

除蟎試驗：評估空氣淨化殺菌裝置之 殺蟎能力試驗

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委託單位 Client：久道科技有限公司
委託單位地址 Client Address：桃園縣龜山鄉復興二路 139 號
檢體名稱 Client Specimen I.D.：空氣淨化殺菌裝置
檢體編號 Specimen I.D.：90090E01
接收時間 Date Received：96 年 8 月 15 日
檢驗日期 Date Tested：96 年 8 月 16 日
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檢體狀態描述 Specimen description：機器一台
送檢方式 Specimen collector： 顧客送檢 台美採檢
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實驗室負責人：蔡文城 博士

報告簽署人：



委託單位：久道科技有限公司
報告編號：SL096E90090m

初步報告
 總結報告

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Study verification and signature

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試驗執行人： 蔡吉齡 日期： 96/09/07
Experiment executor Date

蔡吉齡 碩士

試驗主持人： 蔡岳廷 日期： 96/09/07
Senior researcher Date

蔡岳廷 碩士

試驗機構負責人： 蔡文城 日期： 96/09/07
Laboratory director Date

蔡文城 博士

除蟎試驗：評估空氣淨化殺菌裝置之 殺蟎能力試驗

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除蟎試驗：評估空氣淨化殺菌裝置之 殺蟎能力試驗

摘 要

本實驗為評估久道科技有限公司所提供之試驗物質「空氣淨化殺菌裝置」(台美檢體編號為 90090E01) 對腐食酪蟎 (*Tyrophagus putrescentiae*) 之殺蟎能力。將塵蟎從飼料中分取出約 0.1 g 之塵蟎 (約 1,000 隻) 放入機器內殺菌器平台，作用條件為開機 5 秒/次，作用次數 2 次。作用完畢後將塵蟎倒出殺菌器平台並用顯微鏡觀察塵蟎存活狀況及體表變化並計數存活之塵蟎數。結果顯示經開機作用完畢之後塵蟎全部死亡，存活數為 0 隻，而以顯微鏡觀察外觀，其外觀亦從原先觀察到之飽滿富含水分變為乾扁皺縮。綜合以上結果，久道科技有限公司所提供之試驗物質「空氣淨化殺菌裝置」之殺塵蟎能力於本試驗設計條件下為 100%。



1. 前言：

台灣有 1 / 3 的人口罹患過敏疾病，微小的、肉眼不易察覺的蟎類，存在居住生活的環境中，為引起過敏疾病主要元兇。灰塵內的塵蟎經證實是極強的過敏原，其分泌物、排泄物及蟲體，若經呼吸道進入人體，會刺激鼻黏膜或支氣管、氣管的黏膜，使組織不穩定，當呼吸道受刺激，即引發過敏性鼻炎的症狀，塵蟎引起過敏疾病有氣喘、過敏性鼻炎、眼睛過敏、異位性皮膚炎、蕁麻疹及慢性蕁等。過敏疾病與遺傳有關，但人長期處於過敏原中，亦會誘發過敏疾病。

台灣（1994）進行家塵採樣，結果 3 / 4 的取樣家中檢測出塵蟎。經證實為過敏原有歐洲室塵蟎（*Dermatophagoides pteronyssinus*）、美洲室塵蟎（*Dermatophagoides farinae*）、梅氏塵蟎（*Euroglyphus maynei*）、熱帶無爪蟎（*Blomia tropicalis*）、腐食酪蟎（*Tyrophagus putrescentiae*）等五種。塵蟎體小，足四對，體表有毛與細密或粗皺紋，成蟲體長約 170~500 微米，發育期可分為卵（egg）、幼蟎（larva）（三對足）、第一若蟎（protonymph）、第三若蟎（tritonymph）、成蟎（adult）等五期；由卵發育至成蟎需 29.1 天，且雌蟲壽命 72.6 天，一生可產 28.1 個卵。塵蟎的食性是以自然纖維、食物碎屑、無機物、鹽類、灰塵、花粉、真菌菌絲、孢子、昆蟲體驅碎片、人畜皮膚分泌、代謝物與糞便等為食。塵蟎多發生於居住環境中棉被、枕頭、彈簧床、床墊、地毯、沙發與厚重衣物等處富含纖維的環境中，尤其在家中床墊、地毯、沙發或家人活動頻繁處易蓄積食物碎片與皮膚代謝物。

2. 試驗目的：

評估試驗物質對腐食酪蟎（*Tyrophagus putrescentiae*）之殺蟎能力。

3. 試驗物質：

- 3.1 物質名稱：空氣淨化殺菌裝置（以下皆稱：試驗物質）係由久道科技有限公司（地址：桃園縣龜山鄉復興二路 139 號）提供。其外觀如附件 1。
- 3.2 檢體編號：90090E01。
- 3.3 物質型態：機器一台。
- 3.4 儲存條件：室溫。

