

Appendix D: Review of Published Data - Table 11 : Miscellaneous Skin Care Actives
Enveloped Viruses

Virus/ Strain	Statement of Identity	Active Ingredient/ Concentration	Active Conc. Tested	Viral Diluent	Test Type/ Carrier	Test Method/Description	Contact Time	Virucidal Results	Ref.
HBV	Skin disinfectant	45% Isopropanol, 30% n-Propanol, 0.2% ethyl- hexadecyl dimethyl ammonium ethyl sulfate	99%	Undiluted	Suspension	Time Kill Method. Viral pellet was resuspended in test material. Following contact time, the mixture was neutralized by dilution in 5mL Tris and recovered over a cushion of 20% sucrose in Tris. Activity of DNA polymerase assayed.	5 minutes	89.2%	Howard <i>et al.</i> , 1983
							60 minutes	93.8%	
HBV	Skin disinfectant	45% Isopropanol, 30% n-Propanol, 0.2% ethyl- hexadecyl dimethyl ammonium ethyl sulfate	50%	Undiluted	Suspension	Time Kill Method. Viral pellet was resuspended in test material. Following contact time, the mixture was neutralized by dilution in 5mL Tris and recovered over a cushion of 20% sucrose in Tris. Activity of DNA polymerase assayed.	5 minutes	79.7%	
							60 minutes	89.9%	
HBV	Skin disinfectant	45% Isopropanol, 30% n-Propanol, 0.2% ethyl- hexadecyl dimethyl ammonium ethyl sulfate	99%	Undiluted	Suspension	Time Kill Method. Viral pellet was resuspended in test material. Following contact time, the mixture was neutralized by dilution in 5mL Tris and recovered over a cushion of 20% sucrose in Tris. Activity of HBcAg assayed.	5 minutes	78.1%	
							60 minutes	77.3%	
HBV	Skin disinfectant	45% Isopropanol, 30% n-Propanol, 0.2% ethyl- hexadecyl dimethyl ammonium ethyl sulfate	50%	Undiluted	Suspension	Time Kill Method. Viral pellet was resuspended in test material. Following contact time, the mixture was neutralized by dilution in 5mL Tris and recovered over a cushion of 20% sucrose in Tris. Activity of HBcAg assayed.	5 minutes	24.3%	
							60 minutes	13.9%	

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HBV	Skin disinfectant	45% Isopropanol, 30% n-Propanol, 0.2% ethyl- hexadecyl dimethyl ammonium ethyl sulfate	99.2%	0.8% human albumin solution (2%)	Suspension	Time Kill Method. Viral suspension exposed to test material. Following contact time, the mixture was neutralized by dilution in 5mL Tris and recovered over a cushion of 20% sucrose in Tris. Infectivity assayed by inoculation of chimpanzees with recovered virus.	5 minutes	No HBV markers detected up to 6 months (Control animal positive after 5 days)	Howard <i>et al.</i> , 1983
Herpes Simplex-I (ATCC VR733)	Germicidal hand rinse	0.5% Chlorhexidine gluconate, 78% alcohol	Not available	Not available	Suspension	Not available	15 seconds	>99.994%	Jampani <i>et al.</i> , 1998
							30 seconds	>99.998%	
Herpes Simplex-II (ATCC VR734)	Germicidal hand rinse	0.5% Chlorhexidine gluconate, 78% alcohol	Not available	Not available	Suspension	Not available	15 seconds	>99.97%	Jampani <i>et al.</i> , 1998
							30 seconds	>99.97%	
HIV-1 (Vanderbilt University)	Germicidal hand rinse	0.5% Chlorhexidine gluconate, 78% alcohol	Not available	Not available	Suspension	Not available	15 seconds	>99.9%	Jampani <i>et al.</i> , 1998
							30 seconds	>99.9%	

