

# 藥用植物油甘之介紹與功效

鄭涵菁<sup>1,2</sup>、林文宏<sup>3</sup>、楊舜傑<sup>4</sup>、姜智云<sup>5</sup>、曾文慶<sup>6</sup>、\*郭宗甫<sup>7</sup>

1. 衛生福利部苗栗醫院
2. 國立交通大學生物資訊及系統生物研究所
3. 中華大學財務管理系
4. 台灣粒線體應用技術股份有限公司
5. 台灣中外製藥股份有限公司
6. 中華大學生物資訊學系
7. 國立台灣大學獸醫學系

\*Corresponding author: tzongfu@ntu.edu.tw

## 一、簡介

油甘學名 *Phyllanthus emblica* Linn.(又名 *Emblica officinalis*)，為大戟科 (Euphorbiaceae)之雙子葉喬木，其分類如表1(特有生物研究保育中心; Wikipedia)。油甘主要產地分佈於熱帶及亞熱帶地區，英文名稱Indian Gooseberry, Amla berry，葉互生，長橢圓狀呈二列狀排列，成熟之果實呈黃綠色球型，生食時先呈苦澀酸味，但之後滿口回甘，所以有餘甘子之別名(圖1、圖2)。

明朝李時珍《本草綱目》之〈果部第三十一卷，果之三〉記載：「【釋名】余甘子《唐本》庵摩落迦果。藏器曰：《梵書》名庵摩勒，又名摩勒落迦果。其味初食苦澀，良久更甘，故曰余甘。【集解】恭曰：庵摩勒生嶺南交、廣、愛等州。樹葉細似合昏。其花黃。實似李、柰，青黃色，核圓有稜，或六或七，其中仁亦入藥用。」

雖然書中說果仁也可入藥，但並無相關說明。至於果實之效用書中記載：

【氣味】甘，寒，無毒。曰：苦、酸、甘，微寒，澀。

【主治】風虛熱氣。補益強氣。合鐵粉一斤用，變白不老。取子壓汁，和油塗頭，生發去風癢，令發生如漆黑也。主丹石傷肺，上氣咳嗽。久服，輕身延年長生。服乳石人，宜常食之。為末點湯服，解金石毒，解硫黃毒。

表1 油甘之分類

Kingdom	Plantae
Division	Flowering plant
Class	Magnoliopsida
Order	Malpighiales
Family	Phyllanthaceae
Tribe	Phyllantheae
Subtribe	Flueggeinae

Genus	Phyllanthus
Species	<i>P. emblica</i>



圖1 油甘葉與果實



圖2 油甘果實外觀與大小

油甘樹形優美，樹姿百態，是優良的綠化觀賞與水土保持樹種。整個植株從根莖葉到果實果仁均有用途，除作為木材、枕芯及提煉烤膠外，藥用方面：根有清熱，解毒之效；樹皮有殺菌去撫之效；葉治疳疔毒，疔瘡，痔漏，皮膚濕疹；果實可補氣，化痰，生津，止咳，解毒(莊溪；台灣油甘網；中國在线植物志)。作為傳統的中藥，《本草綱目》指出油柑有久服輕身和延年長生之效。油甘也廣泛用於藏藥中，例如藏族傳統藥物二五味子丸和二五味餘甘散，主要功能為涼血降壓，用於敗血症、高血壓、肝膽疼痛、胸背酸痛之治療(謝文章，2012)。

## 二、 油甘之成分與功效

油甘果實含水超過80%，其他主要成分為蛋白質、纖維、碳水化合物及礦物質(表2)。油甘果實富含維生素C、礦物質及多酚類化合物，營養價值高。維生素C含量很高，是橙汁含量的20倍，蘋果的160倍；礦物質方面，含豐富的鈣、磷、鐵，也含能改善免疫能力之鋅、銅、鉻；酚類化合物中含強抗氧化性的化合物gallic acid(Singh et al., 2012)。

表2 油甘果實之化學成分

Chemical components	Weight (g / 100g fruit)
Water	81.2
Protein	0.5
Fat	0.1
Mineral matter	0.7
Fibre	3.4
Carbohydrate	14.1
Bulk elements	Weight (mg/100g fruit)
Calcium	50
Phosphorous	20
Iron	1.2
Vitamin C	600
Nicotinic acid	0.2

