CHLORATE MRLS COMPLIANCE BEST PRACTICE FOR PROCESSED FOODS:

CURED MEAT, DRIED MILK PRODUCTS, BUTTER

Introduction

EC Regulation 2020/749 which sets maximum residue levels for chlorate in or on certain products entered into force in June 2020 whilst the UK was still in the transition period following exit from the EU, which means that the EU MRLs apply to goods marketed in the UK.

The Regulation contains chlorate MRLs for a range of foods including meat (0.05 ppm) and milk (0.1 ppm). For processed foods, the Regulation contains a Footnote which acknowledges that the MRLs set for chlorate in raw foods will be exceeded when those foods are processed, for example where treated drinking water or processing aids have been used to ensure hygiene standards are maintained. Therefore, the proposal permits these exceedances but places the responsibility on food businesses to generate the evidence needed to show that the MRL is exceeded for legitimate reasons in line with the Footnote. The Footnote states:

"(A) To take into account the specific situation of chlorate residues, in processed food (including for the purpose of this Regulation foodstuffs that have been derived using processes listed in Article 2(1)(n) of Regulation (EC) No 852/2004), that has come in contact with products containing chlorate residues, or that contains ingredients with such residues, such as processing aids or drinking water, used in compliance with the respective legal requirements, these additional contributions of chlorate residues should be taken into account when determining the permitted content of chlorate residues in or on the processed food products in accordance with Article 20 (1) of this Regulation. The burden of proof regarding the level of those additional contributions lies with the food and feed business operator."

Following a consultation, HSE has now advised on the measures that might be adopted and communicated by companies/trading bodies to meet the burden of proof requirements set by the Footnote. HSE states that as the Regulation is already in force, a straightforward and practical approach needs to be agreed and applied now. As it is not possible to identify and apply indicative maximum levels for processed foods at this point, a more general set of guiding principles is required in the short term to address the requirements of the Footnote.

HSE Advice

HSE has advised that companies affected by this Regulation should issue a statement confirming that, with respect to the practical interpretation of the Regulation in the UK, goods identified as processed foods may legitimately exceed statutory MRLs set for unprocessed foods (with no enforcement or restriction on sale/supply arising), with the following provisos:

- That the derogation from the MRL set will only apply where businesses provide proof that there have been legitimate additional chlorate residue inputs at the processing stage, such as through the use of potable water or other sources in processed food production, or through legitimate disinfection practices to maintain hygiene.

- That each food business generates a full description of its production practices to serve as proof that these are legitimate additional inputs leading to the MRL being exceeded.

- Where exceedance results solely from a concentration of the residue through actions such as drying, and not because of additional chlorate inputs at the processing stage (skimmed milk powder and cheese are given as examples), information on the process and calculated processing factors should be generated.

- It is also expected that the above arrangements will run alongside continuing industry efforts to minimise uses and residues arising from those uses, provided standards of food hygiene remain high.

- Any steps taken to comply with the MRLs Regulation should not undermine appropriate food hygiene controls.

FBIG suggests that FBOs should prepare a statement as outlined by HSE where there is any likelihood of an MRL exceedance so that they can provide this statement to the relevant authorities should it be requested in the event of an exceedance arising.

Pointers for FBO statement on production practices

1. Identify how product has been produced and where potable water is introduced (see Appendices for examples)
2. Identify stage(s) where chlorate traces may arise from the use of hygiene biocides to assure produce safety and hygiene

   You could consider presenting 1. and 2. in a flow diagram if you feel this is appropriate.
3. Monitoring

   If you do carry out monitoring of residues levels at any stage of production, you may wish to refer to this in your statement.
4. Refer to any industry guidance which you follow.

   Examples:

   FBIG (2016), Biocides in Cleaning & Disinfection.

   GFSI (2019). Chemicals in Food Hygiene. Volume 1: The optimal usage of cleaning agents, sanitisers and disinfectants to minimise the risk of traces in foods.
5. Refer to any appropriate food safety accreditations which you currently hold in relation to production. This is relevant particularly to show that PPP usage is subject to external scrutiny, e.g. Red Tractor, GlobalGAP, retailer commercial requirements/protocols.

Appendices – Chlorate Sources and Flow Charts

Appendix 1 Sources of Chlorate in Food and Drink

Sources of chlorate in food and drink are well understood. Chlorate arises in food and drink primarily from the use of hygiene biocides by water companies to assure the safety of mains water. It is the responsibility of water companies to supply water of appropriate quality to their customers from all their water treatment works (WTWs).

As the Pesticides Residues in Food Expert Committee (PRiF) recognises[1], chlorate is "... *unavoidable and important for the maintaining of microbiological control vital for food safety..."* In particular, mains water is used as a food ingredient, for cleaning and disinfecting food equipment and utensils, pipework associated with the production, transport storage or consumption of food or feed for humans and animals, and for washing hands.

