

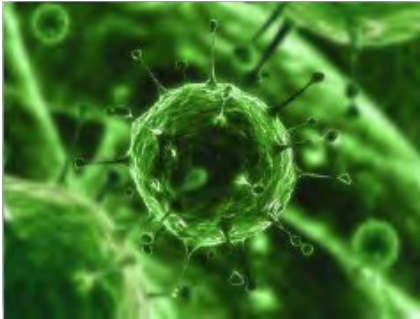


Sanitation System for Air Conditioning Ducts

The system that sanitizes pipes and air in every environment through the use of "Tea Tree Oil"

A new way of living environments making the air around us healthy and pleasant.

The OMS (World Health Organization) has estimated that 30% of buildings in industrialized countries are affected from problems such as to cause disturbances and / or diseases in the occupants.



Viruses and molds



Mushrooms and
bacteria



Pollens, spores



Dust mites

Melaleuca alternifolia Cheel or Tea Tree Oil (TTO)



The essential oil TTO has long been studied by many centers of research, with remarkable results on its properties:

antibacterial

anti-inflammatory

antiviral

antifungal

immunomodulatory

Why sanitize?

Air is a source of life and clean air improves life.

This is why it is important that the environment in which we live, work or attend, the environment in which children and young people study, is a healthy environment.

Less olfactory pollution means less respiratory allergies, asthma, serious diseases of the respiratory system, the spread of influenza viruses.

For this reason, these products allow its plants to reduce the level of pollutants present in the air, such as: ammonia, trimethylamine, hydrogen sulphate, methyl and butyric acid.

Less illness means more well-being for everyone, but also less absenteeism from work / and therefore lower costs for companies and for the national health system.

When we talk about environments we are not referring only to closed rooms. Our machines are able to cover even very large volumes and therefore are suitable for the reclamation of open polluting sites.



What is meant by sanitation?

Sanitation refers to the method used to reduce the number of bacterial contaminants present in the air, allowing to maintain hygienic levels of safety.

With Sanification the bacterial charges are broken down and viruses become inactive in order to eliminate the risks of infection from microbial infections. The microbes in the air can fix themselves on various objects such as air filters and multiply. The phenomenon can determine various problems from the point of view of human health, ranging from the induction of allergic phenomena to the spread of potentially dangerous microorganisms,.

Why sanitize?

The IEMB (Indoor Environment management Branch) of EPA (1998) have shown that indoor concentrations of pollutants are 1-5 times greater than outdoor ones and that indoor exposure is 10-15 times higher than outdoor exposure.

Recent studies have shown that in our society up to 90% of their time is spent in closed a places and 30-40% of this is spent in the workplace:

In the offices, 40% of sick leave from work is due to problems in the indoor air quality the offices.

According to official data from Brussels, unproductiveness affects 2% to 4% of continental GDP.

Where does it apply?

Sanatorium Gyms and Wellness Center



The desire to keep fit involves nowadays a large category of people attending gyms, swimming pools and fitness centers: to this end, hygiene protection is an aspect of fundamental importance especially as regards these traditionally crowded environments.

First of all the air quality must be safeguarded through microbiological tests for the evaluation of the bacterial charges present in the air conditioning systems. Then the healthiness of the centralized water heating systems and the pipes supplying the showers should be considered, all places of easy bacterial proliferation favored by the high temperatures as well as by a series of other factors for which it is necessary and essential to proceed to an adequate and correct bacteriological analysis.

The other environments that may represent a high risk of spreading infections, therefore making accurate sanitation necessary, are those subject to stagnation of water and high humidity values: they are an ideal habitat for the proliferation of fungi, whose biological cycle provides for the formation of particularly resistant spores.

The hot-humid conditions of swimming pools and changing rooms thus favor the risk of transmission of cutaneous fungal infections. Contact with the surfaces of sanitary ware, floors, but also contaminated exercise equipment can promote the appearance of warts.

These products allows you to create an environmental sanitization program suitable for every need thanks to targeted interventions and properly planned over time that provide a wider guarantee on compliance with environmental health requirements.

Risks

An approximate sanitization of surfaces (areas, furniture, equipment and sanitation) causes the proliferation of: Staphylococci aureus, fecal streptococci, Enterobacteria, Aspergillus spp., Human Papilloma Virus, Dermatophytes, indoor dust allergens (mites, molds, cockroaches).

Health effects: bacterial infections (scarlet fever, otitis, pharyngitis), viral infections (varicella, measles, rubella, mumps, flu, mononucleosis, colds, plantar warts), allergies, dermatoses.