4. 試驗菌種：

常出現於污染食物或居家環境中之 *Tyrophagus putrescentiae* 腐食酪蟎（粉蟎科）。

5. 試驗方法：

- 5.1 培養飼料：將磨碎之老鼠飼料與麥麩及酵母粉以 45:45:10 方式混合均勻。
- 5.2 培養環境：25°C/相對溼度 75%。
- 5.3 試驗方法：
 - 5.3.1 將塵蟎從飼料中分取出約 0.1 g 之塵蟎（約 1,000 隻）放入試驗物質內殺菌器平台。
 - 5.3.2 做用方式：開機每次 5 秒，共作用 2 次。
 - 5.3.3 將塵蟎自殺菌器平台倒出，並用顯微鏡觀察蟎存活狀況及體表變化並於顯微鏡下持續觀察 5 分鐘以計數存活之塵蟎隻數。

6. 試驗結果：

- 6.1 於試驗物質內殺菌器平台置入 0.1 g 之塵蟎（約 1,000 隻），經開機作用後將塵蟎自殺菌器平台倒出，並用顯微鏡觀察並計數存活之塵蟎數，觀察結果存活之塵蟎數為 0 隻。
- 6.2 而塵蟎之外觀於開機作用前以顯微鏡觀察為飽滿富含水分並具活力（圖 1），經開機作用後以顯微鏡持續觀察 5 分鐘，發現塵蟎體表呈乾扁皺縮並不具活力呈現死亡（圖 2）。

7. 總結：

綜合以上結果，顯示當試驗物質開機作用 2 次（5 秒/次）之後，所有的塵蟎皆會死亡，表示久道科技有限公司所提供之試驗物質「空氣淨化殺菌裝置」之殺塵蟎能力於本試驗設計條件下為 100%。

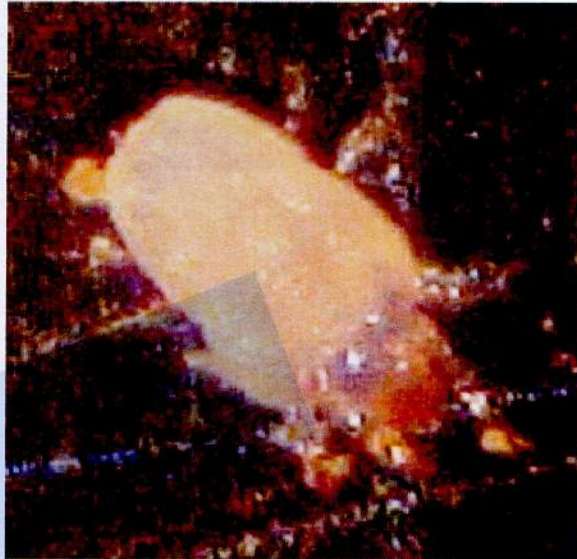
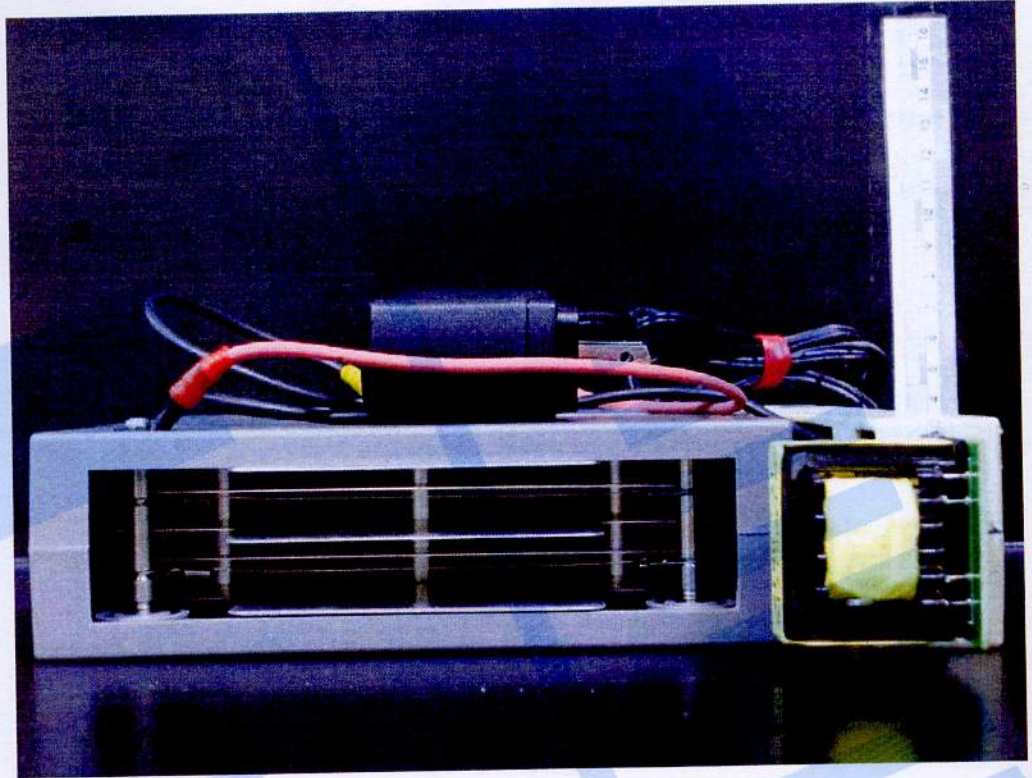


