

6. SUMMARY

Qualitativ and quantitativ, microbial and virological investigations to determine the hygienic situation of different public toilets in a large German city

The present investigation was performed to determine the hygienic situation of public toilets in a large German city, to address possible risks for the human health and, if necessary, to propose solutions to existing problems.

To this effect various surfaces of municipal public conveniences and privately operated self-cleaning toilets were examined by means of swabs to determine the level of microbial and virological germs.

Shigella spp. was detected in low concentrations on five surfaces of a public toilet, indicating a low hygienic risk which must, however, not be neglected. Furthermore, enterobacteriaceae were found in 27% of the samples taken and faecal streptococci were identified in 19%. In particular, the toilet seat, the floor surface in front of it, the urinal and the door handles were found to be sensitive and hygienically relevant surfaces. Moreover, a large number of samples taken after the cleaning showed higher concentrations of germs, particularly hydrophilic germs such as *Pseudomonas spp.* and *Aeromonas spp.*, than samples taken before the cleaning. This suggests the non-observance of cleaning routines, presumably in particular with regards to the use of the cleaning equipment.

The comparison between gentlemen's toilets and ladies' toilets tends to show no significant differences.

In general terms, the results of this investigation indicate that the surfaces of certain installations and implements of public toilets only show a low degree of contamination.

The examination of self-cleaning public conveniences which was limited to the bacterial contamination, revealed an even lower level of germs in this type of toilet. No obligate pathogenic germs could be isolated. Enterobacteriaceae were found in 22% of the samples taken, but neither *Escherichia coli* nor *St. aureus* could be confirmed in any case.

In view of the low level of contamination supposedly due to the user-friendly operation and the less frequent use, such toilet systems can be considered to be a commendable alternative to municipal public conveniences.

During this field study Enterovirus could not be found in any of the toilets examined.

Using ECBO virus, the virological laboratory tests were carried out on plastic and stainless steel surfaces.

On the one hand, the objective of the tests was, depending on the virus concentration applied, to identify on which surface lower virus concentrations can be determined by means of the methodology described, and, on the other hand, to establish from which surface more virus can be regained at identical drying times.

The virus concentration applied was identical for both surfaces whilst the swabs regained less virus from the steel surface after identical drying times.

These findings lead to conclude that the virus either survives on the steel surface for a shorter period of time or that the swabs can resolve it from the surface less easily. Both explanations would support the use of stainless steel in public conveniences, this already being the case in most of the facilities subject to this investigation.