



NDP Air Total + Green CE

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1- NDP Air Total+ Green CE product description

NDP Air Total+ Green CE is a product for the **disinfection of surfaces by air**. It is a very easy to use product, with a total discharge through its "one-shot" valve, which permits nebulisation of the content in a single application. With a broad spectrum biocide and rapid action against **bacteria, fungi and viruses**, it eliminates also odours caused by bacterial decomposition.

NDP Air Total+ Green CE is elaborated from a synergistic blend (NDP) of active ingredients, with next-generation quaternary ammonium compounds in combination with adjuvant agents and active extracts of essential oils. It does not contain flammable gases in its formulation; therefore it can be used in places where other products cannot be applied.

A double effect is achieved applying **NDP Air Total+ Green CE**: massive air and surfaces decontamination, and *quick and effective* elimination of unpleasant odours. Moreover, its residual effect, due to its low surface tension, makes it easily adhere to the surfaces and thereby maintaining its microbicidal effectiveness for an extended period of time.

2- Technical characteristics

- **Composition**

Ingredients	Concentration
Didecyl dimethyl ammonium chloride 70%	0,46%
2-phenoxyethanol	0.10%
Cinnamaldehyde	0.02%
Aliphatic solvent, non flammable propellant (HFO) and excipients, qsf	100%

- **Physical and chemical properties**

State at room temperature	Liquid (actives) – Gas (propellant)
Pressure	20°C: 5.5 kg/cm ² 50°C: 9.5 kg/cm ²
Flammability	Non-flammable*
pH	7 – 8
Weight (50 ml container)	Product: 10.8 g, Propellant: 43.6 g, Total: 75.2 g
Weight (300 ml container)	Product: 65.2 g, Propellant: 160.8 g, Total: 380 g
Interaction with materials	Does not alter the materials used mostly, which it could come into contact with.

Interaction with the environment	Does not harm the ozone layer, does not contain CFCs.
Product sedimentation does not stain surfaces.	

Aerosol format advantages

- Compact, easy to store and easy to use.
- The dosification is simplified, since a controlled quantity is applied in a established volume.

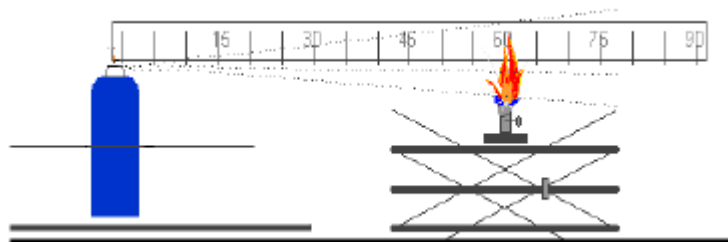
* Flammability

The formulation of the product NDP Air Total + Green CE has the property of being non flammable. The propellant agent use is non flammable (HFO).

Moreover, a study was performed with the product NDP Air Total (previous version), which does not have any variation of flammable substances, with respect to the « + Green CE » formulation.

→ Flammability study according to standard FEA 609-ES: « Determination of the ignition distance of spray of an aerosol », made in the laboratory LGAI – LABORATORIO GENERAL DE ENSAYO E INVESTIGACIONES.

The assay consists on spraying the aerosol in the direction of a flame, at 15cm intervals, in order to observe the ignition and non interrupted combustion.



The study concludes the non ignition in any of the position of the assay as indicated in the standard (90 to 15 cm).

3- Effectiveness

The product NDP Air Total+ Green CE presents the following spectrum of efficacy according to International Standards:

	Time (min)	Reduction
BACTERICIDAL (UNE-EN 1276)		
Gram + (<i>Staphylococcus aureus</i> , <i>Enterococcus hirae</i>) Gram – (<i>Pseudomonas aeruginosa</i> , <i>Escherichia coli</i>)	1 min	>5log ₁₀
<i>Streptococcus equi subs. equi</i>	5 min	>5log ₁₀
BACTERICIDAL (UNE-EN 13697)*		
Gram + (<i>Staphylococcus aureus</i> , <i>Enterococcus hirae</i>) Gram – (<i>Pseudomonas aeruginosa</i> , <i>Escherichia coli</i>)	5 min	>4log ₁₀
BACTERICIDAL (EN 13727)		
<i>Bordetella bronchiseptica</i>	5 min	>5log ₁₀
Gram + (<i>Staphylococcus aureus</i> , <i>Enterococcus hirae</i>) Gram – (<i>Pseudomonas aeruginosa</i>)	30 min	>5log ₁₀
FONGICIDAL (UNE-EN 1650)		
<i>Candida albicans</i> , <i>Aspergillus niger</i>	15 min	>4log ₁₀
FONGICIDAL (UNE-EN 13697)*		
<i>Candida albicans</i> , <i>Aspergillus niger</i>	15 min	>3log ₁₀
YEASTICIDAL (EN 13624)		
<i>Candida albicans</i>	30 min	>4log ₁₀
VIRUCIDAL (EN 14476)		
<i>Influenza A (H1N1)*</i> *Surrogated flu virus for lipophilic viruses (Flu, Coronavirus, Ebola, Hepatitis, HIV...)	15 min	>4log ₁₀
MYCOBACTERICIDAL (EN 14348)		
<i>Mycobacterium avium</i> , <i>Mycobacterium terrae</i>	10 min	>4log ₁₀

* Tests performed with the formulation of the product without alcohol

Others: The active ingredients included in the product NDP Air Total+ Green CE present microbicidal activity supported by the studies performed by the supplier:

Fungi:

Penicillium glaucum, *Trichophyton mentagrophytes*, *Microsporum canis*, *Cladosporium cladosporoides*, *Penicillium verrucosum*, *Aspergillus versicolor*.

