

Focus on IFA's work

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Microbial infestation of plumbed emergency eye washes in laboratories

Problem

Since 1993, the equipping of laboratories with stationary eyewash stations has been mandatory in Germany. At workplaces presenting a risk of contact with toxic and corrosive substances, a facility is thus to be provided for the eye to be washed immediately and sufficiently long with drinking water in the event of contamination or burns. However, if these eye washes are insufficiently serviced, the water used in an emergency may become unhygienic. The eye already damaged by corrosion may thus also be exposed to the additional risk of microbial infection. So that recommendations can be given on the plumbing, maintenance and hygienic operation of such systems in laboratories, the degree of microbial infestation has been examined on different types of eye wash system.

Activities

In a first series of experiments, two types of emergency eye wash (one-hand systems with flexible hoses and rigid installations) have been microbiologically investigated in four laboratories at the IFA. Water samples were taken both immediately after turning on the eye washes and after three minutes' running. To serve as a reference for assessment of the results, the same procedure was adopted for the sampling of water from normal water taps in the same laboratories and its examination. To permit assessment of the effect of maintenance in the form of regular running of the eye washes, further samples were taken two and four weeks after the first ones.



Emergency eye wash

In a follow-on project conducted jointly by the Regional Centre for Occupational Health and Safety of North Rhine-Westphalia (LAfA NRW) and the (then) institution for statutory accident insurance and prevention for the chemical industry, a further 30 eyewash stations were examined.

Results and Application

The total bacteria colony counts ascertained in the various eye washes were comparatively low (max. 3,000 cfu/ml; cfu = colony-forming units). In the first sampling session, higher colony counts were always obtained from the eye washes and normal water taps than after allowing them to run for three minutes.

Acanthamoeba and bacteria of the species *Pseudomonas aeruginosa* were not detectable in any of the samples.

More frequent use of the eye washes at relatively short intervals did not yield a reduction in the concentration of organisms in the wash water.

The second study focussed upon the age and design of the eyewash stations (hoseless, for both eyes, or one-hand eyewash station with hose). The results showed that the eyewash stations became colonized by biofilms, irrespective of their age; that systems without a flexible hose were less affected by such contamination; and that allowing the water to run for a few minutes considerably improved the water quality.

The following recommendations are therefore made:

A function test of the eyewash station should be performed at monthly intervals (DIN 12899 Part 2). Hoses should be replaced at annual intervals and should be kept as short as possible (1.5 to 2 m). They must be suitable for drinking water. Branch pipes must not be used to supply the eyewash stations, and the pipes must not be heated. Cleanliness must be observed during installation work. An annual check should be performed for *Pseudomonas aeruginosa*, and the eyewash station should if possible be used daily, i.e. operated for one minute at the start of work.

Area of Application

Laboratories, occupational safety experts, supervisory staff, company doctors

Additional Information

- Sicheres Arbeiten in Laboratorien (BGI/GUV-I 850-0, 2008). Jedermann, Heidelberg 2008

Expert Assistance

IFA, Division 2: Chemical and biological hazards

BG Expert Committee Chemical Industry, Laboratory Work Group, Heidelberg

Literature Requests

IFA, Zentralbereich