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B. Braun Medical AG
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Bremen, 8. Dezember 2016

Gutachten

Wirksamkeit von Braunol gegenüber dem Modifizierten Vacciniavirus Ankara (MVA) im quantitativen Suspensionsversuch gemäß EN 14476:2013+A1:2015

Dieses Gutachten basiert auf dem Prüfbericht L16/0757bMV.2 vom 08.12.2016.

Das Schleimhautantiseptikum Braunol der B. Braun Medical AG wurde gemäß Auftrag auf seine virusinaktivierenden Eigenschaften gegenüber dem Modifizierten Vacciniavirus Ankara (MVA) gemäß EN 14476 unter hoher Belastung untersucht.

In der EN 14476 wird dann von einer Virus-Wirksamkeit eines Desinfektionsmittels ausgegangen, wenn nach einer bestimmten Einwirkzeit eine Reduktion des initialen Virustiters um ≥ 4 $\log_{10}$ Stufen (Inaktivierung $\geq 99{,}99$ %) erfolgt ist.

Das Schleimhautantiseptikum Braunol wurde unverdünnt bei 20 °C untersucht. Die Einwirkzeiten betrugen 30, 60 und 120 Sekunden. Nach 30 Sekunden war eine ausreichende Reduktion des Virustiters nachweisbar. Deshalb ergibt sich eine Wirksamkeit gegenüber dem MVA wie folgt:

unverdünnt 30 Sekunden hohe Belastung

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B. Braun Medical AG
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Bremen, 08/12/2016

Expert opinion

Activity of Braunol against modified vaccinia virus Ankara (MVA) in a quantitative suspension test according to EN 14476:2013+A1:2015

This expert opinion is based on the test report L16/0757bMV.2 dating 08.12.2016.

The virus-inactivating properties of the mucous membrane antiseptic Braunol of B. Braun Medical AG against modified vaccinia virus Ankara (MVA) were investigated by a quantitative suspension test according to EN 14476 under dirty conditions.

According to this norm, a disinfectant or a disinfectant solution at a particular concentration is considered as having virus-inactivating properties if within the recommended exposure period the titre is reduced by ≥ 4 $\log_{10}$ (inactivation ≥ 99.99 %).

Braunol was examined undiluted at 20 °C. 30, 60 and 120 seconds were chosen as exposure times. After 30 seconds exposure time the virus titre was decreased by ≥ 4 $\log_{10}$ steps. Therefore, a virucidal activity against modified vaccinia virus Ankara (MVA) was measured as follows:

undiluted 30 seconds dirty conditions

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Bremen, 08.12.2016

Summary: Virus-inactivating properties of Braunol of B. Braun Medical AG according to EN 14476:2013+A1:2015

This summary is based on the following test report of Dr. Brill + Partner GmbH for the mucous membrane antiseptic Braunol produced by B. Braun Medical AG:

modified vaccinia virus Ankara test report L16/0757bMV.2 dating 08.12.2016

The following concentration and exposure time are necessary for the inactivation of the test virus:

undiluted 30 seconds dirty conditions

in order to achieve a 4 $\log_{10}$ reduction (inactivation ≥ 99.99 %) under clean conditions in a quantitative suspension test according to EN 14476:2013+A1:2015.

After evaluation with modified vaccinia virus Ankara the mucous membrane antiseptic Braunol can be declared as having **"virucidal activity against all enveloped viruses"** according to EN 14476:2013+A1:2015.

The declaration **"virucidal activity against all enveloped viruses"** covers all enveloped humanpathogenic viruses like HBV, HCV, HIV and Ebola virus.

i.V.

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DAkkS Deutsche Akkreditierungsstelle D-PL-13412-01-01 D-PL-13412-01-02
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ZLG-AP-216.11.02

TEST REPORT

08/12/2016

Test report L16/0757bMV.2

Evaluation of the effectiveness of

Braunol

Test virus: modified vaccinia virus Ankara (MVA)

Method: EN 14476:2013+A1:2015 (dirty conditions)

quantitative suspension test for the evaluation of virucidal activity of chemical disinfectants and antiseptics used in human medicine

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1. Identification of test laboratory

Dr. Brill + Partner GmbH Institute for Hygiene and Microbiology, Norderoog 2, DE - 28259 Bremen