Poorly maintained air conditioning systems could generate: molds, fungi and bacteria (responsible for allergic diseases such as extrinsic allergic alveolitis and bronchial asthma). Legionella, responsible for the so-called "Legionnaire Syndrome" or Legionellosis (the infection may remain asymptomatic or present with an influenza-like form "Pontiac Fever."

In severe cases it can cause severe pneumonia with high mortality).

Solutions

Microbiological sampling

Surfaces: sampling before and after sanitization operations in order to check the levels of bacterial contamination.

Water (Chemical analysis and Legionella)

Sampling of water at various points in the system in a series of water terminal points and swimming pools

Ventilation pipes

Analysis of the bacteriological charge present in the air introduced by the emission and recovery vents of the conditioning system.

Surface sanitization

Surface sanitization by means of 180 0 saturated steam showers, for the elimination of bacterial fillings, mixed with a suitable environmentally friendly and non-toxic sanitizing agent.

Sanitation of the environmental area

Sanification of the environmental area by dry aerosolization of a non-toxic and hypoallergenic plant-based mixture.

Solution with Nebulization Air system



Application of the nebulization technique with the hydrodynamic paradox (or Venturi effect) principle)

The only company to apply the nebulisation system by transforming the natural active ingredient into micro volatile particles without adduction of water.

Advantages of technological innovation

The Air sanitation system exploits the antimicrobial properties of natural products and in particular of *Melaleuca Alternifolia* or Tea tree. The combination of this substance with a system that allows its nebulization without modifying or altering its bactericidal and microbial therapeutic properties, represents an innovative and effective way to sanitize the environments in human presence.

The essential oil *Melaleuca Alternifolia* Cheel or Tea Tree Oil (TTO) has long been studied by the Istituto Superiore di Sanita for its broad spectrum of antimicrobial action and for its potential therapeutic activities, in particular, the use of its component terpinene-4-ol as antimicrobial agent against *Legionella Pneumophila*, for the sanitation of air treatment plants and for water distribution.

Overall, all structural types could be sanitized by terpinene-4-ol.

In particular, Tea Tree Oil is an effective sanitizing agent on the following bacterial charges:

- Mesophilic bacterial load
- Psychrofil bacterial charge
- Total mycetic charge
- Coliform bacteria
- Enterococci bacteria
- Legionella
- Staphylococcus aureus

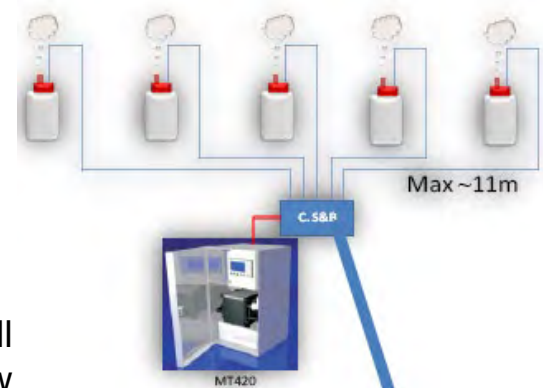
Micronizing device



- Insertion of a collector- balancing unit to branch the flow on more bottles;
- Possibility to dispense in different environments;
- Possibility of supplying different products;

Collector & Balancing C.:

- Allows the arrival of an air flow equal to all the bottles with the insertion of flow regulators to the manifold outputs = all the tubes of equal length;
- Use of non-toxic flexible 4x6 PVC pipes;
- Machine distance (MT420) collector max 6 m;
- Distances bottles - manifold depending on the number of bottles;



ACTIVITIES IN VITRO OF THE ESSENTIAL OIL OF MELALEUCA ALTERNIFOLIA CHEEL (TEA TREE OIL) IN RESPECT OF LEGIONELLA

Il metodo della micro-brodo-diluzione ha dimostrato che TTO ha effetto inibente sulla crescita di ceppi di riferimento di *Lp* con una MIC di 0,25% v/v, mentre ha effetto battericida alla concentrazione di 0,5% v/v (Tabella 1). Gli stessi risultati sono stati osservati nel caso di ceppi di origine clinica e ambientale (Tabella 2).

