Summary of Ceramic Plate & Ceramic Wristband

LTI INC.

LIQUID TECHNOLOGIES INTERNATIONAL

"Better way for the world"

Ceramic Plate is a card-type "ion generation" air purifier.

Number of ions measured by the negative ion measuring instrument "COM-3010PRO" 1,856/cm3

Ceramic Plate is a **card-type air purifier that generates ions in the space around it (theoretically about 1.5 to 2 m) on a constant basis** by reacting with water molecule in in the air.

Ions generated in the surrounding space are anticipated to reduce the risk of inhaling pollen, virus, and allergens.

This new technology solve the major issues of conventional ion air purifiers.

Ions disappear in about one second ▶ Ions continue to be generated
Ions flow only about 40 cm even blowing with fan ▶ longer ion flow distance

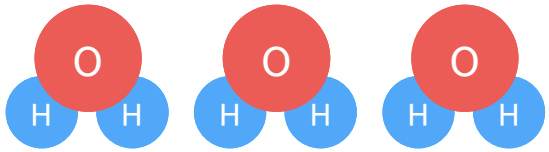
The reason is that water molecules which is the main cause of ion generation are infinitely present in the air.

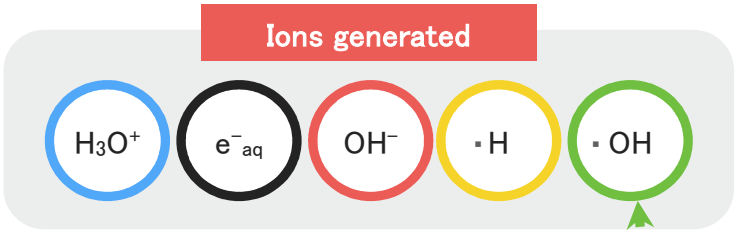
Inspite of individual differences in the measurement with an air ion counter, the number of ions generated by Ceramic Plate at above **1,800/cm3*** on average is confirmed. This is roughly **the same ion density as in forest areas**.

In addition, the mechanism of ion generation is very similar to the theory of forest areas.

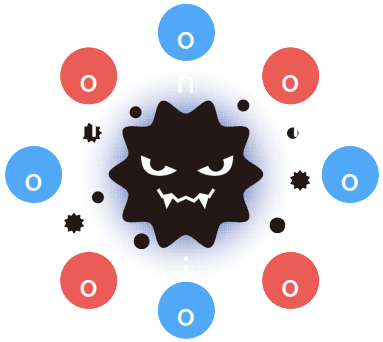
Expected effects of ion generation

React with water molecules to generate ions around



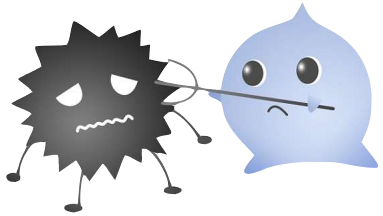


Generated ions are electrical unstable and have the tendency to attract surrounding substances.
Generated ions perform an air purifying effect by two major actions.



① [Surround and pull away]

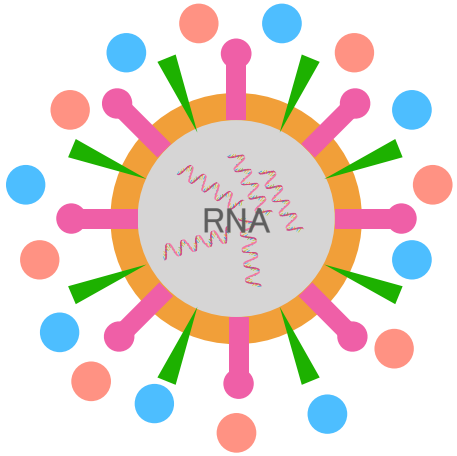
positively- and negatively-charged ions surround substances such as allergens, and draw ions in a chain reaction. **The allergens get heavier and fall before entry the body.**



② [Oxidation by reactive oxygen species]

Generated ions, which have the same properties as reactive oxygen species, react with and oxidize substances such as viruses to reduce the risk of invasion of the body. **Oxidized substances lose their original functions that in turn become inactive.**

Example of oxidation by hydroxyl radicals (OH) (example of influenza viruses)

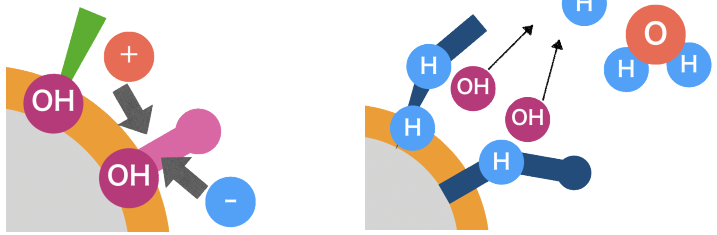


Ions generated in the space around Ceramic Plate surround influenza viruses

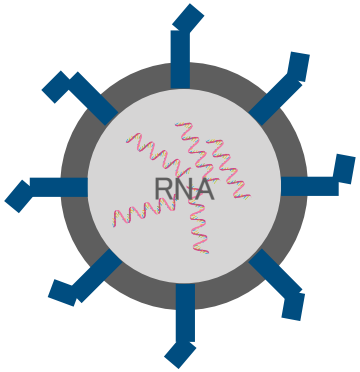
Ions react on the surface of virus, **oxidising species hydroxyl radicals (OH)** are generated.