2. Identification of sample

Manufacturer	B. Braun Medical AG
Name of product	Braunol
Product diluent recommended by the manufacturer	-
Batch number	16073M11
Application	mucous membrane antiseptic
Production date	-
Expiry date	01/2019
Active compound (s) (100 g)	7.5 % Povidon-Iodine (with 10 % available Iodine)
Appearance, odour	brown liquid product specific
pH-values	undiluted: 5.65 (20 °C)
Storage conditions	room temperature in the dark (area with restricted access)
Date of arrival in the laboratory	14/10/2016

3. Materials

3.1 Culture medium and reagents

- Eagle`s Minimum Essential Medium with Hank`s BSS (MEM, Biozym Scientific GmbH, catalogue no. 880144)
- fetal calf serum (Biochrom AG, article no. S 0115)
- 1.4 % formaldehyde solution (dilution of Roti®-Histofix 4 %, Carl Roth GmbH)
- Aqua bidest. (SG ultrapure water system, type Ultra Clear; serial no. 86996-1)
- PBS (Invitrogen, article no. 18912-014)
- BSA (Sigma-Aldrich-Chemie GmbH, article no. CA-2153
- sheep erythrocytes (Fiebig-Nährstofftechnik).

3.2 Virus and cells

The modified vaccinia virus Ankara (MVA) originated from Dr. Manteufel, Institut für Tierhygiene und Öffentliches Veterinärwesen, DE - 04103 Leipzig. Before inactivation assays, virus had been passaged three times in *BHK 21-cells* (Baby Hamster Kidney).

BHK 21-cells (passage 104) originated from the Friedrich-Löffler-Institut, Bundesforschungsinstitut für Tiergesundheit (formerly Bundesforschungsanstalt für Viruskrankheiten der Tiere, isle of Riems).

The cells were inspected regularly for morphological alterations and for contamination by mycoplasmas. No morphological alterations of cells and no contamination by mycoplasmas could be detected.

3.3 Apparatus, glassware and small items of equipment

- CO_2 incubator, Nunc GmbH & Co. KG, model QWJ 350
- Agitator (Vortex Genie Mixer, type G 560E)
- pH measurement 315i (WTW, article no. 2A10-100)
- Centrifuge (Sigma-Aldrich-Chemie GmbH, type 113)
- Microscope (Olympus, type CK 30)
- Centrifuge 5804 R (Eppendorf AG)
- Water bath (JULABO, Julabo U 3)
- Adjustable and fixed-volume pipettes (Eppendorf AG)
- Polysterol 96-well microtitre plate (Nunc GmbH & Co. KG, Wiesbaden)
- Cell culture flask (Nunc GmbH & Co. KG, Wiesbaden)
- Sealed test tubes (Sarstedt AG & Co., Nümbrecht).

4. Experimental conditions

Test temperature	20 °C ± 1.0 °C
Concentration of test product	undiluted (80.0 %) and as 50.0 %, 10.0 % and 1.0 % (demonstration of non-active range) solutions
Appearance of product dilutions	no precipitation
Contact times	30, 60 and 120 seconds and 30 minutes
Interfering substance	3.0 g/l bovine serum albumin + 3.0 g/l erythrocytes (dirty conditions, EN 14476)
Procedure to stop action of disinfectant	immediate dilution
Diluent	water
Stability of product in the mix with virus and interfering substance (80.0 % solution)	minor clouding, no precipitation
Virus strain	modified vaccinia virus Ankara (MVA) (ATCC VR-1508)
Date of testing	14/10/2016 – 08/12/2016
End of testing	08/12/2016

5. Methods

5.1 Preparation of test virus suspension

For preparation of test virus suspension, *BHK 21-cells* were cultivated with MEM and 10 % or 2 % fetal calf serum. *Cells* were infected with a multiplicity of infection of 0.1. After cells showed a cytopathic effect, they were subjected to a freeze/thaw procedure followed by a low speed centrifugation in order to sediment cell debris. After aliquotation, test virus suspension was stored at – 80 °C.

5.2 Preparation of disinfectant (dilutions)

The test product was tested undiluted. Due to the addition of interfering substance and test virus suspension an 80.0 % solution resulted.

Furthermore, the product was evaluated as 50.0 %, 10.0 % and 1.0 % solutions (demonstrating of non-active range). These solutions were prepared with water immediately before the inactivation tests.

