

龍眼果實脫水試驗

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龍眼為亞熱帶經濟果樹之一。以臺灣而言，歷年產量皆居全省果產之第四位，果肉鮮美，但不耐久藏，在豐產之年，因產量激增，供過於求，價格下跌，則果農經濟勢將遭受損失，如予以適當之脫水處理，使果品得以不變質不變味而更延長其壽命 (Shelf life)，以增加果實之商品價值；或使以出口外銷以換取外匯，則於果農經濟至有裨益。

以高雄縣大崗山、大樹鄉及臺南一帶所產之新鮮龍眼為原料，計有鉦子眼、福眼種及晚生種三個品種，利用省農業試驗所鳳山熱帶園藝試驗分所園產加工實驗工廠之小型廂式脫水機 (Cabinet dehydrater) 及熱空氣流動乾燥法以作脫水試驗。

脫水試驗，分為全果脫水與剝取果肉脫水兩種。前者全不用蒸汽殺菁 (Steam blanching)，後者分為蒸汽殺菁與不用蒸汽殺菁 (Non-steam blanching) 兩種。茲將不同品種之龍眼脫水情形，簡記如次：

表一 鉦子眼種龍眼脫水情形記載

Table 1. Records of Dehydration of Niu Tzu Yen Longan

原料別 Raw Materials	製造日期 Manufacturing date 年 月 日	龍眼重 Weight of Longan 公斤(kg.)	殺菁時間 Time of Steam Blanching 分鐘(min.)	加糖量 Percent of Cane sug- ar added %	脫水溫度 Dehydrat- ing temper- ature °F	脫水時間 Time of Dehydrat- ation 小時(hr.)	成品重 Weight of Products 公斤(kg.)	乾燥率 Drying ratio %
全 果 Whole fruit	49. 7. 29	2.0	—	—	170-180	17	0.72	36.0
全 果 Whole fruit	49. 8. 5	1.15	—	—	170-180	20	0.41	35.6

註：鉦子眼種龍眼果實較小，且果肉薄，不適於剝取果肉以供脫水用，故未作果實脫水試驗。

Remarks: The fruit of this variety is rather smaller than Fu yen variety and the flesh is thin too. Really it is unsuitable for the dehydration of flesh only, so we did not do the Experiment of flesh dehydration.

表二 福眼種龍眼脫水情形記載

Table 2. Records of Dehydration of Fu Yen Chung Longan

原料別 Raw Materials	製造日期 Manufacturing date 年 月 日	龍眼重 Weight of Longan 公斤(kg.)	殺菁時間 Time of Steam Blanching 分鐘(min.)	加糖量 Percent of Cane sug- ar added %	脫水溫度 Dehydrat- ing temper- ature °F	脫水時間 Time of Dehydrat- ation 小時(hr.)	成品重 Weight of products 公斤(kg.)	乾燥率 Drying ratio %
全 果 Whole fruit	49. 7. 23	1.35	—	—	170-180	24	0.405	30.0
果 肉 Fruit flesh	49. 7. 13	0.93	—	—	150-160	9	0.09	9.7
果 肉 Fruit flesh	49. 7. 19	1.15	5	—	150-160	9	0.11	9.56
果 肉 Fruit flesh	49. 7. 23	1.50	3	—	150-160	9	0.155	10.30
果 肉 Fruit flesh	49. 8. 15	2.72	3	20	150-160	9	0.355	13.05

果 肉 Fruit flesh	49. 8. 22	1.48	3	15	150-160	9	0.18	12.20
果 肉 Fruit flesh	49. 8. 23	1.48	3	20	150-160	9	0.21	14.20

表三 晚生種龍眼脫水情形記載

Table 3. Records of Dehydration of Wan Sheng Chung Longan

原料別 Raw Materials	製造日期 Manufacturing date 年 月 日	龍眼重 Weight of Longan 公斤(kg.)	殺菁時間 Time of Steam Blanching 分鐘(min.)	加糖量 Percent of Cane sug- ar added %	脫水溫度 Dehydrat- ing temper- ature °F	脫水時間 Time of Dehydrat- ation 小時(hr.)	成品重 Weight of Products 公斤(kg.)	乾燥率 Drying ratio %
果 肉 Fruit flesh	49. 9. 14	3.00	3	20	150-160	9	0.39	13.00
果 肉 Fruit flesh	49. 9. 15	3.00	3	15	150-160	9	0.375	12.50

將以上各品種之龍眼脫水製品分別裝入攜帶罐(即平五號罐)中，經貯藏三個月後，開罐檢查結果如次：

表四 各品種龍眼脫水製品之檢查結果

Table 4. Different Dehydrated Longan product of Various varieties which packed in Cans after inspection

