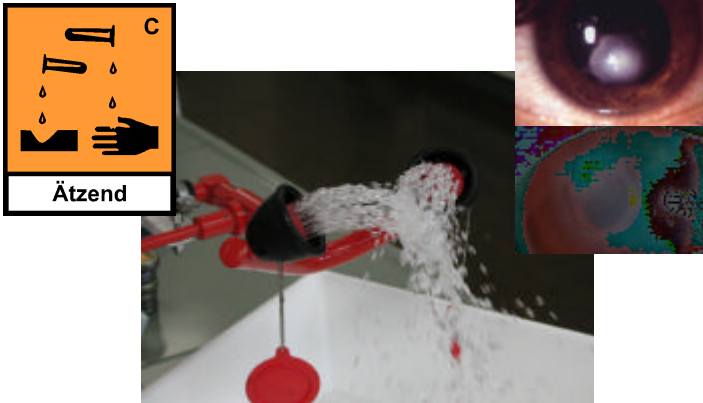


Microbial contamination of stationary eyewash units in laboratories

What's the problem?

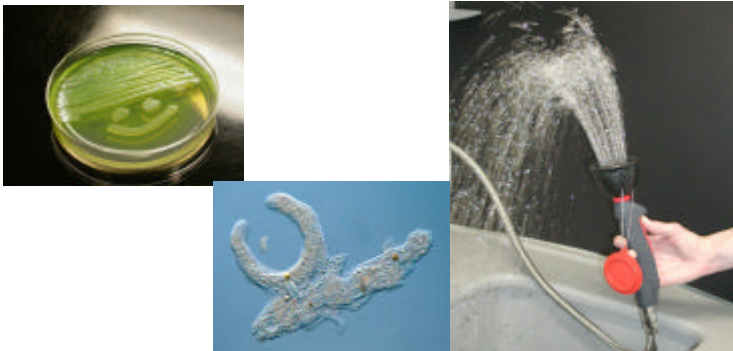
Eye injuries caused by corrosion have to be treated quickly by flushing with huge amounts of clean water. The Institution for Statutory Accident Insurance and Prevention in the Chemical Industry (BG Chemie) therefore recommends the installation of stationary eyewash units in laboratories.



Such installations are often not maintained very carefully so that biofilms may develop, which bear the risk of catching some infectious microbes additionally by using them in case of accident.

What was investigated ?

- Two different types of eyewash unit in four laboratories
- maintenance intervals of 1, 2 and 4 weeks
- normal taps which were used several times daily in the laboratory as a reference
- sample volume: 1.000 ml, taken immediately and after 3 minutes of waterflow
- determination of colony forming units (cfu) of bacteria on trypticase-soy-agar (TSA), at 30°C
- cfu of *Pseudomonas* (especially *P. aeruginosa*) on Cetrimid-Agar at 37 °C
- Acanthamoebae on water-agar infected with *Enterobacter cloacae* (DSMZ 6234), incubated at 37 °C



These investigations were initiated by the working group (WG) Laboratories of the Committee of experts for Chemistry of the BG Chemie, Institution for Accident Insurance and Prevention in the Chemical Industry

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Results

All water samples looked clear and smelled well. The pH of all samples lay between 7.06 and 8.12. Water temperatures were between 14.7 and 34.4 °C. Temperature decreased in all eyewash units within 3 min. for 4.5 up to 8 °C.

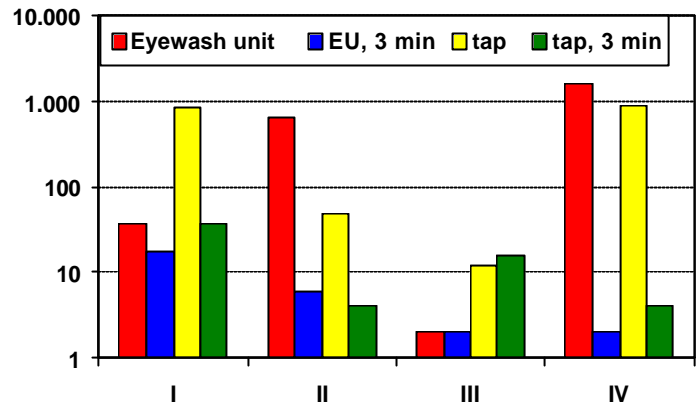


Fig. 1: Initial conditions of [cfu/ml] in four laboratories

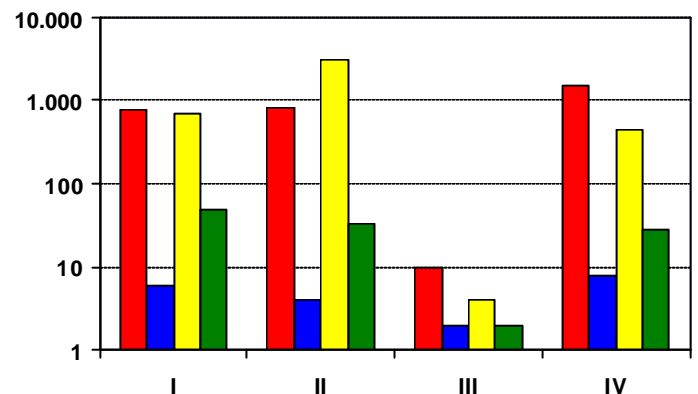


Fig. 2: Four weeks later ... [cfu/ml] in four laboratories

In the initial phase, regularly used water taps in the laboratories I and III showed higher bacterial numbers than the eyewash units. In most samples we found a clear decrease of the bacterial numbers after 3 minutes of waterflow. A brandnew installation (lab. II, 3 months) showed colony counts on the same level as some older ones (labs I, III and IV). In laboratory III, which is situated on the first floor of the building (all others are located on the ground floor), lowest colony counts were registered. Bacterial numbers seem to be higher in one-hand-installations (labs II and IV) than in such for rinsing of two eyes (labs I and III). This might be due to the use of flexible tubes for these installations instead of solid pipes. Bacteria of the species *Pseudomonas* were registered on Cetrimid-agar only in very low concentrations (< 1 to 3 cfu/ml as a maximum). 9 different bacterial species could be identified (using API-systems, Biomérieux, Nürtingen). Pathogenic acanthamoeba were not identified in any sample. Only amoeba of the species *Hartmannella* sp., *Echinamoeba* sp., *Vahlkampfia* sp. and *Vannella* sp. were registered.