5.3 Infectivity assay

Infectivity was determined as endpoint titration according to EN 5.5 transferring 0.1 ml of each dilution into eight wells of a microtitre plate to 0.1 ml of freshly trypsinised *BHK 21-cells* (10-15 x 10^3 cells per well), beginning with the highest dilution. Microtitre plates were incubated at 37 °C in a 5 % CO_2-atmosphere. The cytopathic effect was read by using an inverted microscope after six days. Calculation of the infective dose $TCID_{50}$/ml was calculated with the method of Spearman (2) and Kärber (3) with the following formula:

$$- \log_{10}TCID_{50} = X_0 - 0.5 + \sum r/n$$

meaning

X_0 = $\log_{10}$ of the lowest dilution with 100 % positive reaction

r = number of pos. determinations of lowest dilution step with 100 % positive and all higher positive dilution steps

n = number of determinations for each dilution step.

5.4 Calculation and verification of virucidal activity

The virucidal activity of the test disinfectant was evaluated by calculating the decrease in titre in comparison with the control titration without disinfectant. The difference is given as reduction factor (RF).

According to the EN 14476, a disinfectant or a disinfectant solution at a particular concentration is having virus-inactivating efficacy if the titre is reduced at least by 4 $\log_{10}$ steps within the recommended exposure period. This corresponds to an inactivation of ≥ 99.99 %.

5.5 Inactivation assay (end point titration)

Determination of virucidal activity has been carried out according to EN 5.5. The test product was examined undiluted (80.0 %) and as 50.0 %, 10.0 % and 1.0 % (demonstration of non-active range) solutions in water at 20 °C according to EN 14476. 30, 60 and 120 seconds and 30 minutes were chosen as contact times.

Immediately at the end of a chosen contact time, activity of the disinfectant was stopped by dilution to 10^{-8}.

Titrations of the virus control were performed at the beginning of the test and after the longest exposure time (EN 5.5.7). One part by volume of test virus suspension was mixed with one part interfering substance and eight parts by volume of WSH or Aqua bidest. (RTU products).

Furthermore, a cell control (only addition of medium) was incorporated.

Inactivation tests were carried out in sealed test tubes in a water bath at 20 °C ± 1.0 °C. Aliquots were retained after appropriate exposure times and residual infectivity was determined.

5.6 Inactivation assay following the large volume plating method (LVP)

Following the large volume plating method (4) the inactivation assays were further diluted 1:500 in cell culture medium. The total volume was added (without any further dilution) to the permissive cells. By introducing such a huge dilution it is possible to eliminate cytotoxicity of the test product in order to demonstrate a 4 $\log_{10}$ reduction of virus titre. Calculation of virus titre follows formula of Taylor or Poisson (5, 6). This method is necessary for those products which demonstrate a great cytotoxicity.

125 µl of the inactivation assays were added to 62.5 ml medium (total dilution of 1:500) and then the total volume was distributed in 6 microtitre plates (108 µl / well, 576 wells total). After 6 days of inoculation cultures were observed for cytopathic effects.

The calculation of virus titre without residual virus followed the formula of Poisson:

$$c = \ln p / -V$$

c = number of virus particles

p = the probability to find no virus. The probability to find no virus should not greater than 5 % (p=0.05). By doing so, the number of virus particles can be calculated with a probability of 95 %.

V = test volume (ml)

The titre to be used for calculating the reduction factor (RF) was finally calculated as followed: the determined number of virus particle is first converted with the aid of the dilution factor in the number of particle per ml. Subsequently, the numbers of particles per ml have to be converted in the tissue culture infectious dose per ml ($TCID_{50}$/ml) (1.0 $TCID_{50}$ corresponds to 0.69 infectious virus particles). The common logarithm of this value results in the virus titre ($\log_{10}$ $TCID_{50}$/ml) used for calculating the reduction factor (RF).

In assays with residual virus, formula according to Taylor was used for calculating the virus titre:

$$c/ml = \frac{D}{Vw} \times \left(-\ln \frac{n - n_p}{n}\right)$$

c = number of virus particles

D = dilution

V_W = volume per well

n = number of inoculated wells

n_p = number of virus-positive wells

For calculating the reduction factor using the formula according to Taylor the number of virus particles is converted to the logarithmic titre ($log_{10}TCID_{50}$/ml) as described above.

5.7 Determination of cytotoxicity

Determination of cytotoxicity was performed according to EN 5.5.4.1.

5.8 Cell sensitivity to virus

For the control of cell sensitivity to virus two parts by volume of water were mixed with eight parts by volume of the lowest apparently non-cytotoxic dilution of the product. These mixtures or PBS as control were added to a volume of double concentrated cell suspension. After 1 h at 37 °C the cells were centrifuged and re-suspended in cell culture medium (EN 5.5.4.2b).