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HIV (HTLV-III)	Antiseptic solution	0.5% chlorhexidine gluconate, 70% isopropanol	0.1% Chlor- hexidine, 14% Iso- propanol	None	Suspension	Time Kill Method. 1mL viral inoculum was added to 1mL test material and mixed. Following contact time, 5µL of the mixture was neutralized by dilution in 10mL growth medium (RPMI-1640 with 12% FBS and antibiotic) containing C3 cells. After 9 days tested for IFA.	15 seconds	0% immuno- fluorescence activity	Montefiori <i>et al.</i> , 1990
			0.02% Chlor- hexidine, 2.8% Iso- propanol				15 seconds	100% immuno- fluorescence activity	
			0.01% Chlor- hexidine, 1.4% Iso- propanol				15 seconds	100% immuno- fluorescence activity	
			0.005% Chlor- hexidine, 0.7% Iso- propanol				15 seconds	100% immuno- fluorescence activity	
			0.002% Chlor- hexidine, 0.28% Iso- propanol				15 seconds	100% immuno- fluorescence activity	

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HIV (HTLV-III)	Antiseptic solution (Hibisol)	0.5% chlorhexidine gluconate, 70% isopropanol	0.1% Chlor- hexidine, 14% Iso- propanol	None	Suspension	Time Kill Method. 1mL viral inoculum was added to 1mL test material and mixed Following contact time, 5µL of the mixture was neutralized by dilution in 10mL growth medium (RPMI-1640 with 12% FBS and antibiotic) containing C3 cells. After 9 days tested for IFA.	15 seconds	0% immuno- fluorescence activity	Montefiori <i>et al.</i> , 1990
			0.005% Chlor- hexidine, 0.7% Iso- propanol				15 seconds	100% immuno- fluorescence activity	
HIV	Not available	Alcohol/ acetone	1:1	Fixed infected cells	Suspension	Not available	20 minutes	All detectable virus inactivated	Sattar and Springthorpe, 1991
HIV	Not available	Cold acetone	100%	infected cells	Carrier	Not available	20 minutes	Incomplete virus inactivation	
							57 minutes	All detectable virus inactivated	
							600 minutes	All detectable virus inactivated	
HIV	Not available	Acetone + methanol	50% + 50%	infected cells	Carrier	Not available	20 minutes	All detectable virus inactivated	
HIV	Not available	Acetone + methanol followed by ethanol, methanol	50% + 50%	infected cells	Carrier	Not available	10 minutes	All detectable virus inactivated	
			70%				10 minutes		
			70%				10 minutes		
HIV	Not available	Acetone + Paraformalde- hyde	99.9% + 0.1%	infected cells	Carrier	Not available	20 minutes	All detectable virus inactivated	
HIV	Not available	Ether	100%	TCF	Suspension	Not available	60 minutes	>5 log ₁₀ IVIU remaining	

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HIV	Not available	Chloroform	Water saturated	Lyophil- ized Factor VIII	Suspension	Not available	15-240 minutes	All detectable virus inactivated	Sattar and Springthorpe, 1991
HIV	Not available	Hydrogen peroxide	0.3%	TCF	Suspension	Not available	2-10 minutes	>4.8log ₁₀ reduction	
HIV	Not available	Nonidet p-40	1%	TCF	Suspension	Not available	2-10 minutes	>3.78 log ₁₀ reduction	
HIV	Not available	Nonidet p-40	0.5%	50% human plasma	Suspension	Not available	1 minute	>8.0 log ₁₀ reduction	
							5 minutes	>8.0 log ₁₀ reduction	
							10 minutes	>8.0 log ₁₀ reduction	
							15 minutes	>8.0 log ₁₀ reduction	
HIV	Not available	Tween-20	2.5%	TCF	Suspension	Not available	2-10 minutes	No virus inactivated	
HIV	Not available	Triton X-100	0.5%	TCF	Suspension	Not available	60 minutes	All detectable virus inactivated	
HIV	Not available	Tri(n-butyl) phosphate + sodium cholate	0.3%	Factor VIII concentrate	Not available	Not available	150 minutes	>4.5 log ₁₀ reduction	
							20-300 minutes	>2.5 log ₁₀ reduction	
HIV	Not available	Tri(n-butyl) phosphate + sodium cholate	0.2%	Factor VIII concentrate	Not available	Not available	150 minutes	>4.5 log ₁₀ reduction	
							20-300 minutes	<2.5 log ₁₀ reduction	
HIV	Not available	Nonoxynol-9	0.0005- 0.005%	TCF	Not available	Not available	Not available	<1.0 log ₁₀ reduction	
			0.025%					4.43 log ₁₀ reduction	
			0.05-5.0%					>4.43 log ₁₀ reduction	
HIV	Not available	Nonoxynol-9	<1%	Infected lympho- cytes	Not available	Not available	Not available	Reverse transcriptase not reduced	
			>1%					Reverse transcriptase reduced	