Virus: (results indicated are equivalent to the content of the ingredient in the product NDP Air Total+ Green CE)

Vaccinia virus (Poxvirus), Influenza virus (orthomyxovirus), Adenovirus, Rhabdovirus, Herpes virus.	1 min
Newcastle disease virus, Influenza virus PR8, Poxvirus WR119-ATCC, Herpes virus 1-HF-VR260 ATCC, Orthomyxovirus AWSN, Adenovirus type 2, Rhabdovirus VSV*1145/67	5 min
Vaccine virus, Virus IBR/JPV Colorado, Hepatitis virus B, Virus VIH-1 (HSV)	15 min

Bactericidal activity

1. UNE-EN 1276 (*Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterococcus hirae*, *Escherichia coli*)

Study performed according to the standard **UNE-EN 1276:1998** "Quantitative suspension test for the evaluation of bactericidal activity of chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas (phase 2, step 1).

In this study, the bactericidal effectiveness is evaluated against the reference strains *Pseudomonas aeruginosa* ATCC 15442, *Staphylococcus aureus* ATCC 6538, *Escherichia coli* ATCC 10536, and *Enterococcus hirae* ATCC 10541.

The product demonstrates a bactericidal activity when it is diluted at 80%, 50% and 25% in 5 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 5 log₁₀.

The study was repeated, against the same reference microorganisms, with a contact time of **1 minute**. The study demonstrates that the product is also effective in this time.

2. UNE-EN 1276 (*Streptococcus equi subs. equi*)

Study performed according to the standard **UNE-EN 1276:1998** "Quantitative suspension test for the evaluation of bactericidal activity of chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas (phase 2, step 1).

In this study, the bactericidal effectiveness is evaluated against the reference strain *Streptococcus equi subs. Equi* CECT 989.

The product demonstrates a bactericidal activity when it is diluted at 80%, in 5 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 5 log₁₀.

3. UNE-EN 13697 (*Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Enterococcus hirae*, *Escherichia coli*)

A study was performed according to the standard **UNE-EN 13697:2002** "Quantitative suspension test for the evaluation of bactericidal activity of chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas (phase 2, step 2).

In this study, the bactericidal effectiveness is evaluated against the reference strains *Pseudomonas aeruginosa* ATCC 15442, *Staphylococcus aureus* ATCC 6538, *Escherichia coli* ATCC 10536, and *Enterococcus hirae* ATCC 10541.

The product demonstrates a bactericidal activity in **5 minutes** of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀.

Note: this study is written with the commercial name NDP Air & Surfaces plus, that corresponds to the formula in actives of NDP Air Total+ Green CE without alcohol and propellant.

4. EN 13727 (*Bordetella bronchiseptica*)

Study performed according to the standard **EN 13727** "Quantitative suspension test for the evaluation of bactericidal activity of chemicals disinfectants and antiseptics for instruments in the medical area (phase 2, step 1).

In this study, the bactericidal effectiveness is evaluated against the reference strain *Bordetella bronchiseptica* NCIM 9935.

The product demonstrates a bactericidal activity in 5 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 5 log₁₀.

Note: this study is written with the commercial name NDP Air & Surfaces plus, that corresponds to the formula in actives of NDP Air Total+ Green CE without alcohol and propellant.

5. EN 13727 (*Staphylococcus aureus*, *Enterococcus hirae*, *Pseudomonas aeruginosa*)

Study performed according to the standard **EN 13727** "Quantitative suspension test for the evaluation of bactericidal activity of chemicals disinfectants and antiseptics for instruments in the medical area (phase 2, step 1).

The product demonstrates a bactericidal activity in 30 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 5 log₁₀.

Fungicidal activity

6. UNE-EN 1650 (*Aspergillus niger*, *Candida albicans*)

Study performed according to the standard **UNE-EN 1650:2008** "Quantitative suspension test for evaluation of fungicidal activity of Chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Test method and requirements (phase 2, step 1).

In this study the fungicidal activity is evaluated against the reference microorganisms *Aspergillus niger* ATCC 16404 and *Candida albicans* ATCC 10231.

The product demonstrates a fungicidal activity when it is diluted in water at 80% and 50%, in 15 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀. The product is effective against *Candida albicans* at a lower concentration (25%).

7. UNE-EN 13697 (*Aspergillus niger*, *Candida albicans*)

A study was performed according to the standard **UNE-EN 13697:2002** "Quantitative suspension test for evaluation of fungicidal activity of Chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Test method and requirements (phase 2, step 2).

In this study the fungicidal activity is evaluated against the reference microorganisms *Aspergillus niger* ATCC 16404 and *Candida albicans* ATCC 10231.

The product demonstrates a fungicidal activity in **15 minutes** of contact, at 20°C, and in presence of 0.3 g/l of bovine albumin. The reduction of the viability is higher than 3 log₁₀.

8. UNE-EN 13624 (*Candida albicans*)

Study performed according to the standard **UNE-EN 13624:2014** "Quantitative suspension test for evaluation of yeasticidal activity in medical area (phase 2, step 1).

In this study the fungicidal activity is evaluated against the reference microorganism *Candida albicans* ATCC 10231.

The product demonstrates a yeasticidal activity when it is diluted in water at 97%, 50% and 10%, in 30 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀.

