Standard Operating Procedure **SOP006**

Title: PREPARATION OF DISINFECTANTS FOR USE WITHIN CBE LABORATORIES

Location: CBE Laboratories

1. PURPOSE

To describe the procedure for the preparation Virkon, IMS and ChemGene solutions as the primary disinfectants for use within CBE laboratories[1].

2. SCOPE

Applies to personnel using disinfectants within the containment level 2 (CL2) CBE laboratories, including the CBE Laboratory Unit (located in the Holywell Park) . CBE personnel should refer to individual SOPs for specific instructions on the use of disinfectants within CBE laboratories for decontamination of work surfaces, equipment and glass/plasticware, disinfection of biological cultures/liquids or clean-up of biological spillages.

SPECIAL NOTES: HEALTH & SAFETY

[1]*The number of disinfectants in use in the CBE Laboratory Unit is strictly limited to avoid errors and ambiguities in use and accidental mixing of compounds that may give rise to hazardous reactions or the formation of toxic products. Unless there are compelling reasons to do otherwise i.e. identified in the risk assessment, Virkon and IMS should be the sole disinfectants used in the CBE Laboratories unless specific instructions to the contrary are given in a separate SOP.*

For persons wishing to use a disinfectant that is not recommended in this SOP, they must:

- In the first instance, discuss the proposal with the Laboratory Manager . If a requirement is identified for a specific application ie a procedure for a specific piece of equipment eg use of hypochlorite for flow cytometer, the following should be performed:
  - Submit SOP or revision to existing SOP
  - Carry out a COSHH risk assessment (if identified as hazardous), identifying controls and personal safety measures to be employed when handling concentrated and working dilutions
  - Submit COSHH assessment if the disinfectant is identified as hazardous
- If the proposal is for wider usage, advice should be sought from the local BGMSA. A rationale and justification for the change must be submitted for review by the CBE Safety Committee.

General Precautions:

- Cleaning and decontamination of premises, equipment and samples involved in work with Transmissible Spongiform Encephalopathies (TSE), e.g. BSE (bovine spongiform encephalopathy) and CJD (Creutzfeldt Jakob disease), must only be performed in accordance with specific guidance issued by the Health and Safety Commission. Do **not** use Virkon. Currently, only sodium hypochlorite (20,000 ppm available chlorine) is completely effective, though 2M sodium hydroxide produces partial inactivation. Special regulations apply, and persons wishing to work with materials

that might present a risk of TSE infection must discuss the matter with the local BGMSA and University Biological Safety Officer at the planning stage.

- Working solutions of 1% have low toxicity and no irritancy but in powder form it is a moderate irritant for eyes and the respiratory tract.
- Virkon gives off SO_2 when autoclaved and can liberate molecular halogens from halide salts - liquid waste containing Virkon MUST NOT be autoclaved. Do not mix Virkon with strong alkali or salt (NaCl).
- Virkon can be corrosive for lower quality steel surfaces and its use on metal surface should be avoided.

3. RESPONSIBILITES

The Laboratory Manager shall:

- Provide adequate training in the preparation and use of disinfectants and check that the personnel understand what is required of them and are using disinfectants safely and correctly.
- Ensure that instructions for preparing disinfectants are prominently displayed in all CBE laboratories, are clear, unambiguous and intelligible to even the less experienced personnel, designed to ensure that sufficient quantities of disinfectant are always available at concentrations ready for immediate use, specify the circumstances and/or activities for which each is to be used to avoid confusion in laboratories which have more than one disinfectant available.

The Laboratory User shall:

- Adhere to the procedures outlined in this SOP.
- Be familiar with the hazards and risks associated with the use of Virkon , IMS and ChemGene identified in their respective COSHH risk assessments.
- Assess the performance/adequacy of the disinfectant when changes in working practices, new biological agents or new materials are proposed.
- Where little or no relevant efficacy data is available, (e.g. when working with high titres or with significant quantities of organic material), determine the effectiveness of disinfectants for use with specific biological agents and GMOs to identify the optimal combination of disinfectant concentration and contact time.

4. EQUIPMENT AND MATERIALS

(i) 50g sachets of Virkon disinfectant
(ii) 5g Virkon tablets (see SOP006).
(iii) ChemGene (1:20 & 1:50 solutions)
(iv) IMS
(v) Distilled Water
(vi) 5L Funnel
(vii) Designated storage and dispensing container

5. PROCEDURE

5.1. Preparation of 1% (w/v) Virkon solution

(i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin. .

(ii) Using a funnel pour 5 liters of cold tap water into the polyethylene storage and dispensing vessel

(iii) Carefully add 1 sachet (50g) of Virkon powder, minimizing splashing and powder dispersion

(iv) Stir until dissolved (solution is pink and clear)

(v) Attach label

1% Virkon				
Date				
Preparation Date				
Expiry Date				
Intials				

(vi)

NOTE: Virkon solutions become ineffective after 7 days, evident by a loss of pink colour. Do not use Virkon solution after the expiration date on the label

(iv) Replace in-use Virkon solutions at least weekly or if they have lost their colour (according to the manufacturers recommendation).