Finally, a comparative titration of the test virus suspension was performed on the pre-treated (disinfectant) and non-pre-treated (PBS) cells as described above.

5.9 Control of efficacy for suppression of disinfectant's activity

Furthermore, a control of efficiency for suppression of disinfectant's activity was included (EN 5.5.5).

5.10 Reference virus inactivation test

As reference for test validation a 0.7 % formaldehyde solution according to EN 5.5.6 was included. 5, 15, 30 and 60 minutes were chosen as contact times. In addition, cytotoxicity of formaldehyde test solution was determined following EN 5.5.6.2 with dilutions up to 10^{-5}.

6. Verification of the methodology

The following criteria as mentioned in EN 5.7 were fulfilled:

a) The titre of the test virus suspension allowed the determination of a ≥ 4 log_{10} reduction (maximal virus reduction ≥ 5.27 ± 0.29, LVP)

b) The test product (80.0 %) showed cytotoxicity in the 1:10 dilutions thus allowing the detection of a 4 log_{10} reduction of virus titre.

c) The comparative titration on pre-treated (disinfectant) and non-pre-treated (PBS) *BHK 21-cells* showed no significant difference (< 1 log_{10}; EN 5.7) of virus titre: 6.38 ± 0.41 (PBS, LVP) versus 6.38 ± 0.41 (1:500 dilutions of disinfectant as 80.0 % solution, LVP) and 6.38 ± 0.25 (PBS) versus 6.25 ± 0.44 (1:100 dilutions of disinfectant as 80.0 % solution, LVP) log_{10} $TCID_{50}$/ml, respectively.

d) The control of efficacy for suppression of disinfectant's activity (80.0 % solution) showed a decrease of 3.25 (≤ 3.50 ± 0.00 versus 6.75 ± 0.44 log_{10} $TCID_{50}$/ml) and failed the requirement of the EN (≤ 0.5 log_{10}; EN 5.5.5.1). This was due to the fact that even the 10.0 % solution showed a reduction of virus titre (RF ≥ 4.25 ± 0.31 after 30 minutes). In these experiments at the end of the defined exposure time the test mixture was immediately diluted and the dilutions transferred to the cell culture. Therefore, despite the insufficient control of efficacy for suppression of disinfectant's activity the assay is valid.

e) One concentration demonstrated a 4 log_{10} reduction and (at least) one concentration demonstrated a log_{10} reduction of less than 4.

Since all criteria according EN 5.7 were fulfilled, examination with MVA according to EN 14476 is valid.

7. Results

Results of examination are shown in tables 1 to 12. Tables 1 to 10 demonstrate the raw data, whereas tables 11 (a+b) and 12 give a summary of results.

In the end point dilution method the 80.0 % solution of the test product was active after 30 seconds of exposure time (table 1). No residual virus was found at this time point. The reduction factor was ≥ 4.13 ± 0.18 at this time point. This corresponded to an inactivation of ≥ 99.99 %.

The 50.0 % solution was active after 2 minutes of exposure time (table 2). The reduction factor was ≥ 4.13 ± 0.18 at this time point.

Tested as 10.0 % solution, the product was active after 30 minutes of exposure time (table 3). The reduction factor was ≥ 4.25 ± 0.31 at this time point.

The 1.0 % solution was not active within 30 minutes of exposure time (table 4).

In parallel to the end point dilution method the large volume plating method (LVP) was introduced testing the undiluted test product with 30 seconds of exposure time. The virus titres in the twofold assay were $\log_{10}$ $TCID_{50}$/ml = 6.75 ± 0.44 and 6.88 ± 0.37 (table 9). The mean value was 6.81 ± 0.29.

The undiluted test product was active within 30 seconds of exposure time (table 10). No residual virus was found in 576 cell culture units. The result according to the formula of Poisson was ≤ 1.54 $\log_{10}$ $TCID_{50}$. The reduction factor was therefore ≥ 5.27 ± 0.29 (6.81 ± 0.29 $\log_{10}$ $TCID_{50}$ minus ≤ 1.54 $\log_{10}$ $TCID_{50}$) after 30 seconds of exposure time. This corresponded to an inactivation of ≥ 99.999 %.

8. Conclusion

The mucous membrane antiseptic Braunol tested undiluted demonstrated activity against MVA after an exposure time of 30 seconds under dirty conditions.