Virucidal activity

9. EN 14476 (Influenza A – H1N1)

Study performed according to the standard **EN 14476** "Quantitative suspension test for evaluation of virucidal activity of Chemicals disinfectants and antiseptics used in medical area. Test method and requirements (phase 2, step 1).

In this study the virucidal activity is evaluated against the reference microorganism Influenza A (H1N1) (ATCC VR-1469).

The product demonstrates a virucidal activity when it is diluted in water at 10% in 15 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀.

Mycobactericidal activity

10.EN 14348 (*Mycobacterium avium*, *Mycobacterium terrae*)

Study performed according to the standard **EN 14348** "Quantitative suspension test for the evaluation of mycobactericidal activity of chemical disinfectants in the medical area including instrument disinfectants - Test methods and requirements (phase 2, step 1)."

In this study the mycobactericidal activity is evaluated against the reference microorganisms *mycobacterium avium* and *mycobacterium terrae*

The product demonstrates a mycobactericidal activity in 10 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀.

Fungicidal activity

11.UNE-EN 1650 (*Aspergillus niger*, *Candida albicans*)

Study performed according to the standard **UNE-EN 1650:2008** "Quantitative suspensión test for evaluation of fungicidal activity of Chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Test method and requirements (phase 2, step 1).

In this study the fungicidal activity is evaluated against the reference microorganisms *Aspergillus niger* ATCC 16404 and *Candida albicans* ATCC 10231.

The product demonstrates a fungicidal activity when it is diluted in water at 80% and 50%, in 15 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀. The product is effective against *Candida albicans* at a lower concentration (25%).

12.UNE-EN 13697 (*Aspergillus niger*, *Candida albicans*)

A study was performed according to the standard **UNE-EN 13697:2002** "Quantitative suspension test for evaluation of fungicidal activity of Chemicals disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Test method and requirements (phase 2, step 2).

In this study the fungicidal activity is evaluated against the reference microorganisms *Aspergillus niger* ATCC 16404 and *Candida albicans* ATCC 10231.

The product demonstrates a fungicidal activity in **15 minutes** of contact, at 20°C, and in presence of 0.3 g/l of bovine albumin. The reduction of the viability is higher than 3 log₁₀.

Virucidal activity

13.EN 14476 (Influenza A – H1N1)

Study performed according to the standard **EN 14476** "Quantitative suspensión test for evaluation of virucidal activity of Chemicals disinfectants and antiseptics used in medical area. Test method and requirements (phase 2, step 1).

In this study the fungicidal activity is evaluated against the reference microorganism Influenza A (H1N1) (ATCC VR-1469).

The product demonstrates a virucidal activity when it is diluted in water at 10% in 15 minutes of contact, at 20°C, and in presence of 0.3 g/l of bovine albumine. The reduction of the viability is higher than 4 log₁₀.

Other studies of effectiveness (active ingredients effectiveness):

Active ingredients present microbicidal activity supported by the studies performed by the supplier:

Didecyl dimethyl ammonium chloride

- Fungi and yeasts:
 - *Aspergillus niger*
 - *Candida albicans*
 - *Trichophyton mentagrophytes*
 - *Microsporum canis*
 - *Cladosporium cladosporoides*
 - *Penicillium verrucosum*
 - *Aspergillus versicolor*
- Algae (data referred to the active ingredient at a 50%):
 - Algastatic concentration of 0.5 ppm
 - Alguicidal concentration of 1.0 ppm
- Virus: the effectiveness has been demonstrated in the presence of most enveloped virus, including Hepatitis B and HIV:

	Contact time
Vaccinia virus (Poxvirus), Influenza virus (orthomyxovirus), Adenovirus, Rhabdovirus, Herpes virus.	1 min
Newcastle disease virus, Influenza virus PR8, Poxvirus WR119-ATCC, Herpes virus 1-HF-VR260 ATCC, Orthomyxovirus AWSN, Adenovirus type 2, Rhabdovirus VSV*1145/67	5 min
Vaccine virus, Virus IBR/JPV Colorado, Hepatitis virus B, Virus VIH-1 (HSV)	15 min

Cinnamaldehyde - Cinnamon oil active extract

Two published studies are presented, showing the effectiveness of this ingredient:

- Mechanisms of Bactericidal Action of Cinnamaldehyde against *Listeria monocytogenes* and of Eugenol against *L. monocytogenes* and *Lactobacillus sakei*. Alexander O. Gill and Richard A. Holley. Department of Food Science, Faculty of Agriculture and Food Sciences, University of Manitoba, Winnipeg, Manitoba, Canada. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, OPct. 2004, p. 5750-5755, Vol. 70, nº 10.

- Antibacterial Activities of Naturally Occurring Compounds against *Mycobacterium avium* subsp. *Paratuberculosis*. Stella Y. Y. Wong, Irene R. Grant, Mendel Friedman, Christopher T. Elliott, and Chen Situ. Institute of Agri-Food and Land Use, School of Biological Sciences, queen's University Belfast, Belfast, Northern Ireland, United Kingdom, and Western Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, Albany, California. APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Oct. 2008, p. 5896-5990. Vol. 74, n° 19.