▼

The generated hydroxyl radicals deprive hydrogen and **destroy the virus's surface spike protein.**

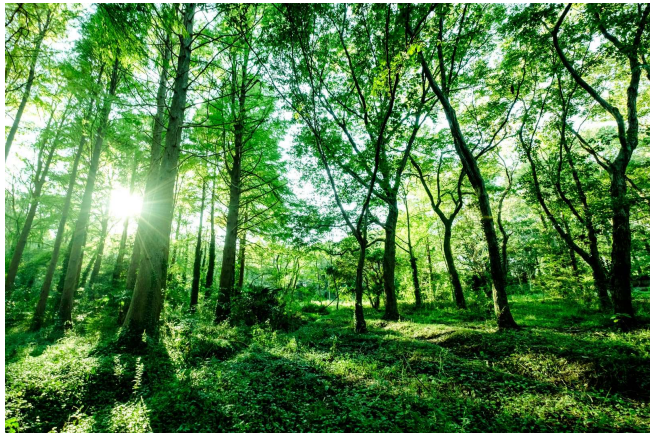


(Enlarged view of the surface)

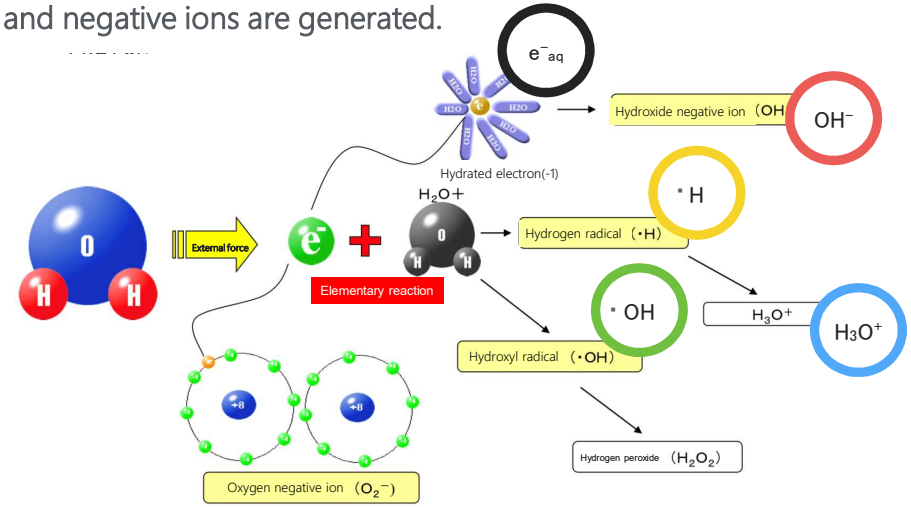


Influenza viruses, whose surface spike proteins have been destroyed, unable to bind tightly to a cell-surface and inactivated.

The mechanism of ion generation is exactly the same as in nature



At the basin of waterfall, potential energy given by a difference in the altitude is applied to water molecules (the Lenard effect), and negative ions are generated when water droplets collide with each other or with a wetted solid in a place where water splashes. In forest areas, which negative ions are abundant like the area around waterfalls, **water molecules in the air are decomposed due to the emission of weak radiant energy in the earth crust, and negative ions are generated.**



The technology of Ceramic Plate got a hint from the fact that negative ions are widespread in forest areas by the emission of weak radiant energy in the earth crust. By kneading functional materials which far-infrared radiation technology is applied into resin, **the ion generation mechanism in forest areas is reproduced in a card-sized air purifier.**

The number of ions generated does not mean the more is better.

(Reference image: https://www.b-zone.biz/products/detail/261088)

Measurement location	Negative ion	Positive ion
Mountain forest area	700以上	–
Shinjuku Kabukicho (Outside air)	–	157
Fountain (Shinjuku)	780	–
Business district where the wind blows through	380	–
Office	–	550以上
Waterfall basin (10 meters away)	**4,730**	–
Forest area	**1,800**	–

* Reference: Health science of negative ions / Noboru Yamanoi

Some air purifiers on the market generate **an extremely high concentration of ions, approximately 10,000/cm3 to 1 million/cm3**. There are also portable air purifiers that provide an air purification effect by simply putting around the neck.

