samples from primary supply and at various points around the distribution system Investigate a change of water source
- Review current risk assessments with emphasis on potential sources of faecal contamination
- Take actions to reduce the risk of contamination of crop or product through changed irrigation practice (i.e. avoiding product contact)
- Take action to alert customers

The acceptability of any levels must be based on crop category

([http://assurance.redtractor.org.uk/resources/001/137/484/Red Tractor Crop Categories - Doc for website - July 2015 2.pdf](http://assurance.redtractor.org.uk/resources/001/137/484/Red_Tractor_Crop_Categories_-_Doc_for_website_-_July_2015_2.pdf)) application method, application timing, post-harvest treatments and customer requirements.

For more information on micro testing and interpretation of results see the FSA Factsheet <http://www.food.gov.uk/sites/default/files/multimedia/pdfs/microbial.pdf>

## 5 Water - Hygiene of irrigation equipment.

**Equipment used for the application and storage of water must be regularly inspected for cleanliness and cleaned as necessary.**

### **Microbiological Water Sampling**

#### Sample Bottles

Only use sterile sample bottles supplied by the laboratory carrying out the water analysis. The minimum sample required is 500ml.

If the sample water is chlorinated, the laboratory should add sufficient sodium thiosulphate to the sample bottle to neutralise any residual chlorine. This allows a more accurate count of the number of bacteria in the water at the time of sampling.

#### Taking the sample

The sampling point should be visibly clean. Clean off any soiling from the sampling point, but do not disinfect it before taking the sample. This ensures that the results reflect the condition of the water as you are using it.

Allow water to run through the sampling point at a uniform rate for a few seconds before taking the sample.

Hold the sample bottle in one hand and remove the stopper or cap with the other. Take care not to touch the top of the bottle or any part of the stopper or cap which comes into contact with the sample water. Do not put the cap or stopper down on the ground or any other surface.

Collect the water sample in the bottle, avoiding splashing, and leave a small air gap at the top. Replace the cap or stopper, again taking care not to touch the top of the bottle or parts of the cap or stopper which comes into contact with the water sample.

If you accidentally contaminate the bottle, use a new sterile one to collect a fresh sample.

#### Transport and Storage of Samples

You should deliver samples to the laboratory and have them analysed as quickly as possible (within 6 hours should be the target). This requires proper planning to ensure you take samples when you can transport them quickly, and the laboratory is open and ready to analyse them.

Keep the samples cool (2 - 10°C) in transit. You may need to use cool boxes, ice packs or refrigerated vehicles. Keep any containers you use to transport samples clean, to avoid contamination of the sample bottles.

In exceptional circumstances, you may keep samples in a cool (2 - 10°C) dark place for a maximum of 48 hours before they are analysed.

Laboratory methods can be found at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/316837/mdwp\\_art3.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/316837/mdwp_art3.pdf) "The Microbiology of Drinking Water (2002) Part 3 Practices & Procedures for Laboratories – A Report by the Environment Agency"