EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate B. Multilateral relations, quality policy
B.4. Organics

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Expert Group for Technical Advice on Organic

Production EGTOP

Final Report on Cleaning and Disinfection

The EGTOP adopted this technical advice at the 12th plenary meeting of 14 – 15

- calcium magnesium carbonate (dolomite) [no restriction proposed]
- cleaning products which do not contain active disinfectant substances
- Ecolabelled (at least to EU standard) cleaning products

1.2 List of substances for cleaning and disinfection, which may be used for limited purposes indicated here (only if other substances listed in chapter 2.1 of this Annex cannot be used):
- iodophors (only in the presence of eggs)
- cleaning products which are not ecolabelled, only if there are no suitable ecolabelled products

2. Products for use in aquaculture, only in the absence of animals
2.1 Basic list of substances for cleaning and disinfection, which may be used for all purposes authorised under general legislation:
- ethanol, propan-2-ol (alcohols)
- sodium hydroxide (caustic soda), calcium hydroxide (slaked lime)
- calcium oxide (quicklime)
- sodium hypochlorite (bleach), calcium hypochlorite, mixtures of potassium peroxomonosulphate and sodium chloride producing hypochlorous acid
- ozone
- cleaning products which do not contain active disinfectant substances
- Ecolabelled (at least to EU standard) cleaning products

2.2 List of substances for cleaning and disinfection, which may be used for limited purposes indicated here (only if other substances listed in chapter 3.1 of this Annex cannot be used):
- potassium permanganate [listing depends on member state consultation]
- tea seed cake made of natural camelia seed (use restricted to shrimp production)
- cleaning products which are not ecolabelled, only if there are no suitable ecolabelled products

4.6 Disinfection technologies

Introduction, scope of this chapter
This chapter covers a few specific disinfection technologies that the Group was specifically asked to consider. There may be others which were not mentioned in the original mandate, which the Group is not aware of, which may be preferable to those discussed below.

4.6.1 'Electrolysed water'

Introduction, scope of this chapter

'Electrolysed water' is traded and known under many names. Other commonly used names are 'activated water' or 'electro-activated water'. Electrolysed water is produced locally from water containing chloride salts, using electrical current. A major difference is whether it is derived from the anion, from the cation or both. Water from the anion ('plus pole') is acid, and is therefore often called 'acid electrolysed water'. Water from the cation ('minus pole') is alkaline, and is therefore often called 'alkaline electrolysed water'. Acid electrolysed water has been used for disinfection for a long time, particularly in Japan. Alkaline electrolysed water is mainly used

for cleaning. The characteristics of electrolysed water depend on the construction and control system of the generator. There are a review articles on electrolysed water (Al-Haq et al., 2005; Hricova et al., 2008; Huang et al., 2008; Gunarathna et al., 2014; Tirpanalan et al., 2011; Colangelo et al. 2015).
Today, water containing chloride salts (usually sodium chloride) is generally used in the generators, so this is taken as a basis for evaluation by the Group. At least in theory, however, it would be possible to use aqueous solutions of other chlorides. For that case, the present evaluation is not necessarily valid.
The technology of generating electrolysed water is a method for obtaining hypochlorous acid in-

situ. In aqueous solutions, hypochlorous acid and hypochlorite co-exist in a pH-dependent equilibrium. Similar solutions are normally obtained by dissolving industrially produced sodium hypochlorite in water. Sodium hypochlorite is already listed in Annex VII. In this chapter, the Group has not performed an evaluation of sodium hypochlorite as such, but only of this new production method. Concerns over the use of chlorinated compounds are expressed in chapter 4.2.1.

Authorisation in general agriculture and in organic farming
For a long time, generators of electrolysed water were not covered by biocide legislation. Today, however, in-situ generated substances are also covered by biocide legislation, and the electrolysis of sodium chloride forming hypochlorous acid is explicitly mentioned.

Agronomic use, technological or physiological functionality for the intended use
Electrolysed water can be applied in plant and animal production and in food processing. It is prepared immediately before use, and is usually applied undiluted. It has a broad anti-microbial activity, and has been used in many areas (Al-Haq et al., 2005; Huang et al., 2008). Existing and possible new applications include medicine and dentistry, crop production (greenhouses, irrigation systems, mushroom cultures, foliage, seeds and fruits prior to storage), animal production (drinking troughs, stables) and food processing (machines, tools, cut vegetables, milk processing, meat and fish industry).
Electrolysed water usually contains 20 – 60 mg/kg free chlorine (hypochlorite and hypochlorous acid, in a pH-dependent equilibrium). Some publications attribute at least part of its activity also to the low pH value and/or to the presence of free radicals, but the contributions of pH and radicals is not clear, and seems to vary from one situation to the other (Al-Haq et al., 2005; Huang et al., 2008; Gunarathna et al., 2014). In line with biocide legislation, the Group considers electrolysed water as a solution of hypochlorous acid.

Necessity for intended use, known alternatives
Very similar to sodium hypochlorite, and possibly other substances from Annex VII.

Origin of raw materials, methods of manufacture
The process for generating electrolysed water is more or less the same process with which sodium hypochlorite is industrially produced. The Group sees no major difference between the two processes, and considers both end-products as synthetic.

Environmental issues, use of resources, recycling
Similar to sodium hypochlorite. However, if the process is carefully controlled, the generation in situ may cause less concerns about formation of chlorinated by-products (Fong et al., 2014)

Animal welfare issues
Similar to sodium hypochlorite.

Human health issues
Similar to sodium hypochlorite. However, if the process is carefully controlled, the generation in situ may cause less concerns about occupational health.

Food quality and authenticity
Similar to sodium hypochlorite. However, if the process is carefully controlled, the generation in situ causes less concerns about formation of chlorinated by-products.

Traditional use and precedents in organic production
Sodium hypochlorite has traditionally been authorised for disinfection in the EU organic regulation, while electrolysed water is not mentioned until now. It is currently used in some applications in organic production, based on the incorrect assumption that this is a physical technology that may be freely used.

Aspects of international harmonisation of organic farming standards
The Codex Alimentarius guidelines for the production, processing, labelling and marketing of organically

produced foods (revision 2013) do not contain provisions concerning disinfectants.
In the USA the EPA (Environmental Protection Agency) has approved the use of electrolysed water in the food industry (Colangelo et al., 2015). A recent document from the USDA clarifies that electrolszed water is a type of chlorine material that is allowed in organic production and handling. (McEvoy, USDA policy memo 15-4). In the IFOAM standard for organic production and processing (version 2014), electrolysed water is not mentioned.

Other relevant issues
None.

Balancing of arguments in the light of organic production principles
The electrolysed water technology is used to generate solutions of hypochlorous acid, which are then applied as disinfectant. In the Group's opinion, this should be regulated identically to the use of sodium hypochlorite, because in both cases there is a pH-dependent equilibrium of hypochlorite and hypochlorous acid.
In the Group's opinion, the current listing of sodium hypochlorite in Annex VII covers in-situ generation as well as industrial production. However, it may be that the generation in situ creates less concern regarding production of by-products (Fong et al, 2014)

Conclusions
In the Group's opinion, the use of electrolysed water is similar to the use of sodium hypochlorite. It may therefore be used for all purposes for which sodium hypochlorite is authorised, but not for any other purposes. For the time being the Group sees no need to mention electrolysed water explicitly. However, if there should be more data showing that this technology leads to significantly lower levels of chlorinated by-products, a difference could be made between use of hypochlorites as such and the use of electrolysed water in the future.

5. REFERENCES

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