Tabella 1. Attività antibatterica del TTO^a nei confronti di ceppi di riferimento ATCC di *L. pneumophila* sierogruppi 1 e 6

Ceppo	MIC**	MIC range	MBC**	MBC range
<i>Lp</i> 1 ATCC 33152	0,25	0,0078-0,5	0,5	0,25-1,0
<i>Lp</i> 6 ATCC 33215	0,25	0,06-0,5	0,5	0,25-2,0

*diluizioni seriali del TTO da 4% a 0.0078% v/v; **MIC e MBC più frequenti

Tabella 2. Attività antibatterica del TTO^a nei confronti di ceppi di *L. pneumophila* sierogruppi 1 e 6 di origine umana e ambientale

Ceppo	n. ceppi	MIC50	MIC90	MIC range	MBC50	MBC90	MBC range
<i>Lp</i> 1**	12	0,25	0,25	0,125-0,25	0,5	0,5	0,50-1,0
<i>Lp</i> 6***	10	0,25	0,25	0,25-0,5	0,5	0,5	0,50-1,0

*diluizioni seriali del TTO da 4% a 0,0078% v/v; ***L. pneumophila* sierogruppo 1 (1 ATCC, 5 ceppi clinici e 6 ambientali);
****L. pneumophila* sierogruppo 6 (1 ATCC, 5 ceppi clinici e 4 ambientali)

Come mostrato nella Tabella sottostante (Tabella 3), il metodo della diffusione in micro-atmosfera rivela come i vapori di TTO abbiano effetto totalmente inibente sulla crescita di *Legionella*.

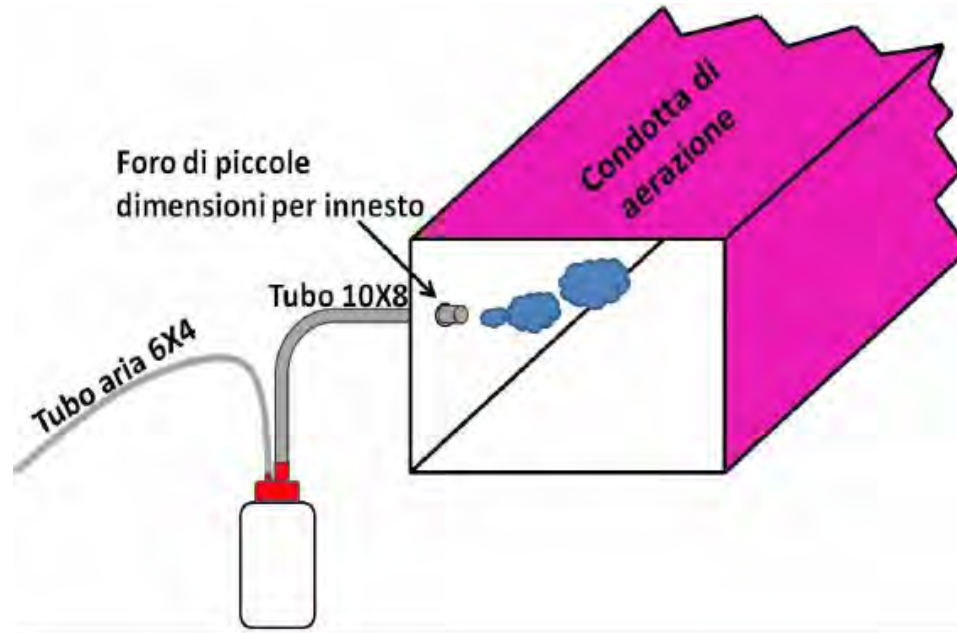
Tabella 3. Inibizione della crescita di ceppi di riferimento di *L. pneumophila* dovuta a vapori di TTO o di terpinene-4-olo

Ceppo	Controllo*	TTO*	Terpinene-4-olo*
<i>Lp</i> 1 ATCC 33152	0	90	90
<i>Lp</i> 3 ATCC 33155	0	90	90
<i>Lp</i> 6 ATCC 33215	0	90	90
<i>Lp</i> 8 ATCC 35096	0	90	90

* Zona di inibizione in mm

Method of intervention

Channeling through a UTA grafting
of the micronized "tea tree oil"



Results of the swabs taken Before and after treatment

SAMPLING

Active

Sampling with suction of predetermined volumes of air inside a room that will be chosen following the inspection with withdrawal adjacent to a cold beam.

This sampling is carried out to minimize the differences in the distribution of bacteria due to the currents, the temperature and the size of the airborne aggregates.



Results of the swabs taken Before and after treatment

Active samplers aspirate predetermined volumes of air, conveying them onto a liquid or solid culture medium.

The microorganisms present in the air adhere to the ground and, after an appropriate incubation period, give rise to colonies visible to the naked eye, which can be numbered and, after isolation, to identify.

The level of microbial contamination is expressed as Unity Forming Colonies (UFC) per m³ of air.



Results of the swabs taken *Before and after treatment*

Surface Control

Sampling of surfaces with classic "pads" on two different areas:

- On the inside wall of the pipeline in an accessible position that will be designated following the inspection.
- On the surface of any cabinet / cabinet in the treated area.