Since these types of air purifiers artificially apply an electric current to generate ions, they have such a high concentration of ions. However, some of the generated ions have a very strong oxidizing species called hydroxyl radicals. How strong hydroxyl radicals are, for example, the reason why skin peeling after sunburn in summer is that the excessive reactive oxygen species generated in the body oxidize the skin cells and destroy the protein. In other words, an excess of ions generation means there are concerns about safety to human body.

On the other hand, except for a very special case, there is no environment where the concentration of ions exceeds10,000/cm3 in the natural world. Even at the basin of waterfall, the concentration of ions is about 5000/cm3. **The technology of Ceramic Plate succeed to reproduce the ion generation method in the natural environment, instead of an artificial mechanism.**

Safety of LTI Ceramic Plate has been verified by a prominent laboratory in Japan

CONFIDENTIAL

Salute.Lab株式会社 様

No. H-0052-1
令和2年6月5日

試験結果報告書(γ線測定)

特定非営利活動法人
日本機能性イオン協会
理事長 浅田敏勝
〒533-0033 大阪市東淀川区東中島1-19-11
TEL 06-4809-4098/FAX 06-4809-4099
試験実施者 福田 周平

依頼のありました試料の測定結果は、下記の通りです。

1)	試験試料	ion"e"air(イオニアカードPLUS)								
2)	試料区分	加工材料								
3)	試料形状	その他								
4)	測定機器	日立アロカメディカル株式会社製 γSURVEI METER TCS-171								
		本体構造 円筒型コンデンサー								
5)	測定月日	令和2年6月3日								
6)	測定場所	日本機能性イオン協会 測定室								
7)	天候	晴れ								
8)	室温	26 ℃								
9)	湿度	49 %								
10)	気圧	1,006 hpa								
11)	大きさ	85.60×53.98(mm)								
12)	測定方法	試料中央部直上5mmに受感部をセットして測定								
13)	測定結果	放射線強度	バックグランドデータ		製品測定値		放射線発生量			
			平均値	0.098 μSv/h	平均値	0.114 μSv/h	平均値	0.02	μSv/h	
			最大値	0.10 μSv/h	最大値	0.13 μSv/h	最大値	0.03	μSv/h	
			最小値	0.09 μSv/h	最小値	0.11 μSv/h	最小値	0.02	μSv/h	
14)	備考	センサーの受感部は、円筒型先端部のφ38×15mmであり、センサーより離れた部分の放射線は、殆ど感じません。								

測定データは、次ページに示すグラフで、安定が見られたことを確認した後、ほぼ1分経過ごとの自動読み取りデータ5個を取り、そのデータを集計したものです。

測定値は、小数点3桁部分を四捨五入したもので、最小桁は動く場合があります。

Negative ion is generated by LTI Ceramic Plate by the emission of weak radiant in the earth crust . Safety of this LTI Ceramic Plate has been verified by a prominent public laboratory of which name is The Japan Functional Ion Association.

※γ Ray has been checked as the testing method since γ Ray can be considered to have the strongest penetrability .

Average amount of γ Ray which has been found by the measurement at the point where it is 5mm upon LTI Ceramic Plate is **0.02 μ Sv/h**

If you put LTI Ceramic Plate so close to you like 5mm and keep that condition for 24 hours, one year, you will face **0.175mSv** (0.02 × 24 × 365=175.2 μ Sv=0.175mSv). Obviously, however, this is a totally unrealistic scenario.

While in Japan, average amount of natural γ Ray **is 0.09 μ Sv/h** so it would amount to 0.788mSv per year. And Average amount of exposure to natural radiation from space or land is 2.1mSv.

Examples for exposure of radiation to your body in the life:、

- Flight by airplane (Tokyo to New York round trip) →0.08～0.11mSv
- X Ray Examination of chest (one time) →0.07mSv
- X Ray Examination of stomach (one time) →3mSv
- CT inspection (one time) →2.4～12.9mSv

The above-mentioned examination can clearly show LTI Ceramic Plate is such a safe product for living creatures on the earth.

＊ μ Sv = 1/1000 of mSv.

Evaluation tests performed by third-party institutions
1) Experiment on cedar pollen removal performance (Ceramic Plate)

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試 験 結 果 報 告 書

№220S－1040
令和2年6月8日

サルーテ・ラボ株式会社 殿

遠赤外線応用研究会
〒542-0081大阪市中央区南船場4-9-11

試験項目　供試のion “e” air（イオニアカードPLUS）を使用した場合の、空気中のスギ花粉の除去性能を確認する。

試験試料　ion “e” air（イオニアカードPLUS）

試験条件　1）試験日時　令和2年6月4日
2）測定機器　DYDOS CORPORATION製 DC110プロB型

試験方法　60L（50cm×40cm×30cm）のボックス内に約7,500個/cc濃度のスギ花粉を入れ、時間経過による濃度を測定し、空試験結果とする。次に、ion “e” air（イオニアカードPLUS）をボックス内の中心に配置し、上記濃度のスギ花粉を入れ、時間経過による濃度を測定し、比較検証する。
なお、表示の数値としては初期濃度を100%として、スギ花粉が減少していく割合を連続測定する。