樣品代號 Sample No.	品 種 別 Varieties	原料別 Raw ma- terials	製造日期 Manufacturing date 年 月 日	開 罐 檢 查 結 果 Results of inspection of the cans
1.	福眼種 Fu Yen Chung	全 果 Whole fruit	49. 7. 23	果肉棕黑色，透明，微甜，風味良好。 The flesh color is brownish black, transparent, slightly sweetness, its flavor is good.
2.	鈕子眼 Niu Tzu Yen	全 果 Whole fruit	49. 7. 29	果肉棕黑色，果肉薄，風味良好。 The flesh color is also brownish black but the flesh is thin. It has a good flavor too.
3.	鈕子眼 Niu Tzu Yen	全 果 Whole fruit	49. 8. 5	果肉薄而乾，色呈棕黑，風味尚佳。 The flesh color is also brownish black, its flesh is thin and hard, the flavor is fair.
4.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	49. 7. 13	果肉棕色，微甜，風味佳良。 The flesh color is brown, slightly sweetness, it has a delicious flavor.
5.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	49. 7. 19	因殺菁時間稍長，果肉蒸爛，色變灰褐，不甜，風味劣。 For the blanching time is longer than the ordinary treatment, so the flesh is broken like the pulp, the color turned to brownish gray, no sweetness, It is not palatable.
6.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	49. 7. 23	成品顏色甚佳，風味優良，惟不過甜。 The flesh color is very good, though it is delicate, but not too sweetness.
7.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	49. 8. 15	顏色風味俱佳，甜度適當，甚為可口。 Both the color and flavor are very good with a increasing of palatability.
8.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	49. 8. 22	顏色風味皆好，味甜可口。 Both the color and flavor are also very good, it is palatable and sweetness.

9.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	49. 8. 23	色味均佳，甜度適當，甚為可口。 Both the color and flavor are good with an optimum sweetness and delicious taste.
10.	晚生種 Wan Sheng Chung	果 肉 Fruit flesh	49. 9. 14	色黃而有光澤，味甜可口。 The color of the product is yellow with a lustrous, it is sweetness and palatable.
11.	晚生種 Wan Sheng Chung	果 肉 Fruit flesh	49. 9. 15	色黃且有光澤，甜度適當，風味良好。 Its color is also yellow with a glossy, it is sweetness and delicacy too.

上列各種龍眼脫水製品，經開罐檢查後，選出一批顏色風味均較佳良之 No. 1, No. 2, No. 4, No. 6, No. 7, No. 8 及 No. 11 等製品，於本年十月一日及四日兩天，邀請鳳山熱帶園藝試驗分所果樹組及製造組同事九人在加工廠作風味品評，茲將品評結果分誌於次：

表五 龍眼脫水製品風味品質之品評記錄

Table 5. Critical records of Color, flavor, taste and quality of Dehydrated Longan

A. 全果脫水製品

Dehydrated products of whole fruit

樣品代號 Sample No.	品 種 別 Varieties	原 料 別 Raw materials	色 澤 Color	風 味 Flavor & Taste	品 質 Quality	外 觀 Appear- ance	總 計 Total	等 第 Grade
1.	福眼種 Fu Yen Chung	全 果 Whole fruit	20.66	22.55	21.67	22.00	86.88	1
2.	鈕子眼 Niu Tzu Yen	全 果 Whole fruit	19.55	21.78	20.33	19.78	81.43	2
備 註 Remarks	<p>1. 以上各項目之滿分各為25，總計為100。 The points of the above items is 25 each, but the grand total is 100.</p> <p>2. 此為經分所同事九人品評記分統計後之平均結果。 All the above data are the average value of organoleptical test by 9 colleagues in our experiment station.</p>							

B. 果肉脫水製品

Dehydrated products of fruit flesh

樣品代號 Sample No.	品 種 別 Varieties	原 料 別 Raw materials	色 澤 Color	風 味 Flavor & Taste	品 質 Quality	外 觀 Appear- ance	總 計 Total	等 第 Grade
4.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	19.43	22.30	23.29	19.57	84.59	2
6.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	19.29	22.00	22.14	19.57	83.00	3
7.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	20.43	21.14	20.43	20.43	82.43	4

8.	福眼種 Fu Yen Chung	果 肉 Fruit flesh	20.14	19.71	21.29	20.30	81.44	5
11.	晚生種 Wan Sheng Chung	果 肉 Fruit flesh	22.71	20.14	20.00	23.14	85.99	1
附 註 Remarks	<p>1. 以上各項目之滿分各為25，總分為100。 The full points of the above items is 25 each and the grand total is 100.</p> <p>2. 此為經分所同事九人品評記分統計後之平均結果。 All the above data are the mean value of organoleptical test by nine colleagues in our experiment station.</p>							