2-Phenoxyethanol

According to the effectiveness of Phenoxyethanol (Technical Ingredient in NDP Air Total+ Green CE): below is found the Minimum Inhibitory Concentrations (MIC) for a wide range of tested microorganisms:

Bacteria positive	Gram	Organism	Strain	% (active ingredient)
		<i>Bacillus subtilis</i>	NCTC 10073	1.00
		<i>Staphylococcus aureus</i>	ATCC 6538	0.75
		<i>Staphylococcus epidermidis</i>	NCIB 9518	0.64
		<i>Streptococcus faecalis</i>	NCTC 8213	0.32
Bacteria negative	Gram	<i>Enterobacter cloacae</i>	(Pre. Ref. 146)	0.32
		<i>Escherichia coli</i>	NCIB 9517	0.32
		<i>Klebsiella aerogenes</i>	NCTC 418	0.50
		<i>Proteus vulgaris</i>	ATCC 14153	0.75
		<i>Pseudomonas aeruginosa</i>	NCTC 6750	1.00
		<i>Burkholderia cepacia</i>	NCIB 9085	1.00
		<i>Pseudomonas fluorescens</i>	NCIB 9046	1.50
		<i>Pseudomonas putida</i>	NCIB 9034	0.32
		<i>Pseudomonas stutzeri</i>	NCIB 9040	0.32
		<i>Salmonella typhimurium</i>	NCTC 74	0.32
		<i>Serratia marcescens</i>	(industrial isolate)	0.32
Yeasts		<i>Saccharomyces cerevisiae</i>	NCUC 87	0.25
		<i>Candida albicans</i>	ATCC 10231	0.32
		<i>Candida tropicalis</i>	(Industrial isolate)	0.32
		<i>Spoilage yeast</i>	Y67	0.32
Fungi		<i>Aspergillus niger</i>	ATCC 16404	0.25
		<i>Chaetomium globosum</i>	IMI 45550	0.16
		<i>Cladosporium</i>	(Industrial isolate)	0.16
		<i>Penicillium funiculosum</i>	IMI 87160	0.06
		<i>Stachybotrys atra</i>	IMI 82021	0.06
		<i>Trichoderma viridae</i>	(Industrial isolate)	0.25

4- **Security**

Acute toxicity:

Oral route: DL_{50} (oral route in rodents) > 2000 mg/kg. It is not harmful by ingestion.

Inhalation route: The concentration during the use of the product has been studied, and has been correlated with its constituents' toxicity, resulting to be not toxic by inhalation way.

Through skin and/or eyes: LD_{50} (dermal way) > 2000 mg/kg

*Skin irritation: It is not irritating. Pure isopropanol is irritating, but the product concentration is not irritating according to RD 255/2003 (European Directive 88/379/CEE). However, the obtained value considering the rest of ingredients and alcohol is very close to the established limit, and it has been decided to classify the product as irritating for the skin.

*Eye irritation: It is not irritating to the eyes. Pure isopropyl alcohol is irritating, and at the product concentration it is irritating according to RD 255/2003 (European Directive 88/379/CEE): the product is irritating for the eyes.

*Skin sensitisation: It does not cause hypersensitisation.

The propellant is nearly not harmful by inhalation: LC_{50} /inhalation/4h/rodent > 500.000 ppm. As other volatile aliphatic halogenated compounds, the product can produce, by vapour accumulation and/or inhalation in great quantities, consciousness loss and heart disorders aggravated by stress and oxygen lack (mortal risk).

Pure isopropyl alcohol is irritating by inhalation and to the eyes. It is slightly toxic in contact with the skin.

Corrosiveness: Non corrosive.

Carcinogenicity: Non carcinogenic

Mutagenicity: Non mutagenic

Toxicity for reproduction: Non toxic for reproduction


→ Security term – persistence of NDP in the environment after application of **NDP Air Total**

Below is shown a summary of the study performed by SGS Tecnos, certified laboratory by ENAC, as Laboratory for Contamination and Toxicology (authorization number 5/LE369 and date of validity entrance: 26/03/99).

The **objective** of the study is the determination of the security term for the disinfectant NDP Air Total.

Methodology description:

- *Sampling*: the pollutant is collected by means of impingers connected to a calibrated suction pump. The air is suck up for 1 hour. The obtained value is the main concentration from the sampling points during the sampling period.
- *Sample analysis*: laboratory samples test was performed by Instituto Químico Sarria, by capillary electrophoresis in line with protocol UV-IQS-CROMA-PNT-A-0050 and IQS-CROMA-PNT-A-0051.
- *Test protocol*: test was performed in a 58 m³ volume room fitted with standard mechanical ventilation. The product is designed to disinfect a 150 m³ volume, the product is overdosed (added security means).
- *Sample points*: before the application, an environmental sampling was carried out to determine the main concentration which, theoretically, should be nil. (1A-1B sampling points). Then 1 hour after the application (2A and 2B), 2 hours after (3A and 3B), 3 hours after (4A and 4B) and 4 hours after (5A and 5B).
- *Admissible Limit Value (VLA)* of the NDP is calculated on the basis of the lethal dose 50 (DL50). With DL50 value of 265 mg/kg (in 2003, the determination of DL50 was repeated and a higher than 2000 mg/kg value was obtained, so that a larger security margin is added to this study) and using a security margin of 400, the VLA for 1 hour was calculated: 2812.5 mg/m³ and the VLA value for 8 hours: 351.5 mg/m³.

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5 PRESENTATION OF THE COMPANY HAVING PERFORMED THE TESTS

OVER A CENTURY EXPERTISE.

Incorporated in 1878, SGS Group is the largest organisation in the world in the supervision and quality field. SGS operates in 140 countries with more than 1.300 offices, 400 laboratories y 40.000 employees. Its turnover level is around Pesetas 330.000 million. The company is world leader in Supervision and Quality, and its wide service range turns it into an institution unique in its kind.