試験結果

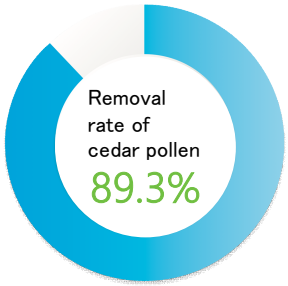
ion “e” air（イオニアカードPLUS）使用によるスギ花粉除去性能試験結果

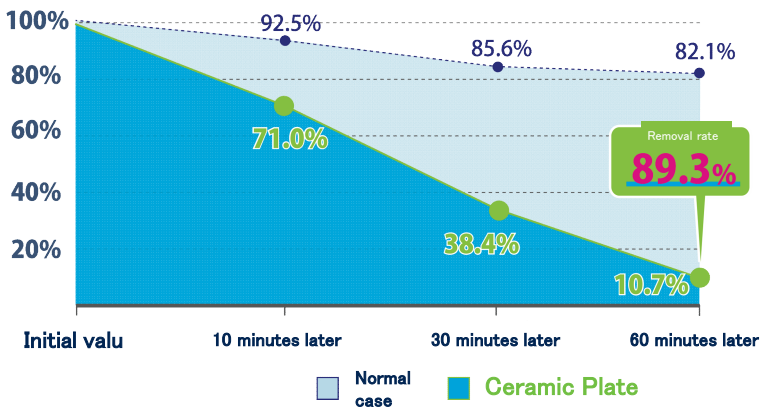
	経過時間				除去率
	初期濃度	10分後	30分後	60分後	
[illegible]	100	71.0	38.4	10.7	89.3
空試験	100	92.5	85.6	82.1	17.9

（単位：%）

考　察　供試のion “e” air（イオニアカードPLUS）を使用した場合、スギ花粉の除去率は60分経過後で89.3%に達した。一方、空試験の場合は17.9%に止まった。
このことから、ion “e” air（イオニアカードPLUS）には、空気中のスギ花粉を除去する性能があることが示唆された。
尚、本試験結果は一定の密閉空間での試験による結果であり、実使用空間での実証試験ではありません（カタログなどには明記して下さい）。

本報告書は供試試料及び試験状況下においてのものであり、全ロットについての結果を報告するものではありません。





* 8 June 2020　Institution: Results of the experiment conducted by Japan Far Infrared Rays Association.
Equipment: Measured with DYDOS CORPORATION DC110 PRO model
* Put cedar pollen with a concentration of 8,000/cc in a 60L (50cm x 40cm x 30cm) box, measure the concentration over time, and then measure the concentration with and without Ceramic Plate over time, and perform data comparison and verification.

* The method of this evaluation test is to measure removal performance in a confined space, instead of a demonstration test in real space.

Evaluation tests performed by third-party institutions
2) Experiment on PM2.5 removal performance (Ceramic Plate)

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試験結果報告書

№220S－1039
令和2年6月8日

サルーテ・ラボ株式会社 殿

遠赤外線応用研究会
〒542-0081大阪市中央区南船場1-9-11

試験項目　供試のion “e” air（イオニアカードPLUS）を使用した場合の、空気中のPM2.5微小粒子状物質の除去性能を確認する。

試験試料　ion “e” air（イオニアカードPLUS）

試験条件　1）試験日時　令和2年6月4日
2）測定機器　DYDOS CORPORATION製 DCI10プロB型

試験方法　60L（50cm×40cm×30cm）のボックス内に約60,000個/cc濃度のPM2.5微小粒子状物質を入れ、時間経過による濃度を測定し、空試験結果とする。次に、ion “e” air（イオニアカードPLUS）をボックス内の中心に配置し、上記濃度のPM2.5微小粒子状物質を入れ、時間経過による濃度を測定し、比較検証する。
なお、表示の数値としては初期濃度を100%として、PM2.5が減少していく割合を連続測定する。

試験結果

ion “e” air（イオニアカードPLUS）使用によるPM2.5除去性能試験結果

	経過時間				除去率
	初期濃度	10分後	30分後	60分後	
ion “e” air（イオニアカードPLUS）	100	54.7	7.1	1.8	98.2
空試験	100	91.6	84.7	77.2	22.8

（単位：%）

考　察　供試のion “e” air（イオニアカードPLUS）を使用した場合、PM2.5の除去率は60分経過後で98.2%に達した。一方、空試験の場合は22.8%に止まった。
このことから、ion “e” air（イオニアカードPLUS）には、空気中のPM2.5を除去する性能があることが示唆された。
尚、本試験結果は一定の密閉空間での試験による結果であり、実使用空間での実証試験ではありません（カタログなどには明記して下さい）。