圖 1：試驗物質開機作用前之塵蟎外觀



圖 2：試驗物質開機作用後之塵蟎外觀

附件 1：試驗物質「空氣淨化殺菌裝置」之外觀(台美檢體編號 90090E01)



實驗室負責人：

蔡文城

研究主持人：

蔡東延

中華民國九十六年九月七日

委託單位：久道科技有限公司
報告編號：SL096E90090m

初步報告
 總結報告



台美檢驗科技有限公司

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Analysis Report
JIU DAO TECHNOLOGY
CO., Ltd.
Sep. 7, 2007

Dust mite lethality test: Evaluation of the ability of "J-Power Air Purifier Sterilizer" to kill dust mites

Report No. : SL096E90090EN
Client : JIU DAO TECHNOLOGY CO., Ltd.
Client Address : No. 139, Fusing 2nd Rd., Gueishan Township, Taoyuan County 333, Taiwan (R.O.C.)
Client Specimen I.D. : J-Power Air Purifier Sterilizer
Specimen I.D. : 90090E01
Date Received : Aug. 15, 2007
Date Tested : Aug. 16, 2007
Date Issued : Sep. 7, 2007
Specimen description : One Equipment
Specimen collector : Client SuperLab

Remarks :

1. This report contains a total of 10 pages. It will be invalid if separated and/or partially copied.
2. The result(s) in this report are valid only to the test substance provided by the client.
3. All contents in this report are to be used as references, not for advertisement, sales promotion, or notarial purpose.
4. The specimen(s) and name(s) in this report was(were) provided by client. Result(s) of the test was(were) only applied to the specimen(s) and if there were any questions, please contact us within 7 days.

Laboratory Director: Wen-chenng Tsai, Ph. D.

Supervisor: Wen-chenng Tsai

Client: JIU DAO TECHNOLOGY CO., Ltd.
Report NO.: SL096E90090EN

Preliminary Report
 Final Report

Study verification and signature

Study initiation date August 13,2006
Test article receipt date August 15, 2007
Experimental starting date August 16, 2007
Experimental completion date August 31, 2007
Study completion date September 7,2007

Experiment executor: Gi-ling Tsai, MS Date: Sep. / 07 / 2007
Gi-ling Tsai, MS

Senior researcher: Yueh-ting Tsai Date: Sep. 7, 2007
Yueh-ting Tsai, MS, MT

Laboratory director: Wen-chenng Tsai Date: Sep. 07/2007
Wen-chenng Tsai, Ph.D., MT(ASCP)

Dust mite lethality test: Evaluation of the ability of “J-Power Air Purifier Sterilizer” to kill dust mites

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Dust mite lethality test: Evaluation of the ability of “J-Power Air Purifier Sterilizer” to kill dust mites

Abstract

This study was conducted for evaluating the ability of a test equipment, namely, “J-Power Air Purifier Sterilizer” that was provided by JIU DAO TECHNOLOGY CO., LTD. (SuperLab Specimen No. 90090E01), to kill the dust mite *Tyrophagus putrescentiae*. Dust mites were isolated from culture feeds, and 0.1 g of dust mites (about 1,000 dust mites) were placed on the sanitized platform of the equipment. The machine was operated twice at 5-second intervals. Subsequently, the survival rate of dust mites was evaluated, and the changes in the appearance of dust mites were observed under a microscope. The result of this study revealed that all the dust mites died completely after the equipment was operated. After sterilization, the appearance of the dust mites changed from a normal nourished morphology to a shrunken arid morphology. In conclusion, our result revealed that the test equipment, namely, “J-Power Air Purifier Sterilizer” that was provided by JIU DAO TECHNOLOGY CO., LTD., had a 100% dust-mite-killing ability.

