

# 雞糞堆肥與牛糞堆肥不同施用期對落花生有機栽培農藝性狀及產量之影響

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## 摘要

本研究主要探討落花生有機栽培管理，以落花生台南14號及黑仁花生為材料，於100年2月(春作)與8月(秋作)利用完全發酵雞糞+菇類廢棄太空包製成之雞糞堆肥(全氮3.5%、全磷3.0%、氧化鉀1.8%、有機質63%)與完全發酵牛糞+菇類廢棄太空包製成之牛糞堆肥(全氮2.0%、全磷2.5%、氧化鉀2.2%、有機質50%)兩種為處理，每公頃3000kg/1a分全施(兩種不同有機肥料全量在種植前施用)與分施(堆肥全量的2/3在種植前施用，剩餘1/3在中耕培土除草行之)兩種不同施用期，收穫時調查落花生農藝性狀及產量組成，並與一般慣行栽培作比較，結果如下：

春作有機栽培落花生雞糞堆肥施用期全施與分施處理則二品種表現不一致，其台南14號以慣行有最高之小區鮮果產量與小區種子產量；黑仁花生則分施與全施之表現在小區種子產量則較慣行栽培為佳。秋作有機栽培落花生牛糞堆肥施用期全施與分施處理則二品種表現不一致，其台南14號以慣行有最高之小區鮮果產量與小區種子產量；黑仁花生則全施之表現在小區鮮果產量與小區種子產量則較分施與慣行栽培為佳。

秋作有機栽培落花生雞糞堆肥施用期全施與分施處理兩品種台南14號及黑仁花生皆以分施處理有最高之小區鮮果產量與小區種子產量，但慣行栽培則較全施與分施處理表現為佳。秋作有機栽培落花生牛糞堆肥施用期全施與分施處理則二品種表現不一致，其台南14號以分施較全施有最高之小區鮮果產量與小區種子產量；黑仁花生則全施之表現在小區鮮果產量與小區種子產量則較分施為佳，但慣行栽培也與雞糞堆肥有相似之現象，較全施與分施處理表現為佳。

**前言** 有機肥料所含之營養元素較化學肥料均衡，具有促進作物生長、提升產量及品質效果 (Jacobs, 1990)。合理施用有機肥料，有助於提升作物生產 (Reddy et al., 2000)。落花生 (*Arachis hypogaea* L.) 是台灣重要之雜糧及食用作物之一，依據2011年台灣農業年報統計，民國99年栽培面積為20917公頃。未來落花生推廣有機栽培，有機肥之施用期可能影響產量與品質，本研究目的探討落花生有機栽培堆肥不同施用期與慣行農法之落花生農藝性狀及產量上之差異。

**材料與方法** 以落花生台南14號與黑仁花生為材料，於100年2月春作與8月(秋作)播種於嘉義縣竹腳有機農家農田，以雞糞與牛糞堆肥不同施用期(1. 施肥全量在種植前施用為基肥；2. 施肥量之全量的2/3在種植前施用為基肥，剩餘之1/3的有機肥在中耕培土除草約種植後30天行之)為處理。花生成熟將各處理小區收穫，並將花生果果乾燥，脫殼後種子進行農藝性狀及產量調查。

## 結果

Table 1. Effects of different application times of chicken compost on agronomic characters of organic cultural peanut TN14 in harvest period (spring crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	62.60b	4.25b	9.24a	3.13a	12.38a	15.88c	12.33b	10.18b
Application at different times	69.29a	4.16b	9.16a	2.67a	11.84a	17.07bc	13.70b	10.92b
All application	66.60ab	4.33b	9.40a	2.72a	12.45a	18.31b	13.90b	10.66b
Common cultural	54.49c	7.00a	11.02a	3.97a	14.99a	33.33a	18.34a	20.89a
LSD	4.32	0.57	NS	NS	NS	1.53	1.753	5.47

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	6.28b	60.59b	4199.4c	1632.9b	49.05b	84.88ab	12.87b	2.24ab
Application at different times	6.62b	60.64b	4467.3bc	1765.5b	50.42b	87.37a	9.90c	2.73a
All application	6.33b	59.31b	4752.4b	1686.3b	49.53b	86.97a	10.98c	2.05ab
Common cultural	14.54a	69.76a	9218.5a	3743.2a	78.77a	83.40a	15.26a	1.34b
LSD	1.36	2.19	431.41	368.74	5.64	2.84	1.69	1.12