油甘果實是優異的維生素C來源，是植物界中含維生素C濃度最高者。另一方面，果實內之維生素C與單寧結合，可保護維生素C免受光與熱之破壞。若果實整顆食用，所含維生素C可容易地被人體吸收消化(Nisha et al., 2004)。油甘果實同時含豐富具有生物活性(biological activity)之成分，其中包含酚類、多酚類、水解單寧、類黃酮及生物鹼之物質 (Patel and Goyal, 2012)。這些生物活性化合物，如表3，賦予了油甘獨特之藥效。

表3 油甘果實含有之生物活性成分

Class	Compounds	Reference
phenolic and polyphenolic compounds	gallic acid, L-malic acid 2-o-gallate, Mucic acid 2-o-gallate, Corilagin Chebulagic acid et al.	( <u>Zhang et al., 2001</u> ; <u>Zhang et al., 2004</u> )
hydrolysable tannins	emblicanin A and B,	<u>Ghosal et al. (1996)</u>

	punigluconin, pedunculagin	
flavonoids	quercetin	(Anila and Vijayalakshmi, 2002; Gulati et al., 1995)
alkaloids	phyllantine, phyllantidine	(Khanna and Bansal, 1975)

### 三、 油甘相關之功效範圍

最早使用油甘果實是由印度起源，早期會與一些草藥合併使用來預防或治療一些身體不適的症狀；近年來研究油甘文獻也指向油甘在生理及藥理上有好的療效(Swetha et al., 2014)(圖3)，生理上的例如降血糖血脂(Usharani et al., 2013)、鎮痛(Sharma et al., 2004)、抗咳嗽(Nosal et al., 2003)、抗動脈粥樣硬化(Santoshkumar et al., 2013)、適應原(Muruganandam et al., 2002)、護心(Baliga et al., 2013)、護胃(Chatterjee et al., 2010)、神經保護(Vasudevan et al., 2007)及增強記憶力、學習能力(Harshad et al., 2014)；藥理上如化學預防(Krishnaveni et al., 2012)、免疫調節(Varadacharyulu et al., 2009)、抗發炎(Santoshkumar et al., 2013)、抗老化(Rawal et al., 2014)及抗癌(Alok et al., 2013)。

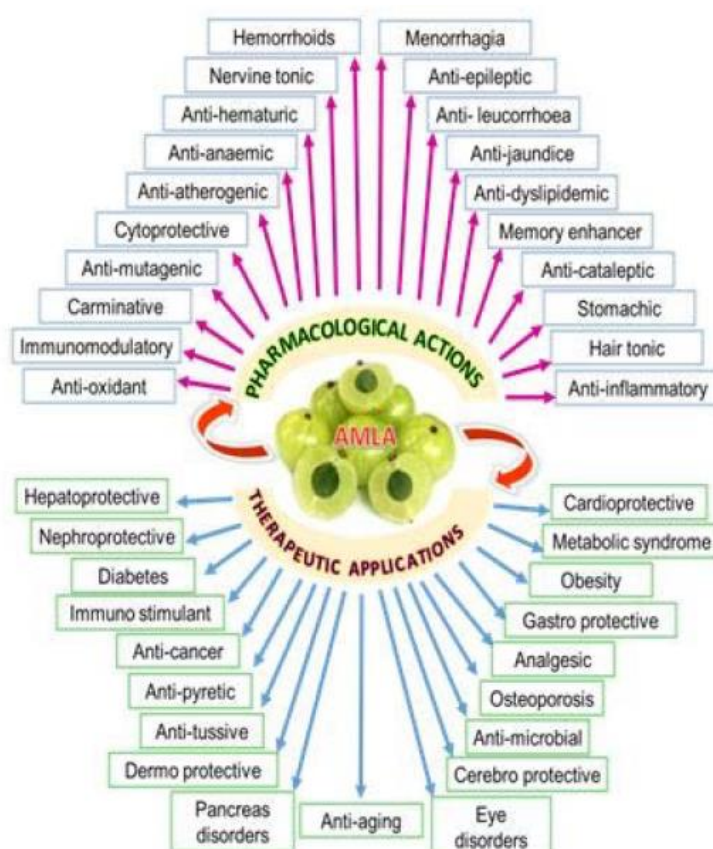


圖3 油甘之藥理及生理功效

#### 四、 油甘之抗氧化作用

《本草綱目》所指油柑有久服輕身和延年長生之效與油甘之抗氧化作用有密切關係。油甘果實內含多種有效用的抗氧化物及自由基清除劑，有助降低疾病及延緩老化程序。在日本之實驗指出以油甘製備之產品含高量之氧化物歧化酶(superoxide dismutase, SOD)，是強力的自由基清除劑(Ghosal, 1996)。