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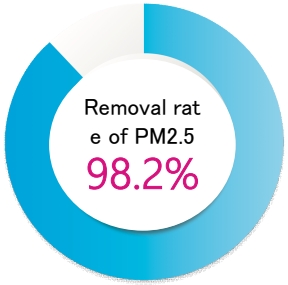

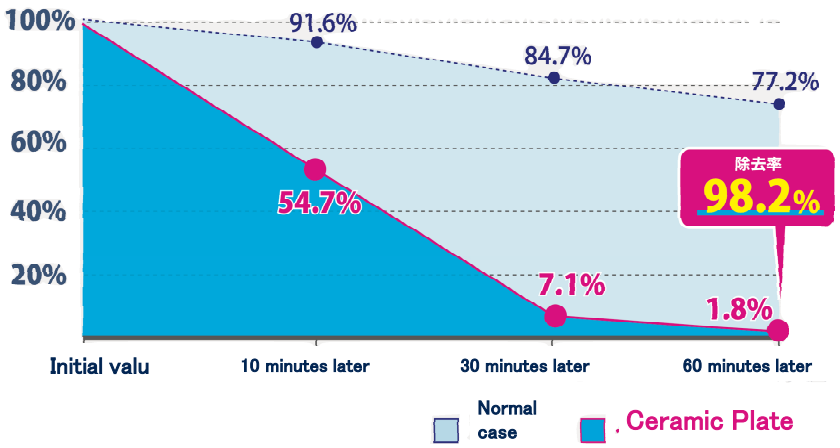

* 8 June 2020　Institution: Results of the experiment conducted by Japan Far Infrared Rays Association.
* Put fine particulate matter (PM2.5) with a concentration of 60,000/cc (initial concentration is 100%) in a 60L (50cm x 40cm x 30cm) box, measure the concentration over time, and then measure the concentration with and without Ceramic Plate over time, and perform data comparison and verification.

* The method of this evaluation test is to measure removal performance in a confined space, instead of a demonstration test in real space.

Evaluation tests performed by third-party institutions
3) Experiment on gas deodorant performance

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本報告書の全部又は一部の無断転載転用を固くお断りします。

KAKEN

No. 0S-18-0815C6R

試 験 報 告 書

依 頼 者　サルーテ・ラボ 株式会社　殿
品　　名　ion" e" air　1点
試験項目　ガスの除去性能評価試験

２０１９年　３月２２日付けで当所に提出された試料の試験結果は下記のとおりです。

２０１９年　４月　１日

カケン
〒550-0002 大阪市西区江戸堀２丁目５番10号
一般財団法人　カケンテストセンター
大阪事業所　分析ラボ
Tel (06)-6441-6752　Fax (06)-6441-6803

記

【試験結果】

1）アンモニアガスの除去性能評価試験

試　料	初発濃度 (ppm)	2時間後 ガス濃度 (ppm)	2時間後 減少率 (%)
原布	100	12	87
ブランク（空試験）	100	95	—

2）酢酸ガスの除去性能評価試験

試　料	初発濃度 (ppm)	2時間後 ガス濃度 (ppm)	2時間後 減少率 (%)
原布	30	10	57
ブランク（空試験）	30	23	—

3）イソ吉草酸ガスの除去性能評価試験（2時間後）

試　料	減少率 (%)
原布	96

4）ノネナールガスの除去性能評価試験（2時間後）

試　料	減少率 (%)
原布	94

【試験方法】SEKマーク繊維製品認証基準で定める方法（（一社）繊維評価技術協議会）準用
ただし、希釈ガスは温調室空気（20℃ 65%RH）、試料量は試験 1)2）：200 cm, 3) 4）：100 cmとした。

（使用バッグの種類）
スマートバッグPA（ジーエルサイエンス社製）

【試　料】

KEN　KAKEN　KA

以　上

本報告書に記載の試験結果は供試々料に対するものであり、荷口（ロット）全体の品質を保証するものではありません。
事業所名の入った報告書については、当財団は一切責任を負いかねますので、念のため申し添えます。

確認	作成
須賀太司	井上

Isovaleric acid, the main cause of feet odor

2-nonenal, the main cause of body odor due to aging

Ammonia, the main cause of smoking tobacco and sweat smells

* Results of the evaluation tests conducted by the Kaken Test Center.
* The rate of decrease in out-gassing after 2 hours is listed.
* According to the certification standards of SEK mark textile products, the sample and gas are sealed in a special bag for verification.

* The method of this evaluation test is to measure deodorant performance in a confined space, instead of a demonstration test in real space.