Therefore, the mucous membrane antiseptic Braunol can be declared as active against MVA as follows:

dirty conditions undiluted 30 seconds

Bremen, 08/12/2016

- Dr. Britta Becker -
Head of Laboratory

- Dr. Dajana Paulmann -
Scientific Project Manager

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9. Quality control

The Quality Assurance of the results was maintained by performing the determination of the virus-inactivating properties of the disinfectant in accordance with Good Laboratory Practice regulations:

1) Chemicals Act of Germany, Appendix 1, dating of 01.08 1994 (BGBI. I, 1994, page 1703). Appendix revised at 14. 05. 1997 (BGBI. I, 1997, page 1060).
2) OECD Principles of Good Laboratory Practice (revised 1997); OECD Environmental Health and Safety Publications; Series on Principles of Good Laboratory Practice and Compliance Monitoring – Number 1. Environment Directorate, Organization for Economic Co-operation and Development, Paris 1998.

The plausibility of the results was additionally confirmed by controls incorporated in the inactivation assays.

10. Records to be maintained

All testing data, protocol, protocol modifications, the final report, and correspondence between Dr. Brill + Partner GmbH and the sponsor will be stored in the archives at Dr. Brill + Partner GmbH.

11. Literature

1. EN 14476:2013+A1:2015: Chemical disinfectants and antiseptics – Quantitative suspension test for the evaluation of virucidal activity of chemicals disinfectants and antiseptics in human medicine test - Test method and requirements (phase 2, step 1)

2. Spearman, C.: The method of `right or wrong cases` (constant stimuli) without Gauss's formulae. Brit J Psychol; 2 1908, 227-242

3. Kärber, G.: Beitrag zur kollektiven Behandlung pharmakologischer Reihenversuche. Arch Exp Path Pharmak; 162, 1931, 480-487

4. Rabenau HF., Schwebke I., Blümel J., Eggers M., Glebe D., Rapp I., Sauerbrei A., Steinmann E., Steinmann, J., Willkommen H. Wutzler P.: Leitlinie der Deutschen Vereinigung zur Bekämpfung der Viruskrankheiten (DVV) e.V. und des Robert Koch-Instituts (RKI) zur Prüfung von chemischen Desinfektionsmitteln auf Wirksamkeit gegen Viren in der Humanmedizin (Fassung vom 1. Dezember 2014). Bundesgesundheitsbl; 58, 2015, 493–504

5. Bekanntmachung über die Zulassung von Arzneimitteln, Anforderungen an Validierungsstudien zum Nachweis der Virussicherheit von Arzneimitteln aus menschlichem Blut oder Plasma vom 20. Dezember 1993/21. Januar 1994. Bundesanzeiger Nr. 84: 4740-4744 bzw. CPMP/BWP/268/95: Note for Guidance on virus validation studies: the design, contribution and interpretation of studies validating the inactivation and removal of viruses. http://www.ema.europa.eu

6. Taylor JR.: An Introduction to Error Analysis: The study of Uncertainties in Physical Measurements. 2nd ed. University Science Books, 1997, 327 pp

Appendix:

Legend to the Tables

Table 1:	Raw data for Braunol (80.0 %) tested against MVA
Table 2:	Raw data for Braunol (50.0 %) tested against MVA
Table 3:	Raw data for Braunol (10.0 %) tested against MVA
Table 4:	Raw data for Braunol (1.0 %) tested against MVA
Table 5:	Raw data for formaldehyde solution (0.7 %) tested against MVA
Table 6:	Raw data for control of efficacy for suppression of disinfectant's activity (80.0 %)
Table 7:	Raw data (MVA) for cell sensitivity (80.0 %)
Table 8:	Raw data (MVA) for cell sensitivity (80.0 %) (LVP)
Table 9:	Determination of virus titre (LVP)
Table 10:	Inactivation of MVA by Braunol (80.0 %) (30 seconds) (LVP)
Table 11 (a+b):	Summary of results (end point dilution method) with Braunol and MVA
Table 12:	Summary of results (LVP, 1:500) with Braunol and MVA

Legend to the Figures

Figure 1: Virus-inactivating properties of Braunol (80.0 %) (LVP)

Figure 2: Virus-inactivating properties of formaldehyde (0.7 %)

Table 1: Raw data for Braunol (80.0 %) tested against MVA at 20 °C (quantal test; 8 wells) (#4669)

Product	Concentration	Interfering substance	Contact time (min)	Dilutions (log_{10})								
				1	2	3	4	5	6	7	8	9
test product	80.0 %	dirty conditions	0.5	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.
			1	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.
			2	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.
			30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
test product cytotoxicity	80.0 %	dirty conditions	n.a.	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.	n.d.	n.d.
virus control	n.a.	dirty conditions	0	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			60	4444 4444	4444 4444	4444 4444	4444 4444	4412 3334	0000 0003	0000 0000	0000 0000	0000 0000

