# 不同容器貯藏蔬菜種子壽命之研究

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## 一、前　言

蔬菜種子在自然氣溫下貯藏，很易失去生命，因此關於各種貯藏方法之研究，國內外以往研究頗多，低溫乾燥貯藏，可保持壽命最久，却因設備不易，爲民間一般農戶和零售種子商，難以採用。作者有鑒及此，研究普遍能合實用的方法，於民國四十六年開始，至五十二年止，前後共計六年，獲得生石灰白鐵罐貯藏，可保持壽命數年不失。茲將前後研究結果，分述於下：

## 二、研　究　結　果

1. 第一期研究結果：供試種子有美濃蘿蔔、山東白菜及番茄三種。貯藏容器：(1)玻璃乾燥器裝氯化鈣，(2)玻璃乾燥器裝生石灰，(3)玻璃乾燥器密閉，(4)白鐵皮罐裝氯化鈣，(5)白鐵皮罐裝生石灰，(6)白鐵皮罐密閉。均於民國四十六年一月開始，五十年五月結束，貯藏四年零四個月，所得結果，僅空氣密閉，不論白鐵皮罐和玻璃乾燥器，均壽命全失。玻璃乾燥器裝氯化鈣，貯藏美濃蘿蔔和丸葉山東白菜種子，略優於裝石灰。貯藏番茄種子則生石灰優於氯化鈣。白鐵皮罐裝生石灰貯藏美濃蘿蔔、丸葉山東白菜、番茄種子，均較裝氯化鈣發芽率略高。

總之，兩種容器，生石灰和氯化鈣作爲乾燥劑，貯藏四年四個月時間，保存壽命效能均高。美濃蘿蔔平均可保持87.5%，丸葉山東白菜平均可保持80.5%，番茄平均可保持71.2%，詳見下表：

表一　不同貯藏容器蔬菜種子壽命之比較

Table 1　Comparison of Vegetable Seeds Stored in Various Kinds of Containers

| 試驗作物 Test crops | 貯藏容器處理種類 Treatments | | 46年1月開始時測定發芽率(%) The percentage of germination before the treatments of storage in Jan. 1957. | 54年5月結束時測定發芽率(%) The percentage of germination at the end of storage in May 1961. | 貯藏4年4個月壽命損失率(%) The percentage of viability lost by storage for 52 months |
|---|---|---|---|---|---|
| 美濃蘿蔔 Minon Radish | 玻璃乾燥器 Desiccator | 裝氯化鈣 with calcium chloride | 94.0 | 87.5 | 6.5 |
| | | 裝生石灰 with caustic lime | 94.0 | 85.0 | 9.0 |
| | | 密閉 closed only | 94.0 | 0 | 94.0 |
| 丸葉山東白菜 Round Leaf Shantung Pe-tsai | 玻璃乾燥器 Desiccator | 裝氯化鈣 with calcium chloride | 98.5 | 82.0 | 16.5 |
| | | 裝生石灰 with caustic lime | 98.5 | 78.5 | 20.0 |
| | | 密閉 closed only | 98.5 | 0 | 98.5 |
| 番茄 Tomato | 玻璃乾燥器 Desiccator | 裝氯化鈣 with calcium chloride | 87.5 | 73.0 | 14.5 |
| | | 裝生石灰 with caustic lime | 87.5 | 80.0 | 7.5 |
| | | 密閉 closed only | 87.5 | 0 | 87.5 |

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|---|---|---|---|---|---|
| 美濃蘿蔔 Minon Radish | 白鐵皮罐 Tin can | 裝氯化鈣 with calcium chloride | 94.0 | 87.5 | 6.5 |
| | | 裝生石灰 with caustic lime | 94.0 | 90.0 | 4.0 |
| | | 密閉 closed only | 94.0 | 0 | 94.0 |
| 丸葉山東白菜 Round Leaf Shantung Pe-tsai | 白鐵皮罐 Tin can | 裝氯化鈣 with calcium chloride | 98.5 | 80.5 | 18.5 |
| | | 裝生石灰 with caustic lime | 98.5 | 81.0 | 17.5 |
| | | 密閉 closed only | 98.5 | 0 | 98.5 |
| 番茄 Tomato | 白鐵皮罐 Tin can | 裝氯化鈣 with calcium chloride | 87.5 | 56.5 | 31.0 |
| | | 裝生石灰 with caustic lime | 87.5 | 75.5 | 12.0 |
| | | 密閉 closed only | 87.5 | 0 | 0 |