Evaluation tests performed by third-party institutions
5) Measurement of antibacterial activity [Verification by direct contact test]

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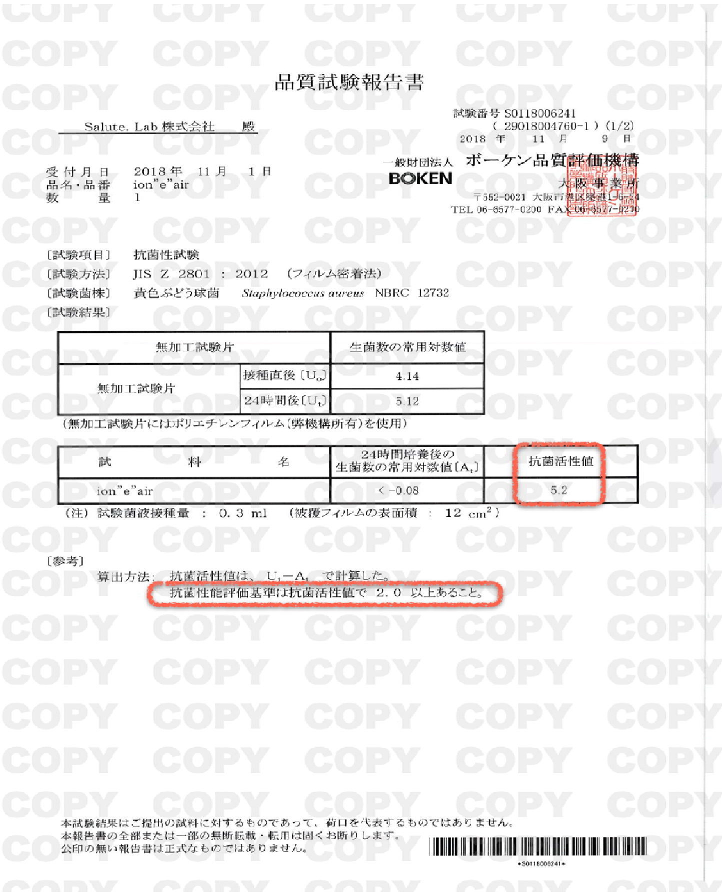


品質試験報告書

Salute. Lab 株式会社　殿

試験番号 S0118006241
(29018004760-1) (1/2)
2018 年 11 月 9 日

一般財団法人 ボーケン品質評価機構
BOKEN
大阪事業所
〒552-0021 大阪市港区築港1-6-24
TEL 06-6577-0200 FAX 06-6577-0210

受付月日　2018 年 11 月 1 日
品名・品番　ion"e"air
数量　1

〔試験項目〕 抗菌性試験
〔試験方法〕 JIS Z 2801 : 2012 （フィルム密着法）
〔試験菌株〕 黄色ぶどう球菌 *Staphylococcus aureus* NBRC 12732
〔試験結果〕

無加工試験片		生菌数の常用対数値
無加工試験片	接種直後〔U_o〕	4.14
	24時間後〔U_t〕	5.12

（無加工試験片にはポリエチレンフィルム（弊機構所有）を使用）

試料名	24時間培養後の生菌数の常用対数値〔A_t〕	抗菌活性値
ion"e"air	< −0.08	5.2

（注） 試験菌液接種量 : 0.3 ml （被覆フィルムの表面積 : 12 cm^2）

〔参考〕
算出方法: 抗菌活性値は、 $U_t - A_t$ で計算した。
抗菌性能評価基準は抗菌活性値で 2.0 以上あること。

本試験結果はご提出の試料に対するものであって、荷口を代表するものではありません。
本報告書の全部または一部の無断転載・転用は固くお断りします。
公印の無い報告書は正式なものではありません。

S0118006241

Direct contact test against Staphylococcus aureus

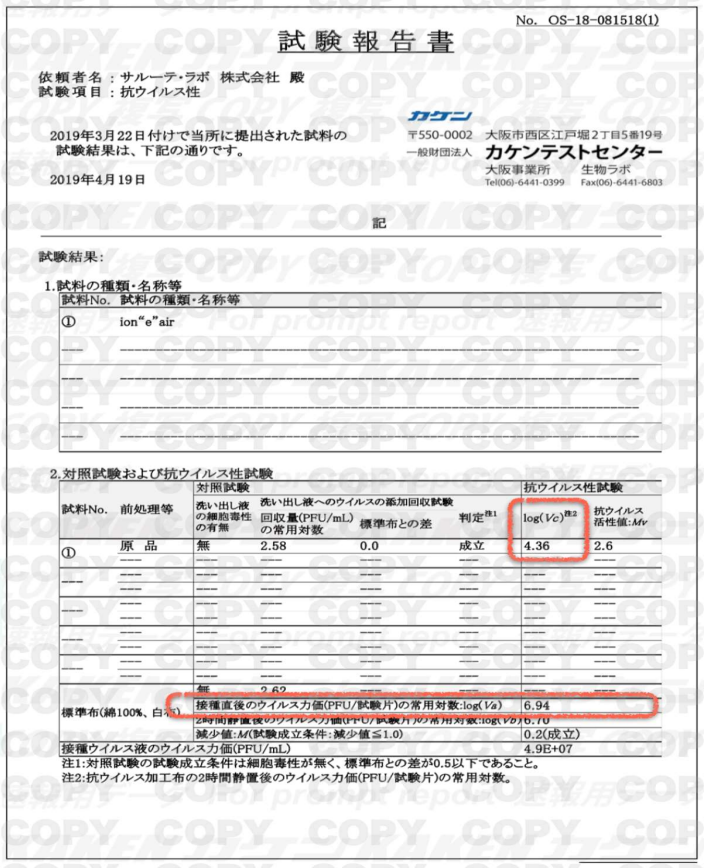
Test method: Antibacterial test　Film adhesion test method　JIS Z 2801: 2012
Strain used in the test: Staphylococcus aureus　Staphylococcus aureus NBRC 12732