最後將貯藏三個月以後之龍眼果肉脫水製品五種，分析其水分及全糖分。茲誌分析結果如次：

表六 龍眼果肉脫水製品之成分分析
Table 6. Analysis of Dehydrated Longan flesh

分析項目 Items	樣品號次 Sample No.	No. 4	No. 6	No. 7	No. 8	No. 11
水 分(%) Moisture		13.84	15.10	11.20	11.92	11.50
全 糖 分(%) Total Sugar		22.58	21.53	35.94	25.20	23.63
附 註 Remarks	<p>全果脫水製品因含水分較多，不易保存較長時間，除少數幾袋品質良好者，供品評之用外，已無好的製品可供分析。 The dehydrated products of Longan whole fruit Comprises more moisture, so it can not be stored for a longer time. Except some polyethylene bags of good quality have been used for organoleptical test, but at present no good products can be employed for analysis.</p>					

綜合以上試驗結果，可得結論數點如下：

- 龍眼脫水品種，以福眼種為佳。
- 龍眼脫水製品，經開罐檢查並由分所同事九人品評之結果，全果脫水以 No. 2 製品為佳，果肉脫水則以 No. 11 製品為優。
- 查 No. 2 製品係在170°~180°F. 溫度脫水24小時；No. 11 製品為果肉先行殺菁(blanching) 3分鐘，加砂糖15~20%，於150°~160°F. 溫度脫水9小時，然後裝盛於鐵罐中。
- 依據分析結果，龍眼果肉脫水製品之水分量，以 No. 7 為低 (11.20%)，但全糖分量高 (35.94%)；No. 11 製品之水分量為 11.50%，雖次於 No. 7 製品，但糖分量適中(23.63%)所以甜度適當，風味良好。
- 裝盛龍眼全果脫水製品之容器，以用塑膠袋 (Polyethylene bag) 為佳；裝盛龍眼果肉脫水製品，以用塗敷釉質的空鐵罐 (Enamel lined cans) 為宜。
- 本試驗所用之熱空氣流動乾燥法及小型箱式脫水機構造圖，均分別刊載於臺灣省農業試驗所41年年報第260~261頁及臺灣糖業公司屏東總廠蔗作改良場48~49年期研究試驗簡報第 139 頁，故此處不再縷述。

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EXPERIMENT ON THE DEHYDRATION OF LONGAN

by

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SUMMARY

Longan (*Euphoria longana* Lam.) is one of the economic fruit trees in the subtropical zone. In Taiwan, its yearly production occupied the fourth rank among the annual total fruit yields. The fruit flesh are delicate and palatable, but it cannot be stored for a longer time. During the harvesting season, though its production increased suddenly but low in price, thus it will be influencing the economics of the farmers-in-fruit. For this reason, the preservation of longan by dehydration is necessary. It is concluded that the dehydrated longan will not alter the quality and flavor. Furthermore, it will be elongated the shelf life of longan product for exportation.

Three varieties of longan are used as the raw materials for dehydration. Viz., Fu Yen Chung, Niu Tzu Yen and Wan Sheng Chung. The dehydration experiment was carried out at the pilot plant of Fengshan Horticulture Experiment Station on June, 1960 and ended on October, 1960. The cabinet dehydrater is employed for dehydration, while the raw materials are dried in a current of heated air in the dehydrater. The experimental results may be summarized as follows:

1. Among the three varieties, Fu Yen Chung is the best one for making the dehydrated longan.
2. Both the inspection of canned longan dehydrated products and the organoleptical tests were performed. In whole fruit dehydration, the product No. 2 is superior than the other one; while in the fruit flesh dehydration only, the product No. 11 is the better than the other four dehydrated products.
3. The optimum drying temperature and time for dehydrating the whole fruit are considered to be most favorable between 170°-180°F. for 24 hours, whereas the operation of dehydrating the fruit flesh is slightly different, the flesh is first steam blanching for 3 minutes, then added the cane sugar 15-20% (based on the weight of fresh flesh), finally dehydrated under the temperature 150°-160°F. for 9 hours and then packed with enamel lined cans.
4. According to the analytical data, though the moisture of the dehydrated product No. 7 is so low (11.20%), but the sugar content (35.94%) is higher than others; while the product No. 11, however, both the moisture content as well as the sugar content are 11.50% and 23.63% respectively. Hence it is palatable and the flavor is also good.
5. The best longan dehydrated product has been obtained when the enamel lined cans are used for packing.