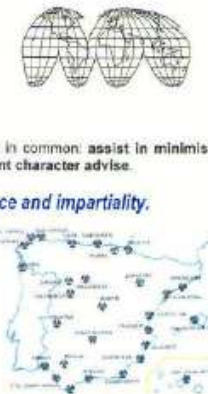

All services provided by SGS, have two important traits in common: assist in minimising risks and provide evaluations, verifications and independent character advice.

Basic principles: quality, independence and impartiality.

Established in Spain since 1929, SGS constitutes itself into the largest entrepreneurial group in the quality field after the incorporation in 1992 of the CIAT Group, composed of the CIAT and TECNOS companies, leaders in the supervision, consulting and quality control fields.

SGS Group has at present in Spain more than 1.800 professionals and is present in all the Country's Autonomous Communities through its 39 offices and 30 laboratories, both stationary and mobile.

SGS holds no interests with manufacturers, trading companies or financial entities that might impair its independence.

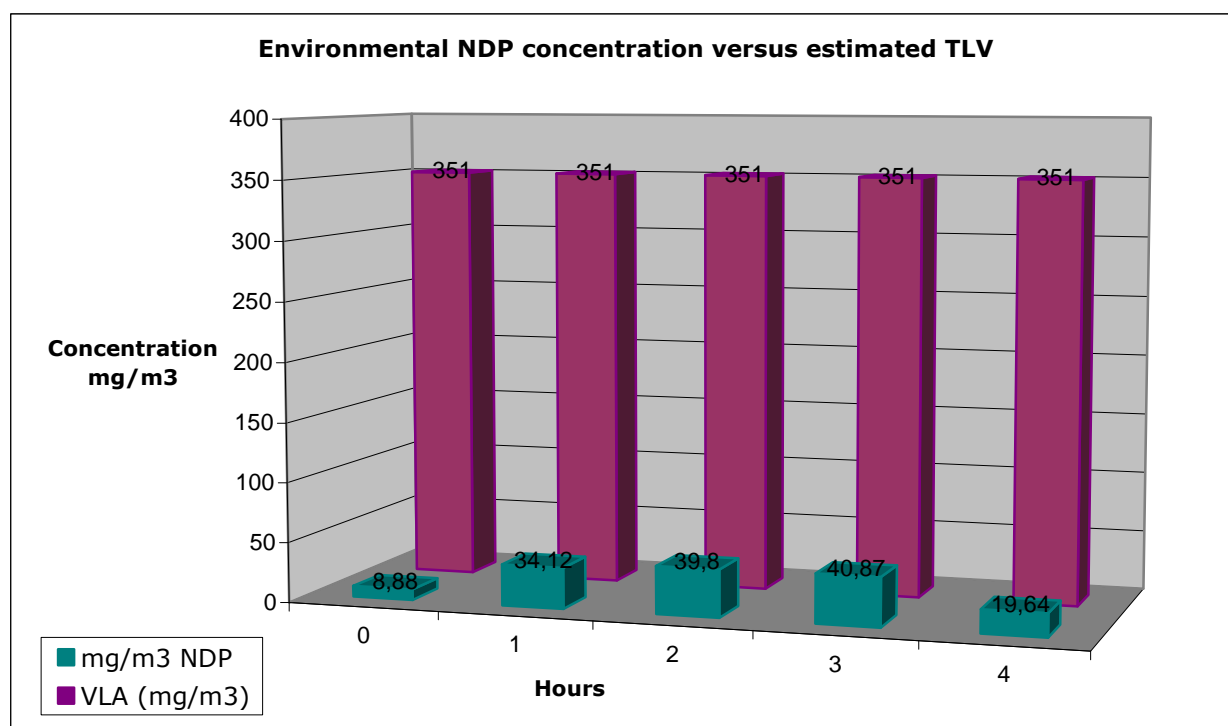


Results

Sample identification	Time	N-Duopropenide (mg/m ³)	Maximum value
1A	Before application	8.88	8.88
1B		3.97	
2A	1st hour	34.12	34.12
2B		14.66	
3A	2nd hour	39.80	39.80
3B		14.22	
4A	3rd hour	11.49	40.87
4B		40.87	
5A	4th hour	17.32	19.64
5B		19.64	

(Sampling previous to discharge is a value practically found in the lowest limit of the detection method used to collect and analyse the composition, and it is due to this reason that when bearing in mind the sampled air volume we obtain a value which may be quantified in NDP).

Outcome graphic representation



Conclusion

Test results show that the Environmental Exposure Limit Value, estimated starting from the DL50 with a security margin of 400, is not surpassed at any time. The graphic shows clearly the difference between the measured and permitted values.

Therefore, **it would not be deemed necessary to set a security margin** for healthy reasons. For comfort reasons, though, and considering the presence of IPA and propellant in the formulation, it is advisable to afford a margin of 1 hour before occupying the treated areas.

Note. Tests referred to below have been made with the formulation of NDP Air total, and refer to the N-Duopropenide as active ingredient (formulated with quaternary ammonium compound). The product NDP Air Total+ Green CE is an improvement of this product, which is presented at the same concentration of quaternary ammonium. The content in alcohol (Isopropyl alcohol) and propellant agent is equivalent. The concentration in actives being the same, the results are extrapolated to the product NDP Air Total + Green CE.