1. Introduction:

One-third of the population of Taiwan is known to be hypersensitive to small invisible mites, which are found in the living environment. Mites are the main factors that are responsible for the development of hypersensitive disease. It has been proved that dust mites are strong allergens. The secretions, wastes or the bug body will stimulate nasal mucosa, bronchus and trachea mucosa if you breathe in. Stimulation of the air tract by dust mites is known to cause the symptoms of allergic rhinitis. In addition, dust mites can cause asthma, allergic rhinitis, allergic conjunctivitis, atopic dermatitis, urticaria, and chronic urticaria. Hypersensitive disease is considered to be genetically transmitted. Hence, genetic predisposition causes the development of hypersensitive disease in individuals exposed to allergens over long periods of time.

According to the survey of house dust collection in Taiwan in 1994, approximately three-fourth of the dust collected contained dust mites. In all, 5 species of dust mites such as *Dermatophagoides pteronyssinus*, *D. farinae*, *Euroglyphus maynei*, *Blomia tropicalis*, and *Tyrophagus putrescentiae* have been confirmed to act as allergens. Dust mites are small insects with 4 pairs of feet and have chaeta and wrinkles on the surface of their body. An adult mite is about 170~500 μm in length, and the development of mites includes the following stages: egg, larva, protonymph, tritonymph, and adult. Generally, 29.1 days are required for an egg to develop into an adult mite. The life span of a female mite is 72.6 days, during which she lays approximately 28.1 eggs. Dust mites use natural fiber, food particles, inorganic salts, dust, pollens, fungi, spores, insect parts, and

secretions, wastes, and stools of animals as food. Dust mites are found in pillows, quilts, spring beds, mattresses, carpets, sofas, and heavy clothes, i.e., within fabrics, especially in the parts that easily accumulate food particles and skin metabolites.

2. Objective:

This study was conducted for evaluating the ability of a test equipment, namely, "J-Power Air Purifier Sterilizer" that was provided by JIU DAO TECHNOLOGY CO., LTD. (SuperLab Specimen No. 90090E01), to kill the dust mite *Tyrophagus putrescentiae*.

3. Test Article:

3.1 Name of test article: "J-Power Air Purifier Sterilizer" provided by JIU DAO TECHNOLOGY CO., LTD. [Address: No. 139, Fusing 2nd Rd., Gueishan Township, Taoyuan County 333, Taiwan(R.O.C.)]. ◦ The appearance is as Appendix 1.

3.2 Specimen I.D : 90090E01 ◦

3.3 Form : One equipment ◦

3.4 Storage condition: Room Temperature.

4. Test Mite Species:

Tyrophagus putrescentiae, often seen in polluted food or house environment, is as test mite.

5. Methods:

- 5.1. Culture feed: The culture feed was prepared by mixing ground mice feed, wheat bran, and yeast powder in a ratio of 45:45:10.
- 5.2. Culture environment : The mites were cultured at 25°C with a 75% related humidity.
- 5.3. Experimental protocol:
 - 5.3.1 Dust mites were isolated from the culture feed, and 0.1 g of dust mites (1000 dust mites) were placed on the sanitized platform of "J-Power Air Purifier Sterilizer".
 - 5.3.2 The machine was operated twice at 5-second intervals.
 - 5.3.3 After the machine had been operated, the dust mites were removed from the platform, their survival rate was evaluated, and then, the changes in their external appearance were observed under a microscope.

6. Results:

- 6.1 After sterilization, the survival rate of dust mites was evaluated by using a microscope. All the dust mites died after the machine was operated twice.
- 6.2 Before sterilization, the dust mites had a normal nourished morphology, while after sterilization, the dust mites died and showed an arid morphology.

7. Conclusion:

In conclusion, all the mites were killed after the machine was operated twice (at 5-second intervals). Our study indicated that the test machine, i.e., the "J-Power Air Purifier Sterilizer" that was provided by JIU DAO TECHNOLOGY CO., LTD., had a 100% dust-mite-killing ability.



Fig. 1 : The appearance of the dust mite before sterilization.



Fig. 2 : The appearance of the dust mite after sterilization.

Appendix 1: The appearance of the test article "J-Power Air Purifier Sterilizer" (SuperLab ID: 90090E01).



Laboratory Director:

Researcher:

September 7, 2007

Client: JIU DAO TECHNOLOGY CO., Ltd.
Report NO.: SL096E90090EN

Preliminary Report
 Final Report