

Risk analysis of microbiological water quality

1 Introduction

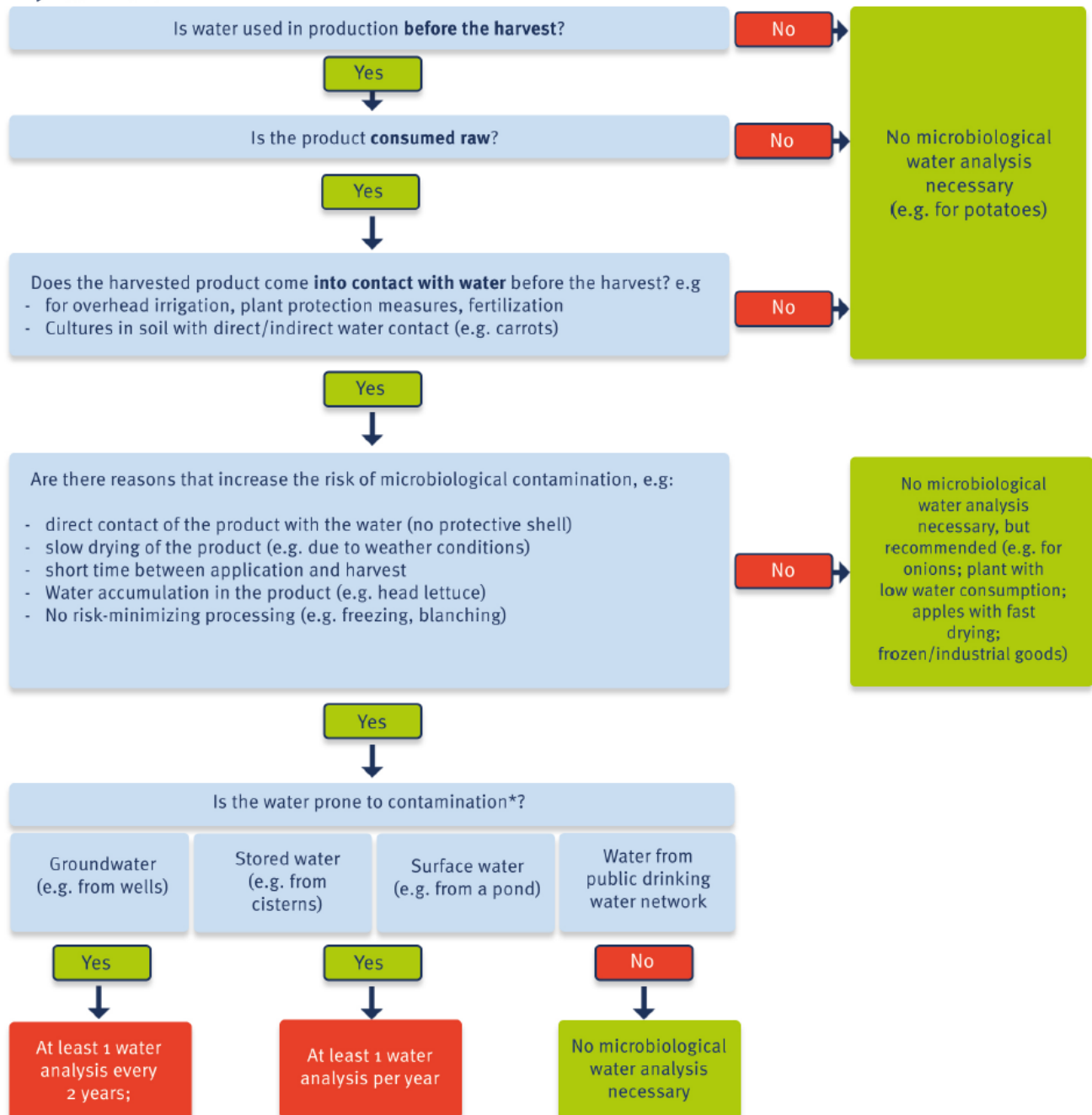
The following work aid offers support for the risk assessment of water used before the harvest of fruit, vegetables and potatoes (e.g. for irrigation, fertilization or plant protection measures) and for meeting the requirement for "Risk analysis of microbiological water quality" in the guidelines **QS-GAP production fruit, vegetables, potatoes and QS production fruit, vegetables and potatoes.**