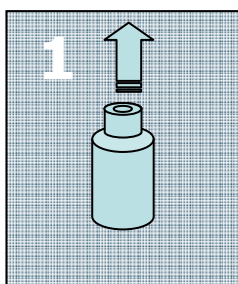
5- Instructions for use

1. Place the bottle on a smooth surface, and unseal it.
2. Press and turn the total-discharge valve allowing the product to disperse into the room space. The product forms a cloud that covers a 40 m³ of volume in 1 minute aprox. For the 50 ml format, and 150 m³ in 3 minutes for the 300 ml format.
3. Once the environment is impregnated, let it act.
4. The security time is 1 hour. Ventilate the room before re-entering.

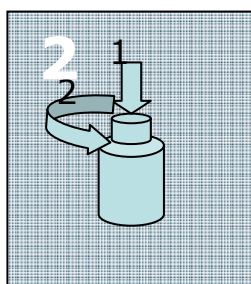
The product must be applied by specialised personnel.

It must be applied in absence of people, food, and kitchen utensils.

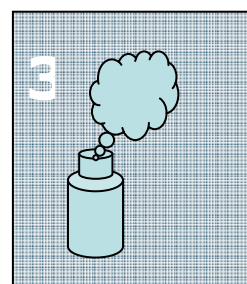
In order to avoid human and environmental risks, follow the instructions for use.



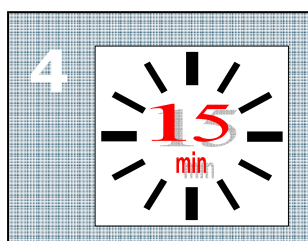
Place the bottle on an even surface, and unseal it.



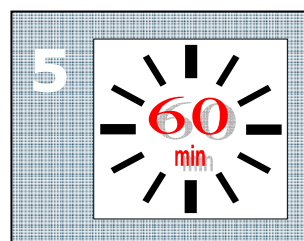
Press and turn the total-discharge valve allowing the product to disperse into the room space.



The product forms a cloud that covers a volume of 40 m³ in approximately 1 minute for the 50 ml format and 150 m³ in 3 minutes for the 300 ml format.



Once the environment is covered, let it act during 15 minutes.



The security time is 1 hour. Ventilate the room before re-entering.

6- Examples of application

- **Test product in a 100.000 class room**

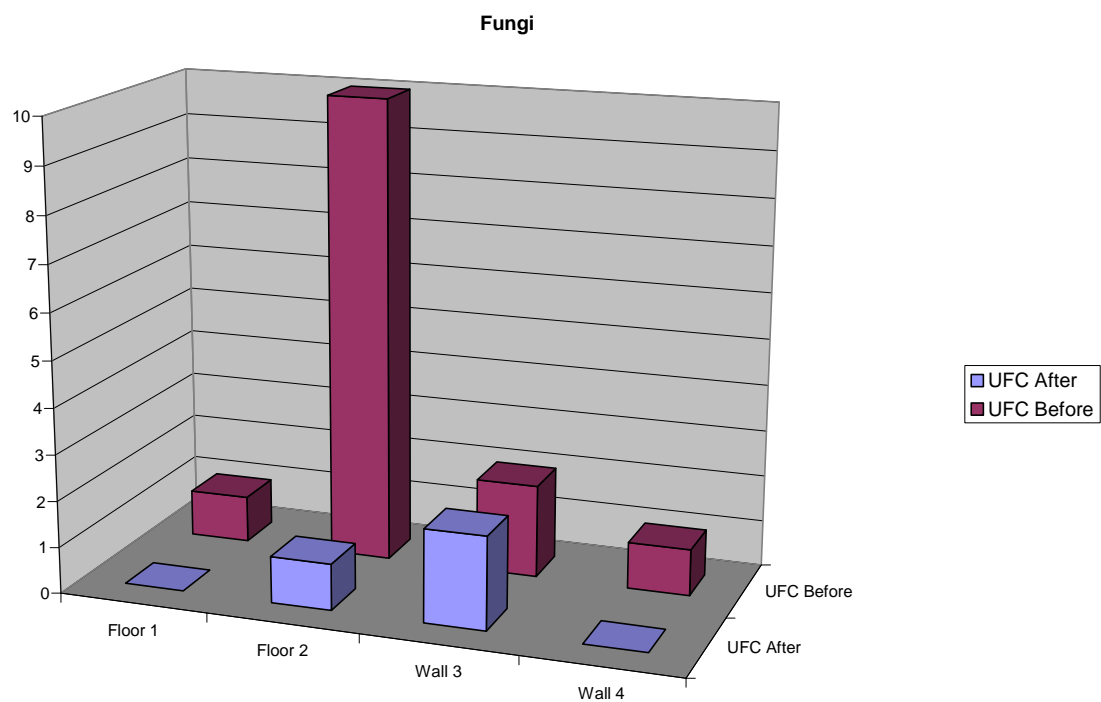
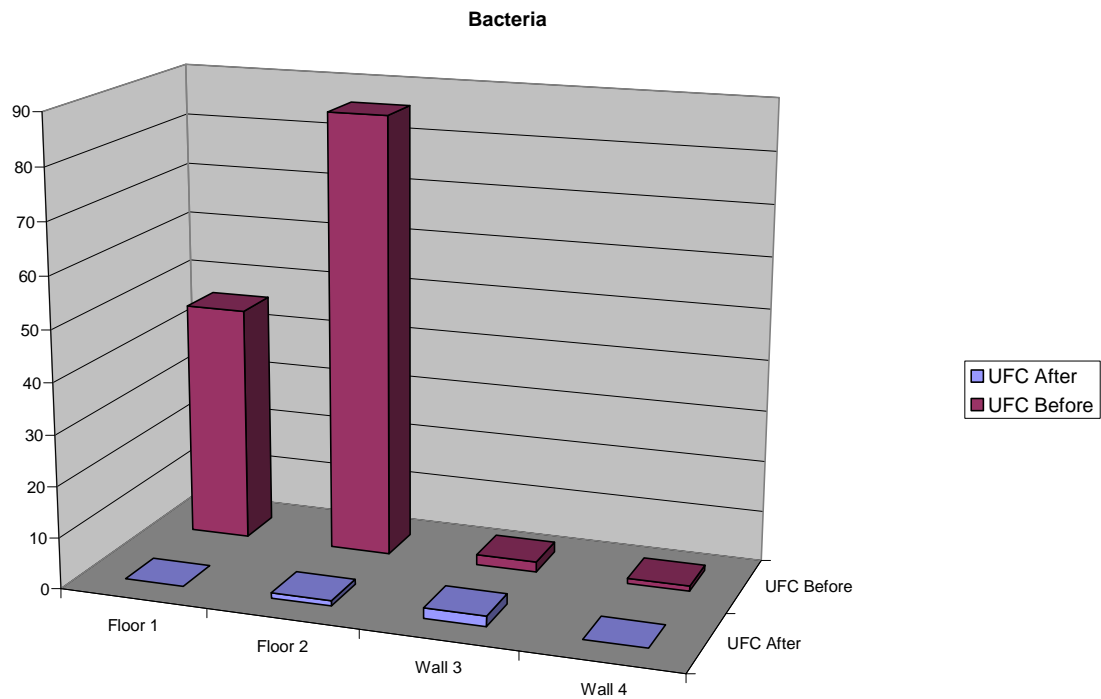
An *in situ* trial was carried out to test NDP Air Total effectiveness packaged in 210 mL containers. For the trial a 60 m³ room was used classified according to the US Fed. Std. 209 B as 100.000. The room had two sets of industrial equipment at each end, what made it difficult for the product to reach the total volume of the room.

