

TWO CASE REPORTS OF DELAYED SKIN BURNS FROM METHYLISOTHIAZOLINES USED IN WATER TREATMENT

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ABSTRACT

Kathon® CG and Kathon WT are biocides containing 5-Chloro-2-Methyl-4-Isothiazoline-3-One (MCI) and 2-Methyl-4-Isothiazoline-3-One (MI) in a 3:1 ratio. These compounds are used as preservatives in skin care products and there have been many reports of allergic contact dermatitis due to Kathon used in this context. They are also widely used in industry as preservatives in metal working fluids, latex emulsions and for water treatment.

Two cases of severe irritant contact dermatitis through accidental exposure to high concentrations of Kathon in industrial settings are reported to highlight the importance of worker education and the use of personal protective equipment when handling this corrosive chemical.

Keywords: *Kathon, methylisothiazolines, irritant contact dermatitis*

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INTRODUCTION

Kathon® CG and Kathon WT are combination isothiazoline biocides containing 5-chloro-2-methyl-4-isothiazoline-3-one (MCI) and 2-methyl-4-isothiazoline-3-one (MI) in a ratio of 3:1. This biocide was first marketed in 1980⁽¹⁾.

Kathon is a colourless and odourless mixture which exhibits microbicidal activity against a wide spectrum of yeasts, fungi, gram positive and gram negative bacteria. Because of its effectiveness, it is widely used as a preservative in skin care products (usually in a concentration of 3 to 15 ppm). The literature abounds with reports of allergic contact dermatitis to Kathon used in this context⁽²⁾.

In industry, Kathon is also used in swimming pool and cooling tower water treatment chemicals, metal working fluids and latex emulsions. It is not common knowledge, however, that Kathon is also a potent skin irritant, with irritation occurring after exposure to as little as 200 ppm. We report here two cases of severe irritant contact dermatitis due to accidental contact with this biocide in Singapore.

CASE 1

Mr L is a service technician in a local chemical company manufacturing cooling tower water treatment chemicals. In mid-1995, whilst blending a batch of these chemicals, he accidentally splashed concentrated Kathon WT (about 14% MCI/MI) onto his right trouser leg but was unaware of this at the time.

About fifteen minutes later, Mr L experienced some itchiness over his right thigh and proceeded to wash the area. He, however, did not change his uniform as he thought the injury was minor.

About five hours later, Mr L started experiencing severe pain in the region and by the time he sought medical treatment the

following day, he had a 5 cm mid-dermal burn over the anterior aspect of his right thigh. He was treated conservatively and recovered fully about eight weeks later.

The company has since provided their workers with aprons besides impermeable gloves and face shields to be worn during the blending of water treatment chemicals. In addition, all workers handling this chemical have been briefed on its possible hazards and precautions to be taken during normal handling and in the event of spillage.

CASE 2

In the early part of 1993, Mr S, a facilities technician in an electronics plant, carried consecutively, 2 containers of chemicals used for cooling tower water treatment on his right shoulder. He did not notice any leakage or irritation at the time. About 2 hours later, he started to experience a burning sensation over the area of contact. On examination by a colleague, erythema and mild blistering were present; these were, however, ascribed to an insect bite and the technician subsequently returned home at the end of his shift.

Nine hours later, the pain became intolerable despite self medication with pain killers and he proceeded to the Accident and Emergency Department of a nearby hospital where he was admitted.

On admission, his general condition was stable. A large 10 cm diameter (3%) mid-dermal burn was seen over the right shoulder and scapular region. Routine haematological investigations were all normal. He was seen by a burns specialist who ordered Tulle-Gras dressing to be applied daily. He was discharged after 5 days of hospitalisation and recovered fully about two months later.

During a visit to the factory, 4 chemical containers were seen on the rooftop adjacent to the cooling tower. Subsequent examination of which showed that the one containing Kathon CG (1.15%) as the active ingredient was leaking from a defective screw-on cap. In addition, this container was not labelled as containing corrosive or otherwise hazardous chemicals. This is despite the fact that the Material Safety Data Sheet (MSDS) obtained from the local suppliers had listed this chemical as being a skin irritant, with the possibility of causing delayed skin burns and sensitisation.