Kettlitz et al (2016[2]) reviewed the origin of chlorate found in foods, collating chlorate data on more than 3,400 samples of mainly prepared foods, including dairy products, meats, fruits, vegetables and different food ingredients/additives. In total, 50.5% of the food samples contained chlorate above 0.01 mg/kg, albeit not due to the use of chlorate as a pesticide but mainly due to the occurrence of chlorate as an unavoidable disinfectant by-product, including in irrigation water, flumes, cooling, washwater, direct incorporation as an ingredient, and from equipment surface decontamination. A further entry point of chlorate into foods may be via additives/ingredients that may contain chlorate as a by-product of the manufacturing process (e.g. electrolysis). Of the positive samples in their study, 22.4% revealed chlorate above 0.1 mg/kg. They confirmed that the presence of chlorate traces in both potable water and on food commodities which are rinsed, sprayed, washed or cooled with potable water is therefore a consequence of water disinfection via oxyhalides.

[1] PRiF **Q3 2019 report**. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879216/prif-monitoring-2019-quarter3.pdf

[2] Beate Kettlitz, Gabriella Kemendi, Nigel Thorgrimsson, Nele Cattoor, Ludovica Verzegnassi, Yves Le Bail-Collet, Farai Maphosa, Aurélie Perrichet, Birgit Christall & Richard H. Stadler (2016): **Why chlorate occurs in potable water and processed foods: a critical assessment and challenges faced by the food industry, Food Additives & Contaminants: Part A**, DOI: 10.1080/19440049.2016.1184521

Appendix 2 **Cured Meat**

Chlorates are not used as phytopharmaceuticals/PPPs. FBOs' Food Safety Management Systems assure chlorate is not used as a PPP.

Curing is the addition of curing salts to meat.

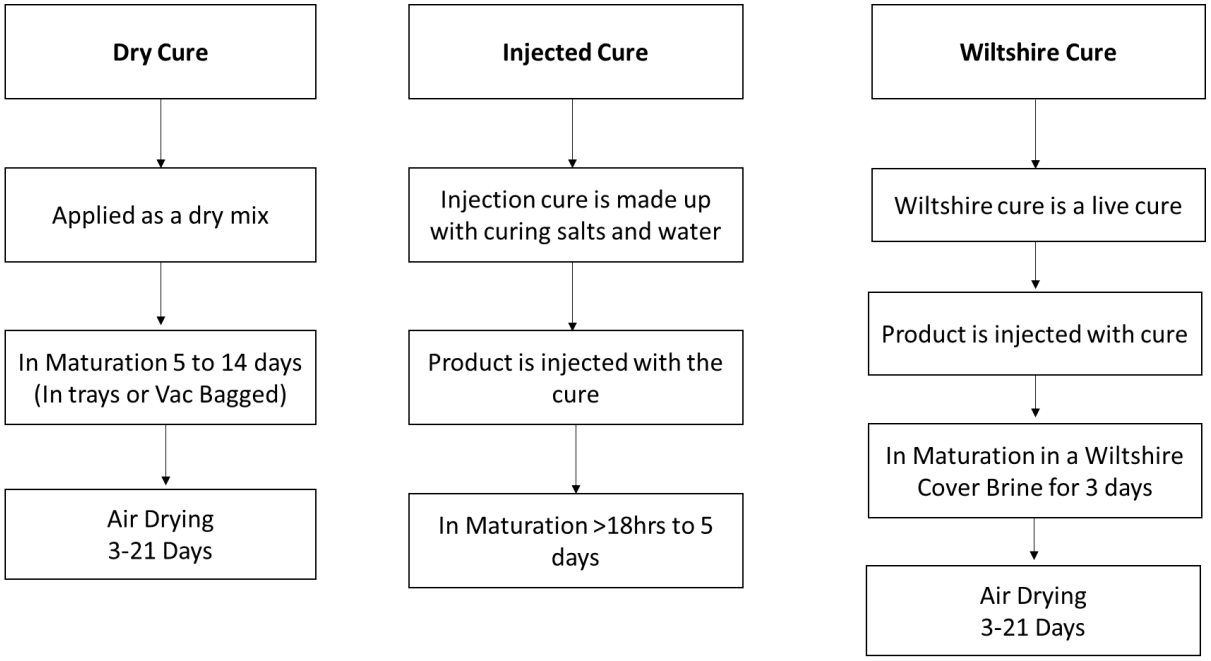
Curing salts are as a minimum sodium chloride plus sodium or potassium nitrite (usually sodium nitrite), optionally with materials added primarily for flavouring.

Curing salts can be added as a solution (brine) made up with potable water (wet cure), or applied as a dried mix (dry cure).

Sources of chlorate traces in components and the final assembled product are:

- Water – as an ingredient in components, disinfectant and sanitiser solvent
- Food contact surface disinfectants and sanitisers
- Animal feed and drink – from water as a component, contact surface disinfectants and sanitisers

There is a wide variety of cured meat products, e.g. bacon, gammon and ham, being produced by different methods, as shown below:



Curing methods include:

Injection of curing salts solution (curing salts in potable water)	

Immersion in curing salts solution (made with potable water), e.g. Wiltshire ham	
Dry-curing (application of curing salts in dehydrated form), e.g. dry-cured ham or bacon	

The type of brine and cure is otherwise determined by the technological and organoleptic requirements of customer specification.