Verification experiment of ioneair	(Common logarithm)		(Theoretical viable bacterial [=10^log(V)])		Theoretical bacterial reduction rate (Inactivation rate)
	Immediately after inoculation	24 hours after standing	Immediately after inoculation	24 hours after standing	
viable bacterial count	log(Uo)=4.14	log(At)=-0.08	13,803.84	0.83	99.99%

* This test is to measure the total viable bacterial count when contacting with the product, instead of an evaluation of its performance in real space.

Evaluation tests performed by third-party institutions
6) Measurement of antiviral activity [Verification by direct contact test]

CONFIDENTIAL



No. OS-18-081518(1)

試験報告書

依頼者名：サルーテ・ラボ 株式会社 殿
試験項目：抗ウイルス性

2019年3月22日付けで当所に提出された試料の試験結果は、下記の通りです。

2019年4月19日

カケンテストセンター
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一般財団法人 カケンテストセンター
大阪事業所 生物ラボ
Tel(06)-6441-0399 Fax(06)-6441-6803

記

試験結果：

1.試料の種類・名称等

試料No.	試料の種類・名称等
①	ion"e"air

2.対照試験および抗ウイルス性試験

試料No.	前処理等	対照試験 洗い出し液の細胞毒性の有無	対照試験 洗い出し液へのウイルスの添加回収試験 回収量(PFU/mL)の常用対数	対照試験 洗い出し液へのウイルスの添加回収試験 標準布との差	対照試験 判定注1	抗ウイルス性試験 log(Vc)注2	抗ウイルス性試験 抗ウイルス活性値:Mv
①	原 品	無	2.58	0.0	成立	4.36	2.6
標準布(綿100%、白布)		無	2.62				

接種直後のウイルス力価(PFU/試験片)の常用対数:log(Va)	6.94
2時間静置後のウイルス力価(PFU/試験片)の常用対数:log(Vb)	6.70
減少値:Mv(試験成立条件:減少値≧1.0)	0.2(成立)
接種ウイルス液のウイルス力価(PFU/mL)	4.9E+07

注1:対照試験の試験成立条件は細胞毒性が無く、標準布との差が0.5以下であること。
注2:抗ウイルス加工布の2時間静置後のウイルス力価(PFU/試験片)の常用対数。

Direct contact test against Influenza A virus

Test method: JIS L 1922: 2016 (ISO 18184: 2014, Mutatis mutandis)
Method for measuring viral titer: Plaque assay
Type of virus used in the test [Host cell] : Influenza A virus (H3N2) ATCC VR-1679 [MDCK cell ATCC CCL-34]

Verification experiment of ioneair	(Common logarithm)		(Theoretical virus count [=10^log(V)])		Theoretical virus reduction rate (Inactivation rate)
	Immediately inoculation	2 hours after standing	Immediately inoculation	2 hours after standing	
Viral titer	log(Va)=6.94	log(Vb)=4.36	8,709,636	22,909	**99.74%**

* This test is to measure the viral titer when contacting with the product, instead of an evaluation of its performance in real space.

Presenteeism and allergic rhinitis

Ranking of health issues that reduce productivity	Productivity lost in one year (wage conversion per person)*
Allergic rhinitis	$593
High degree of stress	$518
Migraine	$277
Melancholia	$273
Rheumatoid arthritis	$269
Anxiety disorders	$248
Respiratory tract infections	$181
High blood pressure	$105
Diabetes	$95
Asthma	$85
Coronary artery disease	$40

Survey of 27 companies (8,267 people)
Sum of hours that disable to work due to the above health issues in one year x average hourly wage / number of recruited groups

Presenteeism refer to a situation that employees are not fully functioning in the workplace because of physical or mental health issues, despite the employees may be physically at work. *Absenteeism refers to a pattern of missing work without a valid reason.

For instance, it is known that the work efficiency of employees who have hay fever decreases by at least 5 to 10% during the pollen season, and the work efficiency of employees who work even got a cold decreases by about 5%. These issues temporarily affect employee performance, and lower the profit level of company. In addition, physical illness causes a continuous deterioration of work performance.