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HIV	Not available	Nonoxynol-9	0.01%	TCF	Not available	Not available	10 minutes	Cytopathic effect positive	Sattar and Springthorpe, 1991
			0.05%				10 minutes	All detectable	
HIV	5 Commercial spermicides	Nonoxynol-9	0.01-0.05%	TCF	Not available	Not available	10 minutes	Cytopathic effect positive	
			0.1-0.5%				10 minutes	Cytopathic effect positive for some products	
			1.0%				10 minutes	All detectable	
HIV	Not available	Nonoxynol-9	0.01%	TCF	Not available	Not available	15 minutes	24%	
HIV	Not available	Nonoxynol-9	0.05-5.0%	TCF	Not available	Not available	Not available	All detectable	
HIV	Contraceptive sponge	Not available	0.000168-0.00168%	TCF	Not available	Not available	Not available	0	
			0.0168%					50%	
			0.168-1.68%					All detectable	
HTLV-III/LAV	Not available	Hydrogen peroxide	0.3%	Media	Suspension	Time Kill Method. Virus suspension was mixed with test material. After contact time, virus serially diluted in media, inoculated onto PHA blasts and assayed for ID ₅₀ .	2-10 minutes	≥ 5.80 log ₁₀ reduction ID ₅₀	Martin <i>et al.</i> , 1985
HTLV-III/LAV	Not available	Hydrogen peroxide	3%	Media	Suspension	Time Kill Method. Virus suspension was mixed with test material. After contact time, virus serially diluted in media, inoculated onto PHA blasts and assayed for ID ₅₀ .	2-10 minutes	39 log ₁₀ reduction ID ₅₀ based on linear regression	
HPIV-3	General purpose antiseptic & handwash	Chlorhexidine gluconate & Cetrimide	0.008% Chlorhexidine gluconate, 0.08% Cetrimide	feces or bovine mucin	Stainless steel	Carrier Method. 10μL viral suspension inoculated on carrier and dried 1hour. 20μL test material placed on carrier. After contact time mixture neutralized by dropping carrier in 1mL TPB. Virus assayed in MA-104 cells.	1 minute	≥ 3 log ₁₀ reduction	Sattar <i>et al.</i> , 1989