2. 第二期研究結果：於民國五十年五月採收之青梗白菜、白花芥藍、球莖甘藍、江門白菜種子，每種種子分爲大粒、中粒、小粒三等級，計分三種容器處理貯藏：(1)紙盒室溫貯藏，(2)生石灰白鐵皮罐貯藏，(3)氯化鈣玻璃乾燥器貯藏。於同年六月一日測定發芽率後貯入，每隔四個月檢查發芽率一次。至五十二年十月，貯滿二十八個月，共檢查發芽率七次，其中紙盒室溫貯藏處理，貯滿四個月後，發芽率開始下降，貯藏十六個月，除江門白菜平均保持18.5%之壽命外，其餘三種全部壽命消失殆盡（詳見表二）。生石灰白鐵罐和氯化鈣玻璃乾燥器貯藏處理，貯滿二十八個月，除球莖甘藍壽命略見消失外，其餘青梗白菜、白花芥藍、江門白菜三種種子，平均發芽率均在85%以上（詳見表三、四）。就兩者貯藏中效能之比較，生石灰白鐵罐處理較氯化鈣玻璃乾燥器稍見遜色，並無極大差別，可說並駕齊驅。

表二 紙盒室溫貯藏中壽命之變化

Table 2 The Percentage of Germination of Vegetable Seeds Stored in Cartons

| 試驗作物 Test crops | 種子大小 Seed size | 1,000粒重量 Weight of 1,000 seeds (g) | 貯藏前測定發芽率(%) The percentage of germination before the treatments | 貯藏中壽命之變化 (%) The percentage of germination in storage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 4個月 4 months | 8個月 8 months | 12個月 12 months | 16個月 16 months | 20個月 20 months | 24個月 24 months | 28個月 28 months |
| 青梗白菜 Ching-Keng Pe-tsai | 大粒 Large | 2.65 | 100.00 | 99.00 | 96.00 | 89.50 | 0 | 0 | 0 | 0 |
| | 中粒 Medium | 1.80 | 100.00 | 98.50 | 88.00 | 73.00 | 0 | 0 | 0 | 0 |
| | 小粒 Small | 1.25 | 94.50 | 69.00 | 64.00 | 43.50 | 0 | 0 | 0 | 0 |
| | 平均 Average | 1.90 | 98.16 | 88.83 | 82.66 | 68.66 | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|---|---|
| 白花芥藍 White Flowered Chinese Kale | 大粒 Large | 3.90 | 100.00 | 98.00 | 78.00 | 68.00 | 0 | 0 | 0 | 0 |
| | 中粒 Medium | 2.40 | 96.50 | 92.00 | 47.00 | 28.50 | 0 | 0 | 0 | 0 |
| | 小粒 Small | 1.50 | 90.50 | 87.00 | 54.00 | 1.50 | 0 | 0 | 0 | 0 |
| | 平均 Average | 2.60 | 95.66 | 92.33 | 59.66 | 32.66 | 0 | 0 | 0 | 0 |
| 球莖甘藍 Kohlrabi | 大粒 Large | 3.10 | 97.50 | 72.00 | 57.00 | 24.00 | 0 | 0 | 0 | 0 |
| | 中粒 Medium | 2.00 | 93.50 | 50.00 | 15.00 | 0.50 | 0 | 0 | 0 | 0 |
| | 小粒 Small | 1.40 | 68.50 | 22.00 | 12.00 | 2.00 | 0 | 0 | 0 | 0 |
| | 平均 Average | 2.16 | 86.50 | 48.00 | 28.00 | 8.83 | 0 | 0 | 0 | 0 |
| 江門白菜 Chiang-men Pe-tsai | 大粒 Large | 2.30 | 100.00 | 97.00 | 92.00 | 90.50 | 31.50 | 0 | 0 | 0 |
| | 中粒 Medium | 1.80 | 100.00 | 87.00 | 81.00 | 75.50 | 18.00 | 0 | 0 | 0 |
| | 小粒 Small | 1.20 | 98.50 | 88.00 | 76.00 | 54.50 | 6.00 | 0 | 0 | 0 |
| | 平均 Average | 1.76 | 99.50 | 90.66 | 83.00 | 73.50 | 18.50 | 0 | 0 | 0 |

