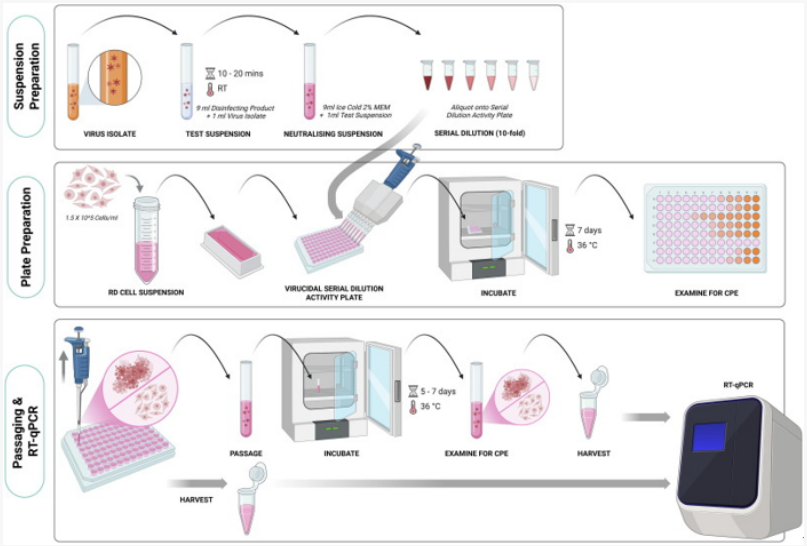
Efficacy of commercial disinfectants Virkon®S and Microchem Plus against poliovirus

FAYETTEVILLE, GA, UNITED STATES, September 21, 2026 / EINPresswire.com/ -- The WHO Global Action Plan for Poliovirus Containment, 4th edition (GAPIV) describes the necessary conditions for the containment of poliovirus material in poliovirus-essential facilities (PEFs). The method used for validation of chemical products for poliovirus decontamination in this study was based on processes outlined in European Standard EN14476, as recommended by the WHO GAPIV guidelines. The disinfectants 5 % Microchem Plus and 1 % Virkon®S were evaluated for efficacy against high titre poliovirus in solutions with and without high organic load using an endpoint dilution assay. A poliovirus Sabin 1 strain was used as the reference virus with the titre 8.33 log10 CCID50 (50 % cell culture infectious dose) in 0.1 ml. Microchem Plus only partially inactivated poliovirus and cannot be relied upon as the sole decontaminant. In contrast, Virkon®S performed well for both high titre poliovirus in solutions with and without high organic load, achieving >4 log10 titre reduction for both, making Virkon®S a suitable disinfectant for poliovirus.



Summary diagram and description of the virucidal activity test process.

The WHO 4th Global Action Plan for Poliovirus Containment (GAPIV) mandates poliovirus-essential facilities (PEFs) to validate on-site decontamination protocols for non-enveloped poliovirus, a pathogen resistant to many routine disinfectants. A study published in the Journal of Biosafety and Biosecurity assessed two commercial biosecurity disinfectants—5% quaternary ammonium compound (QAC) Microchem Plus (20 min contact) and 1% oxidizing Virkon®S (10 min contact)—per European standard EN14476, using Sabin 1 poliovirus stock at an initial titre of 8.33 log□□ CCID□□ per 0.1 mL.

Tests included pure high-titre virus (HTV) and virus-spiked faecal suspension simulating high organic load (HOL); infectivity was measured via RD cell cytopathic effect (CPE) and confirmed by

enterovirus RT-qPCR.

Microchem Plus only partially inactivated poliovirus. After 20 min treatment, residual virus titre reached 5.5 log□□ CCID□□, equalling merely a 2.8 log□□ reduction—far below the ≥4 log□□ threshold required for PEF disinfection. Secondary cell passaging and RT-qPCR both detected viable viral RNA, proving persistent infectivity. Consistent with prior research on another QAC disinfectant Cavicide, QACs show weak activity against non-enveloped enteroviruses like poliovirus, so Microchem Plus cannot serve as a standalone decontaminant for PEFs.

In contrast, 1% Virkon®S achieved full viral suppression meeting official efficacy criteria. For HTV samples, viral titre dropped to ≤1.5 log□□ CCID□□ (≥6.8 log reduction); under heavy organic interference (HOL), it still delivered a ≥5.8 log titre cutback. No CPE or amplifiable viral RNA was recovered after two rounds of cell culture, indicating near-complete viral inactivation at the assay's detection limit.

Notably, as a peroxygen-based broad-spectrum disinfectant, Virkon®S retains potency amid organic matter, is less corrosive and toxic than bleach, formaldehyde or glutaraldehyde, and works against analogous enteroviruses such as EV-A71.

Nonetheless, limitations exist for Virkon®S: its working solution expires within five days after preparation, and long-term exposure may mildly corrode metal. It suits bench surfaces, small labware and spill cleanup but is unsuitable for immersion tanks and chemical showers. For facilities relying on such equipment, combined disinfection workflows are recommended.

In conclusion, Microchem Plus fails to fully neutralize poliovirus and is unfit for exclusive PEF decontamination, whereas Virkon®S meets international standards for poliovirus inactivation with or without organic contamination, offering a reliable disinfection option for poliovirus containment laboratories to shape biosafety protocols.

References

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