DISCUSSION

The biocides MCI/MI have been predominantly reported to cause

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allergic contact dermatitis⁽³⁻⁷⁾. In one study of patients attending dermatology clinics in six countries⁽⁸⁾, it was reported that the frequency of contact sensitivity to Kathon CG ranged from 0.6% to 3.3% in females and from 0.0% to 1.4% in males.

However, reports of irritant contact dermatitis due to Kathon are less common. In 1987, Clark⁽⁹⁾ reported 2 cases of irritant contact dermatitis due to accidental exposure to isothiazolines in a concentration of 2.7%. In the first case, severe erythema over the exposed area subsided after 48 hours (perhaps because the chemical was immediately washed off), and in the second, a man developed painful desquamation over the right gluteal region after sitting on a drum containing the biocide. In the latter case, the lesion subsided after eight days. The authors conclude that isothiazolines are potent skin irritants and recommend full use of protective clothing during handling.

In Singapore, hazard labelling and the use of personal protective equipment during the handling of hazardous substances is provided for in the Factories Act⁽¹⁰⁾. In addition, since 1 April 1995, it is also a legal requirement that factory occupiers obtain Material Safety Data Sheets (MSDS) of all hazardous chemicals used in the workplace. The recommendations contained therein regarding control measures, leak and spillage procedures, precautions to be taken and personal protective equipment, should also be adopted. Finally, the MSDS must be made available to all workers handling these substances.

CONCLUSION

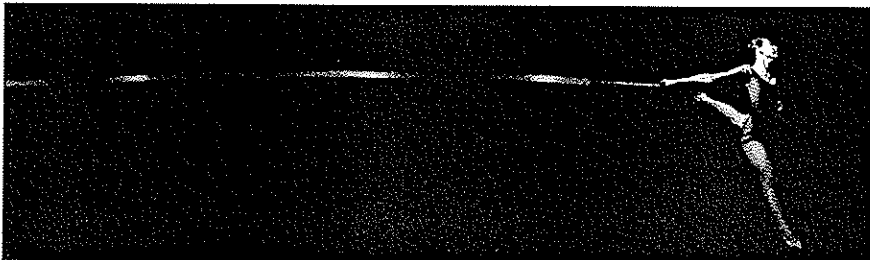
These cases are the first documented of severe irritant contact dermatitis due to Kathon in Singapore. They serve to highlight the corrosive nature of this chemical, especially in the concentrations used in industry, and underscore the importance

of hazard labelling of containers of the biocide, training and education of personnel handling these substances and the use of personal protective equipment.

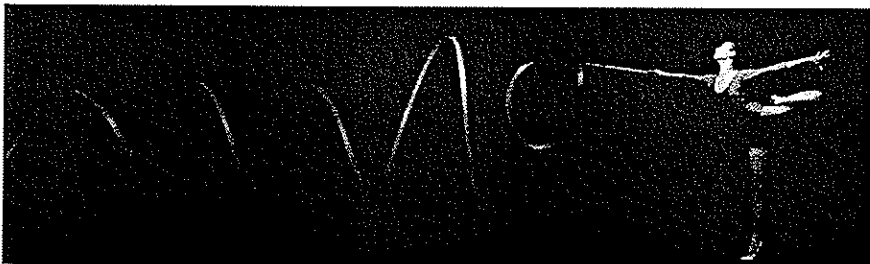
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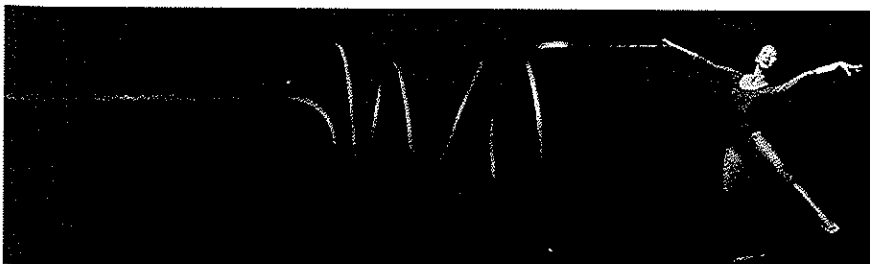
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