表三　生石灰白鐵罐貯藏中壽命之變化

Table 3 The Percentage of Germination of Vegetable Seeds Stored in Tin Can with Caustic Lime

| 試驗作物 Test crops | 種子大小 Seed size | 1,000粒重量 Weight of 1,000 seeds (g) | 貯藏前測定發芽率(%) The percentage of germination before the treatments | 貯藏中壽命之變化 (%) The percentage of germination in storage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 4個月 4 months | 8個月 8 months | 12個月 12 months | 16個月 16 months | 20個月 20 months | 24個月 24 months | 28個月 28 months |
| 青梗白菜 Ching-Keng Pe-tsai | 大粒 Large | 2.65 | 100.00 | 100.00 | 99.00 | 97.50 | 95.00 | 94.00 | 94.00 | 93.00 |
| | 中粒 Medium | 1.80 | 100.00 | 100.00 | 99.50 | 98.50 | 92.50 | 92.50 | 92.00 | 92.00 |
| | 小粒 Small | 1.25 | 94.50 | 93.00 | 93.00 | 93.00 | 90.00 | 90.00 | 89.50 | 89.00 |
| | 平均 Average | 1.90 | 98.16 | 97.66 | 97.16 | 96.33 | 92.50 | 92.17 | 91.83 | 91.33 |

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|---|---|---|---|---|---|---|---|---|---|---|
| 白花芥藍 White Flowered Chinese Kale | 大粒 Large | 3.90 | 100,00 | 100.00 | 99.50 | 99.50 | 97.00 | 97.00 | 97.00 | 97.00 |
| | 中粒 Medium | 2.40 | 96.50 | 97.00 | 96.50 | 93.00 | 92.00 | 90.00 | 85.00 | 86.00 |
| | 小粒 Small | 1.50 | 90.50 | 86.50 | 84.00 | 80.50 | 80.00 | 79.50 | 76.50 | 73.00 |
| | 平均 Average | 2.50 | 95.66 | 94.50 | 93.33 | 91.00 | 89.66 | 88.83 | 86.17 | 85.33 |
| 球莖甘藍 Kohlrabi | 大粒 Large | 3.10 | 97.50 | 97.00 | 94.50 | 92.50 | 95.50 | 90.00 | 87.50 | 81.00 |
| | 中粒 Medium | 2.00 | 93.50 | 89.00 | 85.50 | 71.50 | 67.00 | 67.00 | 65.50 | 66.00 |
| | 小粒 Small | 1.40 | 68.50 | 62.00 | 58.00 | 51.00 | 49.00 | 45.00 | 38.50 | 32.00 |
| | 平均 Average | 2.16 | 86.50 | 82.66 | 79.33 | 71.66 | 70.50 | 67.33 | 63.83 | 59.67 |
| 江門白菜 Chiang-men Pe-tsai | 大粒 Large | 2.30 | 100.00 | 99.00 | 99.00 | 99.00 | 99.00 | 98.50 | 98.00 | 97.00 |
| | 中粒 Medium | 1.80 | 100.00 | 100.00 | 99.00 | 99.00 | 90.00 | 90.00 | 89.00 | 88.00 |
| | 小粒 Small | 1.20 | 98.50 | 97.00 | 97.50 | 97.00 | 97.00 | 97.00 | 96.50 | 97.00 |
| | 平均 Average | 1.76 | 99.50 | 98.66 | 98.50 | 98.33 | 95.33 | 95.17 | 94.50 | 94.33 |

表四　氯化鈣玻璃乾燥器貯藏中壽命之變化

Table 4 The Percentage of Germination of Vegetable Seeds Stored in Desiccator with Calcium Chloride

| 試驗作物 Test crops | 種子大小 Seed size | 1,000粒種量 Weight of 1,000 seeds | 貯藏前測定發芽率(%) The percentage of germination before the treatments | 貯藏中壽命之變化 (%) The percentage of germination in storage | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 4個月 4 months | 8個月 8 months | 12個月 12 months | 16個月 16 months | 20個月 20 months | 24個月 24 months | 28個月 28 months |
| 青梗白菜 Ching-Keng Pe-tsai | 大粒 Large | 2.65 | 100.00 | 100.00 | 99.50 | 99.50 | 100.00 | 99.00 | 96.50 | 97.00 |
| | 中粒 Medium | 1.80 | 100.00 | 100.00 | 98.50 | 97.50 | 96.50 | 95.00 | 94.50 | 93.00 |
| | 小粒 Small | 1.25 | 94.50 | 94.00 | 94.00 | 94.00 | 95.00 | 95.00 | 94.50 | 93.00 |
| | 平均 Average | 1.90 | 98.16 | 98.00 | 97.33 | 97.00 | 97.16 | 96.33 | 95.17 | 94.33 |