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 2: Raw data for Braunol (50.0 %) tested against MVA at 20 °C (quantal test; 8 wells) (#4669)

Product	Concentration	Interfering substance	Contact time (min)	Dilutions (log_{10})								
				1	2	3	4	5	6	7	8	9
test product	50.0 %	dirty conditions	0.5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			2	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.
			30	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
test product cytotoxicity	50.0 %	dirty conditions	n.a.	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.	n.d.	n.d.
virus control	n.a.	dirty conditions	0	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			60	4444 4444	4444 4444	4444 4444	4444 4444	4412 3334	0000 0003	0000 0000	0000 0000	0000 0000

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 3: Raw data for Braunol (10.0 %) tested against MVA at 20 °C (quantal test; 8 wells) (#4733)

Product	Concentration	Interfering substance	Contact time (min)	Dilutions (log_{10})								
				1	2	3	4	5	6	7	8	9
test product	10.0 %	dirty conditions	0.5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			30	n.a.	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.
test product cytotoxicity	10.0 %	dirty conditions	n.a.	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.	n.d.	n.d.
virus control	n.a.	dirty conditions	0	4444 4444	4444 4444	4444 4444	4444 4444	3234 3234	0000 0000	0000 0000	0000 0000	0000 0000
			60	4444 4444	4444 4444	4444 4444	4444 4444	4423 0213	4001 0040	0000 0000	0000 0000	0000 0000

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 4: Raw data for Braunol (1.0 %) tested against MVA at 20 °C (quantal test; 8 wells) (#4733)

Product	Concentration	Interfering substance	Contact time (min)	Dilutions (log_{10})								
				1	2	3	4	5	6	7	8	9
test product	1.0 %	dirty conditions	0.5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			30	n.d.	0042 3000	0000 0200	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.
test product cytotoxicity	1.0 %	dirty conditions	n.a.	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.	n.d.	n.d.	n.d.
virus control	n.a.	dirty conditions	0	4444 4444	4444 4444	4444 4444	4444 4444	3234 3224	0000 0000	0000 0000	0000 0000	0000 0000
			60	4444 4444	4444 4444	4444 4444	4444 4444	4423 0213	4001 0040	0000 0000	0000 0000	0000 0000

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 5: Raw data for formaldehyde solution (0.7 %) tested against MVA at 20 °C (quantal test; 8 wells) (#4733)

Product	Concentration	Interfering substance	Contact time (min)	Dilutions (log_{10})								
				1	2	3	4	5	6	7	8	9
formaldehyde	0.7 % (m/V)	PBS	5	tttt tttt	tttt tttt	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.
			15	tttt tttt	tttt tttt	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.
			30	tttt tttt	tttt tttt	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.
			60	tttt tttt	tttt tttt	tttt tttt	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.
formaldehyde cytotoxicity	0.7 % (m/V)	PBS	n.a.	tttt tttt	tttt tttt	tttt tttt	0000 0000	0000 0000	n.d.	n.d.	n.d.	n.d.
virus control	n.a.	PBS	0	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
			60	4444 4444	4444 4444	4444 4444	4444 4444	4444 4212	3020 0004	0000 0000	0000 0000	0000 0000

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 6: Raw data for control of efficacy for suppression of disinfectant's activity (80.0 %) (#4733)

Product	Interfering substance	dilutions (log_{10})								
		1	2	3	4	5	6	7	8	9
test product	dirty conditions	n.d.	n.d.	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	n.d.
corresponding virus control	dirty conditions	4444 4444	4444 4444	4444 4444	4444 4444	4423 0213	4001 0040	0000 0000	0000 0000	0000 0000

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 7: Raw data (MVA) for cell sensitivity (80.0 % solution) (#4733)

Product	Dilution	Dilutions (log_{10})								
		1	2	3	4	5	6	7	8	9
PBS	-	4444 4444	4444 4444	4444 4444	4444 4444	4342 4404	0000 0000	0000 0000	0000 0000	n.d.
test product	1:100	4444 4444	4444 4444	4444 4444	4444 4444	4400 4330	0002 0000	0000 0000	0000 0000	n.d.