However, certain process methods and cures may only relate to specific types of cured meats.

Uncooked cured meats such as wet-cured bacon typically contain 10% added water. The water-holding capacity of meat varies resulting in variation in the amount of added water retained

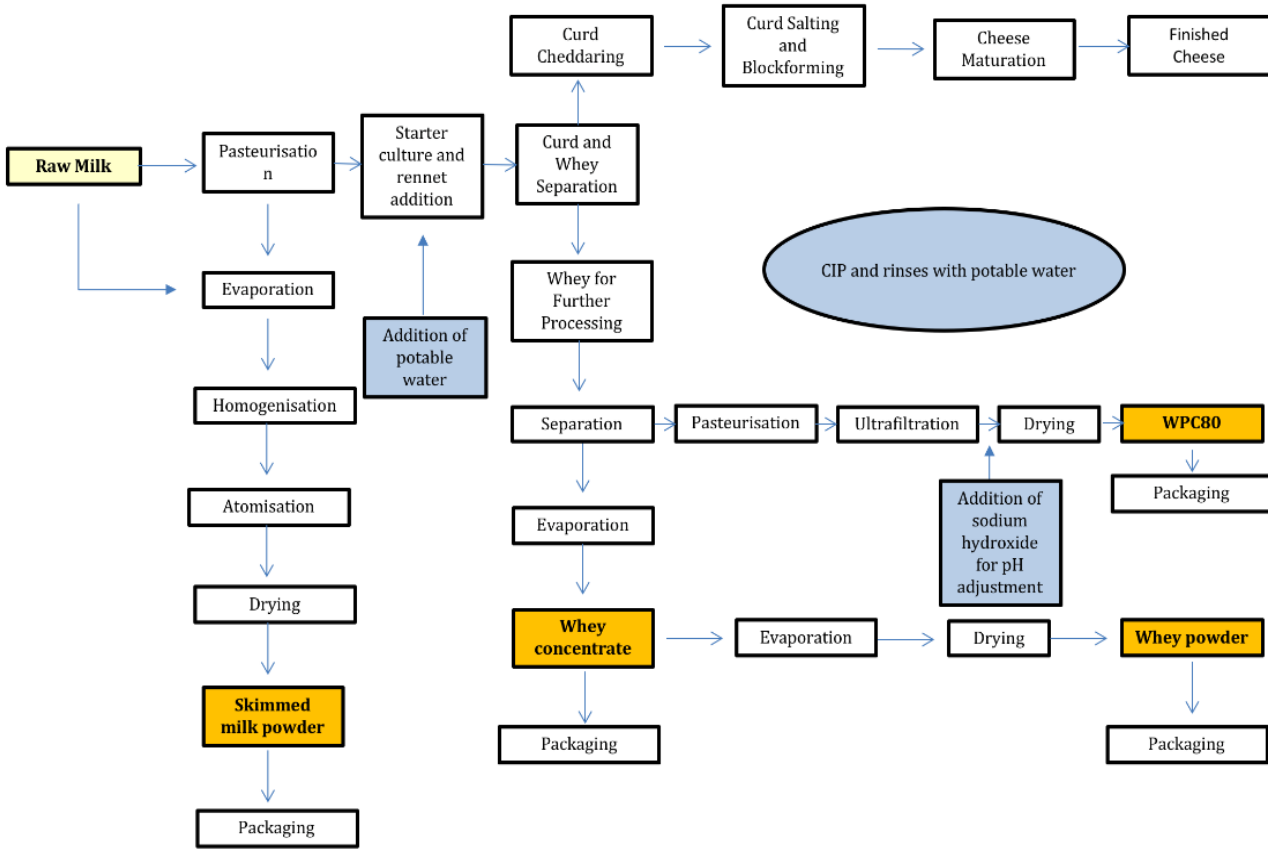
Curing processes are controlled according to documented production procedures, specifications, brine make-up recipes, and monitored using chemical analysis and batch processing records, e.g. salt and temperature for curing brines.

Chlorate levels will vary according to the source of meat, the quality of potable water used to make up brine, and the curing process used.

Appendix 3 **Dried Milk Products**

Chlorates are not used as phytopharmaceuticals/PPPs. FBOs' Food Safety Management Systems assure chlorate is not used as a PPP.
Sources of chlorate traces in components and the final assembled product are:

- Water – water consumed by cattle, an ingredient in components, disinfectant and sanitiser solvent
- Food contact surface disinfectants and sanitisers
- Use of sodium hydroxide for pH adjustment
- Animal feed and drink – from water as a component, contact surface disinfectants and sanitisers



Appendix 4 **Butter Manufacture**

Chlorates are not used as phytopharmaceuticals/PPPs. FBOs' Food Safety Management Systems assure chlorate is not used as a PPP.

Sources of chlorate traces are:

- Animal feed – from water as a component, contact surface disinfectants and sanitisers
- Water as an ingredient in components, disinfectant and sanitiser solvent
- Food contact surface disinfectants and sanitisers