When risks are identified, measures must be taken to reduce the identified risks to a minimum. As a result of the risk analysis it must be determined how often, when and where the water must be tested for microbiological parameters. The decision tree shown in chapter 2 is used to determine the required number of water analyses.



2 Decision tree

A) Basic risks



⇒ Continuation of decision tree see next page!

B) Further risks

Are there other risks of microbiological contamination, for example:

- Obvious contamination of the water
- Contamination by machines, etc.
- Contamination from surrounding industry
- Entry of faeces (e.g. by wild animals, ...)
- Uncontrollable surface water influx (e.g. through flooding, ...)
- Weather (e.g. heat, dryness, ...)

Yes



Increase number of samples, in case of acute risk of contamination direct water analysis

No



Keep sample number

*= The following recommendations apply to **distribution systems** regardless of the origin of the water:

- Flush the distribution system regularly, especially after long periods of non-use.
- Take water sample for analyses at a representative outlet point of the water.
- Open distribution systems pose a higher risk of microbiological contamination than closed systems, therefore the sampling frequency may have to be adjusted.

3 Sampling for water analysis

Water analyses by laboratories accredited according to ISO 17025 shall be carried out with the frequency used in the risk analysis. The following must be observed:

- Determination of the sampling location and time based on the risk analysis
- Sampling time within the period of water use (e.g. irrigation, plant protection measures)
- Sampling at a representative outlet point of the irrigation system after flushing the irrigation system before sampling
- At least 1 liter of water per sample
- Exclusive use of clean and sterile vessels for sampling, these can be for example provided by the laboratory and are also available in pharmacies
- Marking of the sample containers for a clear allocation with name, address, type of water sample, sampling point and date
- Cool and dark storage of samples, fastest possible transport to the laboratory
- Recommendation: Create a protocol with additional information that may be necessary for later interpretation (e.g. weather, water level, abnormalities, etc.)

Notes:

General: Analyses that are available as part of drinking, bathing or surface water monitoring (e.g. water quality studies) can also be used.

Well water: If well water is sampled, it is permissible to divide the sampling of several wells with similar risk (same water source, comparable sediment, age, etc.) over several years and to rotate the well analyses over the years. It is recommended to perform an analysis of each well at least every 3 years. This should be recorded in the risk analysis.

Surface water and stored water: For scoop samples from basins, tubs or ponds, the samples should be taken below the water surface.

4 Water analysis results

The water shall be tested at least for *Escherichia coli*. The following limit value must be observed:

$$Escherichia coli < 1.000 \text{ Colony forming units (CFU)/100 ml}$$

If this limit is exceeded or if the water analysis reveals a risk to food safety, parts of the plant suitable for raw consumption must not come into contact with the water. In this case, corrective measures with deadlines must be defined and documented.

The following table gives the possibility of a further, more exact evaluation of the analysis results.

Tabelle 1: Evaluation of the microbial water test results

Analysis result for E. coli	Evaluation
≤ 200 KbE/100 ml	Target value: The water has a low risk of microbial contamination
200 bis 1000 KbE/100 ml	Corrective measures to improve the microbial water quality should be defined and documented with deadlines, see also the QS work aid Assessment and reduction of microbiological risks in fruit and vegetables
> 1000 KbE/100 ml	Limit value: The water represents a potential microbial risk and must not be used for products suitable for raw consumption or come into contact with these parts of the plant. Corrective measures to improve the microbial water quality must be defined and documented with deadlines