Table 2. Effects of different application times of chicken compost on agronomic characters of organic cultural black kernel peanut in harvest period (spring crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	95.56b	3.34ab	7.01a	4.67a	11.67a	19.67a	18.78a	11.87a
Application at different times	101.88a	3.17b	7.44a	4.61a	12.05a	21.86a	20.46a	12.80a
All application	105.01a	3.30ab	7.32a	4.91a	12.23a	20.93a	19.74a	11.85a
Common cultural	84.62c	3.83a	7.53a	4.13a	11.67a	22.20a	19.50a	12.28a
LSD	4.61	0.66	NS	NS	NS	NS	NS	NS

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	6.48a	57.95a	5198.9a	1636.5b	34.83c	63.04b	27.13a	9.82a
Application at different times	8.66a	59.86a	5828.3a	2268.7a	42.07ab	69.30a	21.42b	9.28a
All application	8.71a	58.85a	5343.8a	2261.2a	44.78a	68.63a	23.52ab	7.85a
Common cultural	7.24a	58.22a	5852.2a	1830.7b	37.96bc	65.26ab	28.55a	6.86a
LSD	NS	NS	NS	365.88	5.11	5.16	5.11	NS

Table 3. Effects of different application times of dairy compost on agronomic characters of organic cultural peanut TN14 in harvest period (spring crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	63.87a	3.86b	8.68b	2.72bc	11.41bc	16.58b	13.88b	11.03b
Application at different times	67.72a	4.18b	9.61ab	3.15ab	12.76b	18.92b	15.12b	11.77b
All application	65.26a	3.81b	8.75b	2.22c	10.97c	17.20b	14.80b	11.53b
Common cultural	54.49b	7.00a	11.02a	3.97a	14.99a	33.33a	18.34a	20.89a
LSD	4.05	0.57	1.48	0.87	1.77	3.40	1.94	1.90

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	6.55b	59.49b	4332.9b	1746.9b	49.05b	82.48a	13.17a	4.35a
Application at different times	7.12b	60.38b	5043.7b	1897.0b	45.53b	84.36a	13.57a	2.07b
All application	6.69b	60.83b	4515.3b	1776.2b	48.42b	84.84a	13.26a	1.90b
Common cultural	14.54a	69.76a	9218.5a	3743.2a	78.77a	83.40a	15.26a	1.34b
LSD	1.17	3.81	915.45	311.57	5.38	NS	NS	NS

Table 4. Effects of different application times of dairy compost on agronomic characters of organic cultural black kernel peanut in harvest period (spring crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	97.80b	3.18b	6.20a	4.23a	10.44a	18.57a	16.19a	10.16a
Application at different times	104.16a	3.39ab	7.30a	3.81a	11.11a	19.83a	18.51a	11.31a
All application	106.10a	3.36ab	7.80a	4.71a	12.51a	22.67a	20.99a	12.85a
Common cultural	84.62c	3.83a	7.53a	4.13a	11.67a	22.20a	19.50a	12.28a
LSD	5.19	0.52	NS	NS	NS	NS	NS	NS

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	6.24b	55.77a	4834.5a	1662.4b	34.42b	61.00b	26.73a	12.27a
Application at different times	6.96ab	58.67a	5236.9a	1836.7b	37.71ab	63.63ab	27.59a	8.78a
All application	8.48a	59.15a	6044.4a	2239.5a	41.00a	68.9a	24.35a	6.95a
Common cultural	7.24ab	58.22a	5852.2a	1830.7b	37.96ab	65.26ab	28.55a	6.86a
LSD	2.07	NS	NS	402.43	3.92	5.49	NS	NS

Table 5. Effects of different application times of chicken compost on agronomic characters of organic cultural peanut TN14 in harvest period (fall crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	39.36b	7.17b	9.12b	9.54b	18.66c	18.92b	9.12a	14.14b
Application at different times	42.11ab	8.92a	12.13a	11.02ab	23.15a	23.49ab	12.29a	18.18ab
All application	43.61a	9.06a	10.63ab	11.70a	22.34ab	21.76b	11.23a	16.16ab
Common cultural	44.68a	7.22b	12.50a	7.06c	19.56bc	29.07a	13.37a	19.72a
LSD	3.18	1.43	1.97	1.83	3.35	6.24	NS	4.23