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|---|---|---|---|---|---|---|---|---|---|---|
| 白花芥藍 White Flowered Chinese Kale | 大粒 Large | 3.90 | 100.00 | 99.50 | 99.50 | 99.50 | 99.00 | 99.00 | 99.00 | 99.00 |
| | 中粒 Medium | 2.40 | 96.50 | 96.50 | 95.00 | 94.50 | 83.00 | 82.50 | 82.00 | 81.00 |
| | 小粒 Small | 1.50 | 90.50 | 86.00 | 82.00 | 78.00 | 72.00 | 68.50 | 59.50 | 56.00 |
| | 平均 Average | 2.60 | 95.66 | 94.00 | 92.16 | 90.66 | 84.66 | 83.33 | 80.17 | 78.67 |
| 球莖甘藍 Kohlrabi | 大粒 Large | 3.10 | 97.50 | 97.00 | 94.00 | 93.50 | 93.00 | 93.00 | 92.00 | 91.00 |
| | 中粒 Medium | 2.00 | 93.50 | 93.00 | 93.00 | 74.50 | 74.50 | 73.50 | 72.00 | 70.00 |
| | 小粒 Small | 1.40 | 68.50 | 68.00 | 55.00 | 45.00 | 42.50 | 42.00 | 40.50 | 40.00 |
| | 平均 Average | 2.16 | 86.50 | 86.00 | 80.66 | 71.00 | 70.00 | 69.50 | 68.17 | 67.00 |
| 江門白菜 Chiang-men Pe-tsai | 大粒 Large | 2.30 | 100.00 | 99.00 | 99.00 | 99.00 | 99.50 | 99.50 | 99.00 | 99.00 |
| | 中粒 Medium | 1.80 | 100.00 | 99.00 | 99.00 | 99.00 | 99.00 | 99.00 | 99.00 | 99.00 |
| | 小粒 Small | 1.20 | 98.50 | 98.00 | 98.00 | 98.00 | 95.00 | 95.00 | 94.00 | 94.50 |
| | 平均 Average | 1.76 | 99.50 | 98.66 | 98.66 | 98.66 | 97.83 | 97.83 | 97.33 | 97.50 |

## 三、結論及檢討

1. 生石灰白鐵罐貯藏容器和氯化鈣玻璃乾燥器貯藏容器，貯藏蔬菜種子，經連續二次試驗結果，前後費時六年餘，證明兩者之效能約略相等。

2. 生石灰白鐵罐容器不但價廉方便，且不易破損，可大可小製造上非常便利，值得普遍推廣應用，不像氯化鈣玻璃乾燥容器之移動不便，難於管理，且價值又貴，不適普遍應用。

3. 生石灰白鐵罐貯藏容器，如貯藏較多種子時，其生石灰之用量，應相等於種子之重量，否則貯藏效能欠佳。氯化鈣玻璃乾燥貯藏容器，亦屬同樣情形。

# EXPERIMENT ON VEGETABLE SEED STORAGE IN VARIOUS KINDS OF CONTAINERS

by

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## SUMMARY

1. In this experiment, the seed storage effect of a tin can and a glass desiccator with caustic lime or calcium chloride was studied.

2. From the data of this experiment, a tin can with caustic lime and a glass desiccator with calcium chloride showed good results.

3. Although glass desiccator is a common container for the use of seed storage, yet it has some faults. Those are expensive, difficult to convey, and easy to break. In view of these facts, we consider that the tin can is a more practical container to most of the local seed merchants or farmers in Taiwan.

4. When we store a large quantity of seeds in a tin can or a glass desiccator, the same weight of desiccative, such as calcium chloride, caustic lime should be put.