With these samplings it will be possible to detect the bacterial charges and / or the presence of legionella inside the pipeline and the bacterial charges present in the forced air that eventually fall on the underlying surfaces.



Mode

The methods and sampling times will be as follows:

ACTIVE SAMPLING

1° Withdrawal	2 days before start of treatment
2° Withdrawal	2 days after start of treatment
3° Withdrawal	5 days before start of treatment
4° Withdrawal	10 days after start of treatment
5° Withdrawal	15 days after start of treatment
6° Withdrawal	5 days after the end of treatment

SURFACE SAMPLING OF THE CONDUCT

1° Withdrawal	2 days before start of treatment
2° Withdrawal	5 days after start of treatment
3° Withdrawal	10 days after start of treatment
4° Withdrawal	15 days after start of treatment
5° Withdrawal	5 days after the end of treatment

SURFACE MOUNTING OF THE FURNITURE / CABINET

1° Withdrawal	2 days before start of treatment
2° Withdrawal	5 days after start of treatment
3° Withdrawal	10 days after start of treatment
4° Withdrawal	15 days after start of treatment
5° Withdrawal	5 days after the end of treatment

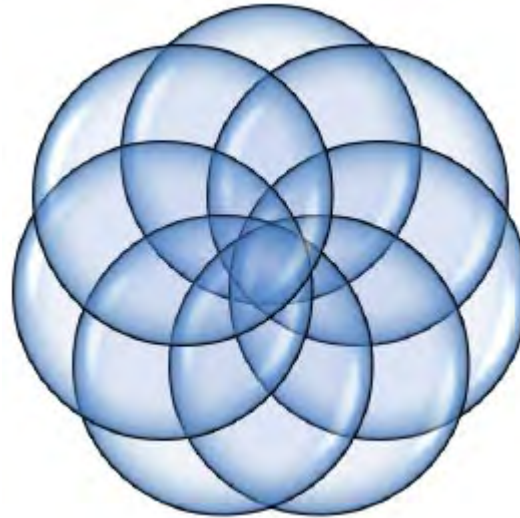
From the methods described above it is determined that the time required for the correct execution of the tests is **15 days of treatment**.

Features of the nebulizer

The different applications depend on the liquid used

The active substance to be emitted in the environment is not mixed neither with alcohol nor with propellants and therefore it is not denatured.

It is programmable: it is possible to modulate the diffusion of the nebulized liquid according to the needs of the case in question



Compared to the nebulizers / vaporizers currently on the market, it transforms the active ingredient of the liquid in DRY VAPOR therefore it is dispersed more in the environment

Limited
maintenance
costs

The efficiency is around 80% against 30-35% of the systems that use alcohol (heating) and 45-50% of the systems that use propellants

CONCLUSIONS

The project aims to demonstrate the effectiveness of the many properties contained in the extract (Essential Oil) of *melaleuca alternifolia* and how it is possible to spread homogeneously and quickly this substance present in liquid form, and micronized in gaseous form with the special Air system .

This Air method for air sanitization uses the dry micronization process of a sanitizing solution: this type of sanitizing technique has proved to be one of the most reliable scientifically, and without doubt the best and most convenient from the point of view of practicality and economy.

The technique is particularly indicated for quick and effective sanitizing treatments for closed environments of different sizes, in one operating cycle, with maximum hygiene safety. The environments most at risk and therefore the most suitable for a sanitizing treatment of the air, are those frequented by many people such as kindergartens, hotels, fairs, schools, universities, nursing homes, clinics, gyms, call centers, trains, airports , ships, and those working environments that require a higher level of hygiene.

This Air method for air sanitization is the completion of the daily cleaning service for a certification of hygiene and sanitization of all surfaces present in the workplace.

We are constantly searching for the best methods of intervention to guarantee and maintain an excellent air quality and safe environments in which to live, work and transit.

The company uses equipment capable of emitting a mixed aerosol and hyper-solar suspension to achieve both air and surface disinfection.

The emission of dry fog occurs until the saturation of the environment to be sanitized, in a short time and proportionally to the size of the area to be treated, with small particles of up to 5 microns that tend to remain suspended in the air, while those of upper diameter, tend to settle on exposed surfaces.

The adoption of our treatment means transparency towards workers and all the union bodies in preventing and constantly monitoring the environmental conditions in the workplace, translating into the reduction of absenteeism from the workplace due to allergic problems, migraines and forms flu, and provides your company with a return to image for all possible customers, suppliers and employees.

Sanification with this Air method means maximum safety for people and objects with a guaranteed total hygiene result.

VELAS LARGAS, HEALTH CARE EQUIPAMENT

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