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	5.26b	57.55b	5042.9b	1402.7b	37.20a	52.02c	43.82a	4.17a
Application at different times	7.03ab	57.19b	6261.7ab	1873.7ab	38.41a	55.54bc	38.98ab	5.48a
All application	6.53ab	58.18a	5802.2b	1739.5ab	40.28a	63.29b	33.90b	2.81a
Common cultural	8.74a	66.18a	7750.1a	2331.0a	45.21a	72.78a	15.29c	2.94a
LSD	2.71	8.33	1663.6	721.25	NS	8.27	6.53	NS

Table 6. Effects of different application times of chicken compost on agronomic characters of organic cultural black kernel peanut in harvest period (fall crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	41.64b	3.66a	6.45b	4.72b	11.17b	26.75a	9.63b	18.49b
Application at different times	44.09ab	3.67a	7.30b	5.83ab	13.12b	28.62a	11.16ab	19.49ab
All application	42.11ab	3.85a	7.01b	5.14b	12.15b	27.03a	10.48b	18.56b
Common cultural	44.82a	3.80a	10.17a	6.83a	17.01a	30.12a	13.25a	23.90a
LSD	3.16	NS	1.90	1.39	2.81	NS	2.74	4.57

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	4.07b	42.44b	7130.4a	1084.7b	22.00b	27.88b	53.83a	18.29a
Application at different times	4.87b	43.53b	7631.0a	1298.8b	25.26b	36.73b	51.11a	12.16bc
All application	4.48b	42.77b	7206.6a	1193.5b	24.01b	32.55b	54.41a	13.04ab
Common cultural	8.47a	64.84a	8029.1a	2257.2a	35.53a	58.28a	35.29b	6.43c
LSD	1.40	13.11	NS	371.9	6.45	9.62	10.15	6.05

Table 7. Effects of different application times of dairy compost on agronomic characters of organic cultural peanut TN14 in harvest period (fall crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	41.42b	8.46a	10.82a	9.31ab	20.13ab	21.66b	11.49a	15.40b
Application at different times	43.74a	8.40a	11.10a	11.69a	22.78a	23.60ab	12.35a	16.58ab
All application	42.94a	8.55a	11.24a	10.01ab	20.92ab	22.23b	11.95a	16.18ab
Common cultural	44.68a	7.22b	12.50a	7.06c	19.56c	29.07a	13.37a	19.72a
LSD	2.03	0.72	NS	3.13	3.00	5.90	NS	3.84

Organic fertilizer application time	Weight of seeds (g)	100 -seed weight (g)	Pod yield /plot (g/10m <sup>2</sup> )	Seed yield /plot (g/10m <sup>2</sup> )	Shelling percentage (%)	Rate of 1 <sup>st</sup> grade seed (%)	Rate of 2 <sup>nd</sup> grade seed (%)	Rate of 3 <sup>rd</sup> grade seed (%)
Control	6.29b	55.01a	5773.9b	1677.4b	40.86a	61.14b	35.99a	2.86a
Application at different times	6.78b	54.90a	6293.1ab	1806.8b	40.85a	64.84b	31.38b	3.77a
All application	6.48b	54.08a	5925.3b	1726.9b	39.99a	61.73b	34.35ab	3.92a
Common cultural	8.47a	66.18a	7750.1a	2331.0a	45.21a	72.78a	15.29c	2.94a
LSD	1.31	NS	1572.7	348.76	NS	4.489	4.10	NS

Table 8. Effects of different application times of dairy compost on agronomic characters of organic cultural black kernel peanut in harvest period (fall crop of 2010).

Organic fertilizer application time	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant (no.)	Mature pod dry weight (g)
Control	38.73b	3.85a	6.58b	5.35b	11.93b	22.16b	8.20b	16.22b
Application at different times	42.95ab	3.82a	7.42b	4.56b	11.94b	22.91b	9.02b	16.99b
All application	42.28ab	3.99a	7.47b	5.36b	12.83b	28.11ab	9.51b	18.35b
Common cultural	44.82a							