

Viral contaminations in laboratories and manufacturing facilities

Dr Marcin Los outlines how to tackle the reoccurring problems of viral contaminations.

The problem of viral contaminations has gained a lot of attention in recent times. One high profile example was the viral outbreak which took place in Genzyme manufacturing plant in Allston Landing, MA, USA.

Although this case was a kind of worst possible scenario, viral contaminations occur relatively often in scientific laboratories as well as in production facilities. They can endanger all types of bacterial cultures and eukariotic cell cultures.

The consequences range from relatively mild workflow disturbances to total paralysis of the productivity within the facility.

One of the most common causes of the problems with recovering from viral contaminations is the use of disinfectants which do not show viricidal action - or which the virucidal effect is not strong enough - or the disinfectant is not used properly.

However, there are several causes and combination of these gives negative result of contamination eradication attempts.

Among the other causes are: wrong choice of equipment; facility

architecture; wrong work procedures; and badly designed workflow habits.

In some cases, the reason lies outside of the facility. The problems can be caused, for example, by the contamination of raw materials or the facilities position near rich sources of viruses.

The most important concern in the majority of facilities is that there are no procedures prepared which can be used in case of viral contamination, or that existing procedures are inadequate.

Proper procedures are necessary, otherwise personnel have to learn by themselves how to fight with the contamination, while problems with productivity persists. This process can be very long and not always leads to the solution of the problem. It also distracts personnel from their routine work, and thus the process of recovery from contamination is often accompanied with decreased productivity even in the areas not affected directly by virus contamination.

However, it can be shortened considerably, and thus costs of outbreak can be reduced, when help of external experts is used.

The main reason is the accumulated experience - experts who specialise in solving contamination problems have experience obtained in many different facilities on different types of contamination. It should be emphasised that their knowledge will be much broader and deeper when compared to internal experts.

The most frequently observed pattern is a seasonal occurrence of the viral outbreaks with maxima in wet seasons, such as spring and autumn in temperate latitudes or the monsoon season closely to equator. This usually means, that there are some problems in the design of the process or procedures, facility itself or instrumentation, and the seasonal appearance is connected with improved transfer and increased load of viruses in the environment. Thus it should be considered a warning sign, which show, that situation can easily go out of control.

Maybe it is good idea to be prepared when next autumn comes.

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Fig. 1. (Below Left) E. coli killed by bacteriophages.

Fig 2. (Below Right) Phage T4.