Samples of bacteria and fungi were taken in four points of the room prior to disinfection (two on the wall and two on the floor). Two aerosol sprays were used, located in different points of the room. They were applied by pressing the total discharge valve, and the product was left to act for 30 minutes. Afterwards, four additional samples were taken (two on the wall and two on the floor).

The following results were obtained:

		Contamination before NDP Air Total application		Contamination after NDP Air Total application	
Sample point	N point	Fungi (ufc)	Bacteria (ufc)	Fungi (ufc)	Bacteria (ufc)
Floor	1	1	46	0	0
Floor	2	10	86	1	1
Wall	3	2	2	2	2
Wall	4	1	1	0	0

Note. Tests referred to below have been made with the formulation of NDP Air total, and refer to the N-Duopropenide as active ingredient (formulated with quaternary ammonium compound). The product NDP Air Total+ Green CE is an improvement of this product, which is presented at the same concentration of quaternary ammonium. The content in alcohol (Isopropyl alcohol) and propellant agent is equivalent. The concentration in actives being the same, the results are extrapolated to the product NDP Air Total + Green CE.



These results show a significant decrease on the initial level of bacteria and fungi is observed in the controlled room.

It is recommended that this process is repeated as often as necessary in order to maintain low contamination levels and to obtain a stable and long lasting effect, according to user needs.

- **Product trial in airplane**

→ *Situation: transmitted infection in means of transport*

The globalización has caused, among other consequences, the reemergence of epidemic diseases that were believed controlled (tuberculosis or paludism) and the appearance of other new ones like the ebola fever, AIDS or the bovine spongiform encephalopathy.

Scientific evidence exists that demonstrates that commercial air lines constitute an appropriate area for the extension of pathogens carried by the passengers or the crew. In these cases, the used environmental control systems in the airplanes are able to restrict the extension of the aerial pathogens.

For example, investigations on the transmissions in flight of tuberculosis conclude that to be seated in the two rows near the passenger infected during a flight of 8 h constitutes an important factor of risk for the transmission of the disease. The scientists maintain that these situations are extrapolating to other infectious diseases that are transmitted by the air. Nevertheless, in an outbreak of severe acute respiratory syndrome (SARS), passengers as far as seven rows away from the infected passenger were affected.