The influence of health issues such as allergic rhinitis on employee performance are partcularly significant in intellectual labour, and a typical example of Presenteeism in Japan is the pollen season.

In the United States, economic loss caused by Presenteeism is regarded as an important issue. In a survey of 8,267 people from 27 companies, showing that the average total productivity lost per year due to allergic rhinitis was approximately USD 600 per year for all employees regardless of their symptoms.

Reference: Journal of Occupational Health, Conceptual analysis of Presenteeism and its potential use in Japan: Lamb C.E. et al. Current Medical Research and Opinion; 22, 2006

Relationship between pollen-induced allergic rhinitis and work performance

Economic loss due to a decrease in labor productivity of allergic rhinitis patients in Japan

Average income (month)	296,700 yen/month	Japanese average income
Average income (day)	15,048 yen/day	(296,700 yen/month x 12 months) / number of actual working days * (47.5 weeks x 5 days a week)
Loss of working hours	12.74 days/year in total	Absence (3.57 days/year) + Decrease in labor productivity (2.3 hours/day x 52.5 days ** - Absence) x number of actual working days *
Economic loss per worker with allergic rhinitis	191,783 yen/year	15,048 yen/day × 12.74 days/year

* : The number of actual working days is assumed to be 47.5 weeks a year and 5 days a week, from 14 public holidays and 8.6 days of average annual leave.

** : Average annual duration of incidence in patients with allergic rhinitis

The annual economic loss per patient with allergic rhinitis in Japan is about 200,000 yen.

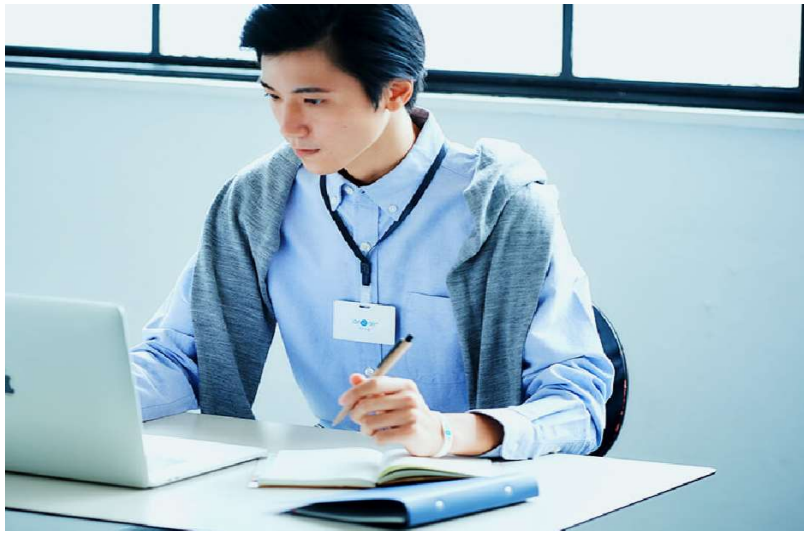
[Survey in the United States] The prevalence of allergic rhinitis (cedar pollinosis) is **over 30% in the 10s to 50s who are active in studying and working, and is extremely high at 39.1% in the 40s**, indicating that the decrease in labor productivity caused by allergic rhinitis (cedar pollinosis) has a significant influence on society.

According to a survey in the United States, showing that **Presenteeism accounts for 60% of the economic loss caused by illness**, and it is gradually recognized as a more serious problem rather than Absenteeism. Furthermore, it has been clarified that allergic rhinitis such as pollinosis have a large impact on Presenteeism.

[Survey in Japan]

A survey of the relationship between pollen-induced allergic rhinitis and work performance in 2008 (year-round pollen volume) and 2009 (year-round 1.5 times the pollen volume) revealed that the number of employees absent from work or left early because of hay fever is low, but the **labor efficiency fell by 42% in 2009** compared with 33% in 2008, indicating that pollen-induced allergic rhinitis pose a significant obstacle to the workplace. In addition, it has been clarified that when the amount of airborne pollen is low, only people with high levels of allergy develop hay fever, whereas **when massive amounts of pollen dispersed in the air, people with relatively low levels of allergy also develop the symptoms of hay fever**.

Portable air purifier, Ceramic Plate & Ceramic Wristband



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There are many air pollutants around us, including

- Pollen in spring and fall
- Pandemic influenzas in the winter season
- Pet allergens
- Fine particulate matter (PM2.5)
- Odor of cigarette smoke

etc...

To reduce suffering from the air pollutants as above, Ceramic Plate & Ceramic Wristband were launched, providing an air purifying effect by simply wearing it.

Ceramic Plate & Ceramic Wristband are excellent in cost performance that no power supply or maintenance is required with long-lasting effects more than 2 years.

The more people wear Ceramic Plate & Ceramic Wristband, the surrounding air is getting cleaner. Ceramic Plate & Ceramic Wristband are a new form of air purification.