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 8: Raw data (MVA) for cell sensitivity (80.0 % solution) (#4733) (LVP)

Product	Dilution	Dilutions (log_{10})								
		1	2	3	4	5	6	7	8	9
PBS	-	4444 4444	4444 4444	4444 4444	4444 4444	3342 0404	4000 0000	0000 0000	0000 0000	n.d.
test product	1:500	4444 4444	4444 4444	4444 4444	4444 4444	4442 0130	0002 0000	0000 0000	0000 0000	n.d.

n.a. = not applicable
n.d. = not done

0 = no virus present; t = cytotoxic
1 to 4 = virus present (degree of CPE in 8 cell culture units) (wells of microtitre plates)

Table 9: Determination of virus titre (LVP) at 20 °C (#4733)

Virus titration	Interfering substance	dilutions (log_{10})								
		1	2	3	4	5	6	7	8	9
1st control	dirty conditions	4444 4444	4444 4444	4444 4444	4444 4444	4423 0213	4001 0040	0000 0000	0000 0000	n.d.
2nd control	dirty conditions	4444 4444	4444 4444	4444 4444	4444 4444	3223 4433	0030 3300	0000 0000	0000 0000	n.d.

n.a. = not applicable
n.d. = not done

t = cytotoxic 0 = no virus detectable
1 to 4 = virus detectable (degree of CPE in 8 wells of a microtitre plate)

Table 10: Inactivation of MVA by Braunol (80.0 %) at 20 °C (30 seconds) (LVP, 1:500) (#4733)

Interfering substance	Row	1	2	3	4	5	6	7	8	9	10	11	12
dirty conditions	plate 1/6	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	plate 2/6	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	plate 3/6	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	plate 4/6	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	plate 5/6	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000
	plate 6/6	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000	0000 0000

t = cytotoxic

0 = no virus detectable
1 to 4 = virus detectable (degree of CPE in 8 wells of a microtitre plate)

Table 11a: Summary of results (end point dilution method) with Braunol and MVA

Product	Con-centration	Interfering substance	Level of cytotoxicity	log_{10} $TCID_{50}$/ml after ....min					> 4 log_{10} reduction after ...min
				0.5	1	2	30	60	
test product	80.0 %	dirty conditions	2.50	≤ 2.50±0.00	≤ 2.50±0.00	≤ 2.50±0.00	n.d.	n.d.	0.5 (RF ≥ 4.13±0.18)
test product	50.0 %	dirty conditions	2.50	n.d.	n.d.	≤ 2.50±0.00	n.d.	n.d.	2 (RF ≥ 4.13±0.18)
test product	10.0 %	dirty conditions	1.50	n.d.	n.d.	n.d.	≤ 2.50±0.00	n.d.	30 (RF ≥ 4.25±0.31)
test product	1.0 %	dirty conditions	1.50	n.d.	n.d.	n.d.	≤ 3.00±0.44	n.d.	> 30

n.a. = not applicable n.d. = not done

Table 11b: Summary of results (end point dilution method) with Braunol and MVA

Product	Con-centration	Interfering substance	Level of cytotoxicity	log_{10} $TCID_{50}$/ml after ....min					> 4 log_{10} reduction after ... min
				0	5	15	30	60	
formaldehyde	0.7 % (w/v)	PBS	4.50	n.d.	≤ 4.50±0.00	≤ 4.50±0.00	≤ 4.50±0.00	≤ 4.50±0.00	≥ 5 (RF ≥ 2.38±0.26)
virus control	n.a.	PBS	n.a.	n.d.	n.d.	n.d.	n.d.	6.88±0.37	n.a.
virus control (1)	n.a.	dirty conditions	n.a.	n.d.	n.d.	n.d.	n.d.	6.63±0.25	n.a.
virus control (2)	n.a.	dirty conditions	n.a.	6.50±0.00	n.d.	n.d.	n.d.	6.75±0.44	n.a.
suppression control	80.0 %	dirty conditions	2.50	n.d.	n.d.	n.d.	≤ 3.50±0.00	n.d.	n.a.
sens. PBS	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	6.38±0.25	n.a.
sens. product	80.0 % →1:100	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	6.25±0.44	n.a.