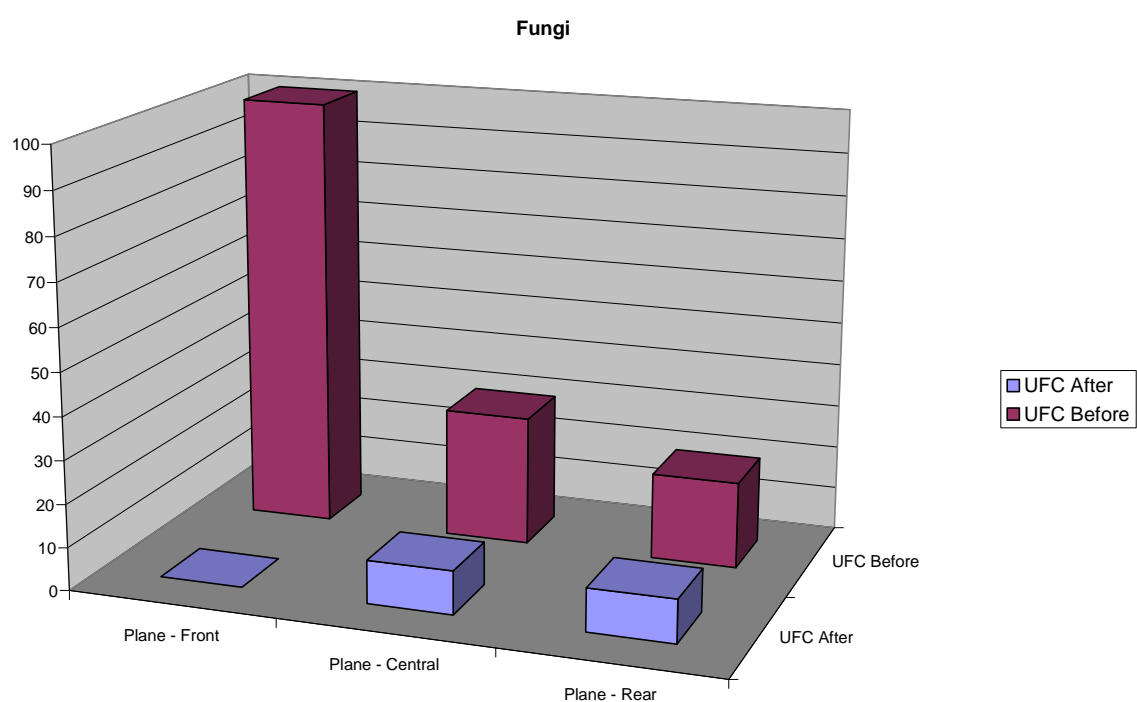
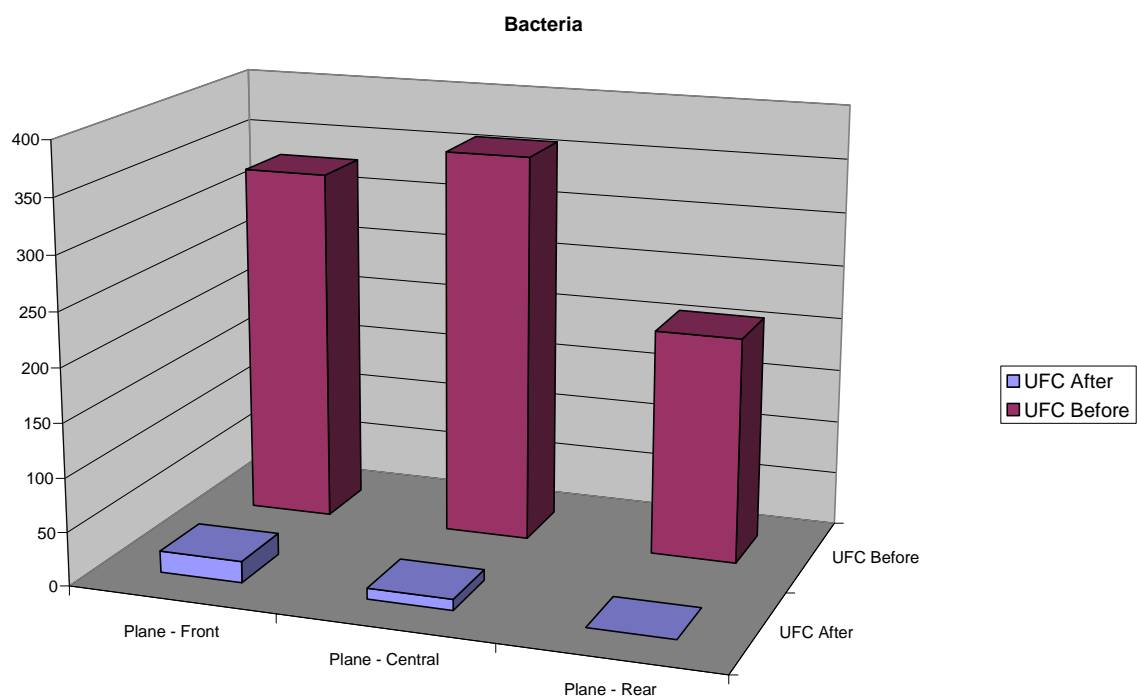
→ With the aim of verifying NDP Air Total effectiveness in an airplane disinfection, the following test has been performed:

An *in situ* test was carried out to test NDP Air Total effectiveness in 300 mL format. For the trial an airplane was used with an interior space measuring 150 m³ and 35 rows of tourist class seats.

- Samples of bacteria and fungi were taken in three points of the airplane (front, central and rear areas) by means of SAS air filtration.
- Two aerosol sprays were positioned, one in row 12 of the airplane and another in row 24, in order to distribute the product into the airplane indoor environment. They were applied by pressing the total discharge valve, and allowing it to disperse and act for 30 minutes.
- Afterwards, three additional samples were taken.

The following *results* were obtained:

Sample points in the plane	Before NDP Air Total application		After NDP Air Total application	
	Bacteria (ufc)	Fungi (ufc)	Bacteria (ufc)	Fungi (ufc)
Front	330	100	20	0
Central	360	30	10	10
Rear	210	20	0	10



→ The results confirm the decrease of bacteria and fungi initially observed in the studied room.

Note. Tests referred to below have been made with the formulation of NDP Air total, and refer to the N-Duopropenide as active ingredient (formulated with quaternary ammonium compound). The product NDP Air Total+ Green CE is an improvement of this product, which is presented at the same concentration of quaternary ammonium. The content in alcohol (Isopropyl alcohol) and propellant agent is equivalent. The concentration in actives being the same, the results are extrapolated to the product NDP Air Total + Green CE.