5.2 Preparation of 1:20 Chemgene stock solution

A stock solution of 1:20 Chemgene solution in a 5L container will be maintained in Room H34. This will be topped up by the Laboratory User on Duty using the following procedure:

i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin.
ii) Fill up a 1L measuring cylinder with 950ml of deionised water from the water purifier.
iii) Fetch a bottle of the concentrated Chemgene 5L solution and top up the measuring cylinder with 50mL of concentrated Chemgene.
iv) Pour into the 5L stock solution container using funnel. The pouring will allow the Chemgene and deionised water to mix.
v) Repeat to top up the stock solution container.
vi) To ensure that the stock solution does not last longer than a month, the Lab Manager will empty the entire stock solution every three months and start from scratch. An electronic reminder will be set in the Lab Managers calendar.

5.3 Preparation of 1:50 Chemgene stock solution

A stock solution of 1:50 Chemgene solution in a 10L container will be maintained in Room H34. This will be topped up by the Laboratory User on Duty using the following procedure:

i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin.
ii) Fill up a 1L measuring cylinder with 980ml of deionised water from the water purifier.
iii) Fetch a bottle of the concentrated Chemgene 5L solution and top up the measuring cylinder with 20mL of concentrated Chemgene.
iv) Pour into the 10L stock solution container using funnel. The pouring will allow the Chemgene and deionised water to mix.
v) Repeat to top up the stock solution container.
vi) To ensure that the stock solution does not last longer than a month, the Lab Manager will empty the entire stock solution every three months and start from scratch. An electronic reminder will be set in the Lab Managers calendar.

Please refer to SOP160 for more detail regarding the preparation and use of ChemGene

5.4. Preparation of 70% (v/v) IMS solution

(i) Wear personal protective equipment, including eye protection, and chemically resistant gloves to prevent contact with eyes and skin.

(ii) In a well-ventilated area, away from any ignition sources, use a funnel to pour 2.5L IMS (99%) into the storage and dispensing bottle

(iii) Add 1.07L of double distilled water (DDW) to dilute to 70%

(iv) Attach label.

Identity: E.g. 70% Industrial Methylated Spirit Preparation date: E.g. 01.08.06 Expiry date: E.g. 08.08.06 Prepared by: E.g. YL Storage conditions: E.g. Ambient temperature

6. DOCUMENTATION

There are no records as outputs of this SOP:

Annex.1. Example of instructional poster for preparation of 1% Virkon Solution

Annex 1: Example of instructional poster for preparation of 1% Virkon Solution

Protocol:

Using a funnel pour 5 litres of cold tap water into the polyethylene storage and dispensing vessel

Carefully add 1 sachet (50g) of Virkon powder

Stir until dissolved (solution is pink and clear)

Attach label

Identity:	**E.g. 1% Virkon Solution**
Preparation date:	**E.g. 01.08.06**
Expiry date:	**E.g. 08.08.06**
Prepared by:	**E.g. YL**
Storage conditions:	**E.g. Ambient temperature**

Location:

E.g. Analytical Laboratory

PRECAUTIONS:

Virkon contains Potassium peroxomonosulphate, Sulphamic acid and Sodium alkyl benzene sulphonate. It may cause serious eye damage. The powder is irritating to skin and to mucous membranes through inhalation or ingestion

Use protective equipment including eye protection, and chemically resistant gloves when preparing stock solutions of Virkon. Avoid contact with eyes, skin, and mucous membranes.

Virkon solutions become ineffective after 7 days, evident by a loss of pink colour. Do not use Virkon solution after the expiration date on the label

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SOP Version History

Version Reviewed	Date Revised/ Reviewed	Revision Summary	New Version Number
1.0	25.03.10 E.Ratcliffe	Annual Review – Minor editorial revisions. New version issue not required	Not issued
1.0	24.10.12 P.Hourd & C. Kavanagh	Annual Review – revised to narrow the scope	2.0
2.0	**1st November 2015 C.Kavanagh**	Annual Review.	**Not issued**
2.0	19th January 2016 C.Kavanagh	i)Removal of references to 70% IMS due to it being withdrawn as a disinfectant in the laboratories. ii)Addition of references to 1:20 & 1:50 Chemgene solutions where appropriate due to implementation .(Replacing 70% IMS).	3.0
3.0	2nd March 2016 C. Kavanagh	i)Addition of section for making up 70% IMS following the re-introduction of IMS into the laboratories for a 'rinsing stage' following cleaning with ChemGene (to minimize residue left behind).	4.0
4.0	**2nd June 2025 by C.Kavanagh**	**Minor amendments only**	**4.0**