n.a. = not applicable n.d. = not done sens. = sensitivity

Table 12: Summary of results (LVP, 1:500) with Braunol and MVA

Product	Con-centration	Interfering substance	Level of cytotoxicity	log_{10} $TCID_{50}$/ml after ....min					> 4 log_{10} reduction after ...min
				0.5	1	2	30	60	
test product	80.0 %	dirty conditions	n.a.	≤ 1.54	n.d.	n.d.	n.d.	n.d.	0.5 (RF ≥ 5.27±0.29)
virus control	n.a.	dirty conditions	n.a.	n.d.	n.d.	n.d.	n.d.	6.75±0.44 6.88±0.37 (Ø6.81±0.29)	n.a.
sens. PBS	n.a.	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	6.38±0.41	n.a.
sens. product	80.0 % → 1:500	n.a.	n.a.	n.d.	n.d.	n.d.	n.d.	6.38±0.41	n.a.

n.a. = not applicable n.d. = not done sens. = sensitivity n.c. = not calculable

Figure 1: Virus-inactivating properties of Braunol (80.0 %)

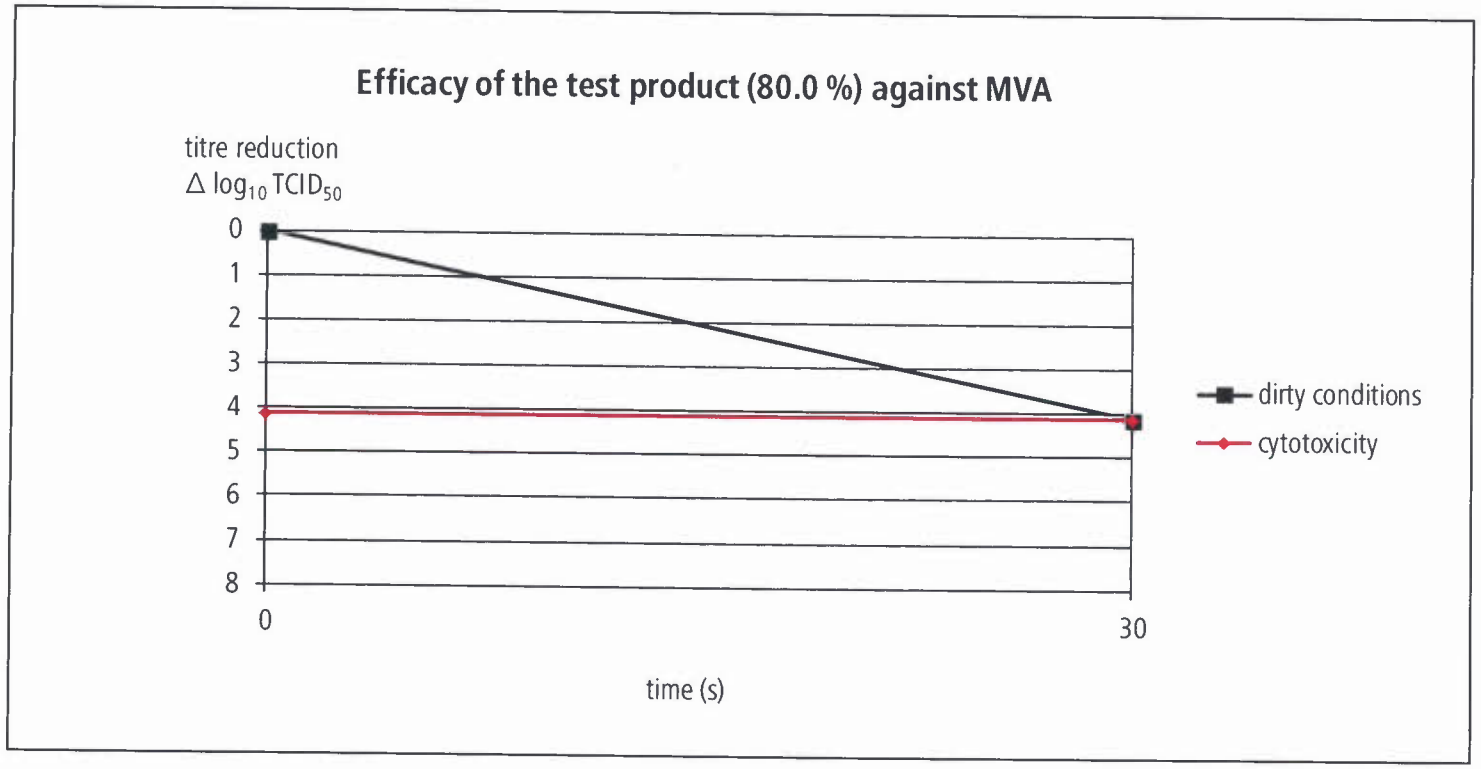

Figure 2: Virus-inactivating properties of formaldehyde (0.7 %)