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HPIV-3	Preoperative preparation	Chlorhexidine gluconate, Cetrimide & Ethanol	0.05% Chlor- hexidine gluconate, 0.50% Cetrimide 70% Ethanol	feces or bovine mucin	Stainless steel	Carrier Method. 10µL viral suspension inoculated on carrier and dried 1hour. 20µL test material placed on carrier. After contact time mixture neutralized by dropping carrier in 1mL TPB. Virus assayed in MA-104 cells.	1 minute	≥ 3 log ₁₀ reduction	Sattar <i>et al.</i> , 1989
Human coronavirus (229E)	General purpose antiseptic & handwash	Chlorhexidine gluconate & Cetrimide	0.008% Chlorhex- idine, gluconate 0.08% Cetrimide	feces or bovine mucin	Stainless steel	Carrier Method. 10µL viral suspension inoculated on carrier and dried 1hour. 20µL test material placed on carrier. After contact time mixture neutralized by dropping carrier in 1mL TPB. Virus assayed in L-132 cells.	1 minute	<3 log ₁₀ reduction	Sattar <i>et al.</i> , 1989
Human coronavirus (229E)	Preoperative preparation	Chlorhexidine gluconate, Cetrimide & Ethanol	0.05% Chlorhex- idine gluconate, 0.50% Cetrimide, 70% Ethanol	feces or bovine mucin	Stainless steel	Carrier Method. 10µL viral suspension inoculated on carrier and dried 1hour. 20µL test material placed on carrier. After contact time mixture neutralized by dropping carrier in 1mL TPB. Virus assayed in L-132 cells.	1 minute	≥ 3 log ₁₀ reduction	Sattar <i>et al.</i> , 1989
Influenza (Type A)	Germicidal hand rinse	0.5% Chlorhexidine gluconate, 78% alcohol	Not available	Not available	Suspension	Not available	15 seconds	>99.999%	Jampani <i>et al.</i> , 1998
							30 seconds	>99.999%	
Lipid encapsulated viruses (HSV-I, HIV-1)	Hand sanitizer	Benzalkonium chloride	Not available	Not available	Not available	Not available	15 seconds	"killed"	Woodward Laboratories, Inc., 1999
Lipid encapsulated viruses (HSV-I, HIV-1)	Health care personnel handwash	Benzalkonium chloride	Not available	Not available	Not available	Not available	30 seconds	"killed"	

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Lipid encapsulated viruses (HSV-I, HIV-1)	Hand sanitizer	Benzalkonium chloride	Not available	Not available	Not available	Not available	15 seconds	"killed"	Hospital Specialty Company, 1999
Lipid encapsulated viruses (HSV-I, HIV-1)	Health care personnel handwash	Benzalkonium chloride	Not available	Not available	Not available	Not available	30 seconds	"killed"	
Respiratory Syncytial (Long Strain)	Antibacterial soap	Bac-Down (Decon Labs)	0.045%	None	Suspension	Time Kill Method. Viral inoculum (100 pfu) was added to 10-fold serial dilutions of test material. Following contact time, the mixture was plated on HEp-2 cells.	5 minutes	90% plaque reduction	Contreras <i>et al.</i> , 1999
Respiratory Syncytial (Long Strain)	Antibacterial soap	Not available	0.390%	None	Suspension	Time Kill Method. Viral inoculum (100 pfu) was added to 10-fold serial dilutions of test material. Following contact time, the mixture was plated on HEp-2 cells.	5 minutes	90% plaque reduction	Contreras <i>et al.</i> , 1999
Respiratory Syncytial (Long Strain)	Antibacterial soap	Soft N Sure (Steris)	0.280%	None	Suspension	Time Kill Method. Viral inoculum (100 pfu) was added to 10-fold serial dilutions of test material. Following contact time, the mixture was plated on HEp-2 cells.	5 minutes	90% plaque reduction	Contreras <i>et al.</i> , 1999
Respiratory Syncytial (Long Strain)	Antibacterial soap	Not available	0.039%	None	Suspension	Time Kill Method. Viral inoculum (100 pfu) was added to 10-fold serial dilutions of test material. Following contact time, the mixture was plated on HEp-2 cells.	5 minutes	90% plaque reduction	Contreras <i>et al.</i> , 1999
Respiratory Syncytial (Long Strain)	Antibacterial soap	Not available	0.360%	None	Suspension	Time Kill Method. Viral inoculum (100 pfu) was added to 10-fold serial dilutions of test material. Following contact time, the mixture was plated on HEp-2 cells.	5 minutes	90% plaque reduction	Contreras <i>et al.</i> , 1999

µL microliter
 ATCC American Type Culture Collection
 FBS Fetal bovine serum
 HBcAg Hepatitis B core antigen
 HBV Hepatitis B virus
 HIV Human immunodeficiency virus
 HPIV Human parainfluenza virus
 HSV Herpes simplex virus

HTLV Human T-cell lymphotropic virus
 ID₅₀ Infectious dose 50%
 IFA Immunofluorescence assay
 IVIU *In vitro* infectious units
 mL milliliter
 TCF Tissue culture fluid
 TPB Tryptose phosphate buffer