Ghosal等研究油甘果汁及萃提取物之抗氧化特性，不是肇因於高含量之維生素C，而是與低分子量之水解單寧有關。老鼠周邊血液之研究發現單寧化合物如 embelicanin-A, emblicanin-B, punigluconin及pedunculagin能保護老鼠的紅血球，抵抗氧化傷害(Ghosal *et al.*, 1996)。

多項生體外之研究顯示，油甘水萃液能強烈抑制脂質過氧化物形成，掃除氫氧自由基與過氧化自由基(Jose and Kuttan, 1995; Naik *et al.*, 2005)。Kumar等研究油甘中自由及鍵結的酚類化合物，發現油甘之高抗氧化來自其高的酚類化合物含量，而Gallic acid及tannic acid即是其主要的抗氧化成分(Kumar *et al.*, 2006)。老鼠肝臟實驗顯示，油甘水萃液能抑制伽馬輻射引發之脂質過氧化作用，也能抑制超氧化物歧化酶Superoxide Dismutase (SOD)之損害(Khopde *et al.*, 2001)。

#### 五、 油甘之調節血脂、血糖作用

以油甘水萃物(60%低分子量之水解單寧如 embelicanin-A, emblicanin-B, punigluconin及pedunculagin)給予每組20位年齡介於30~68歲，血糖濃度110~126 mg/dL，醣化血色素(HbA1c)7%~9%之第二型糖尿病患者，組別為A：250mg水萃物 2次/天、B：500mg水萃物 2次/天、C：降血脂藥物 Atorvastatin 10mg/天及D：安慰劑為期12週測試；結果發現油甘水萃物與降血脂藥物 Atorvastatin組別對於病人血液抗氧化指標MDA及GSH皆有好轉的效果，其中B組給予500mg水萃物與藥物C組幾乎接近相同的效果(圖4) (Usharani *et al.*, 2013)。

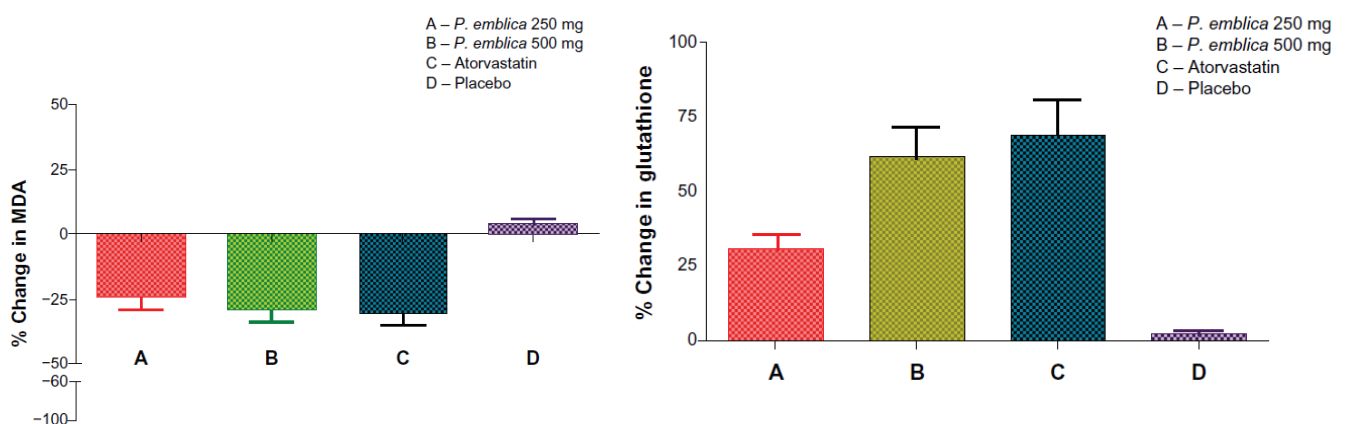


圖4 油甘水萃物臨床抗氧化指標

另外在血液血脂中發現給予油甘水萃物組別對於總膽固醇(TC)、低密度膽固醇(LDL-C)、三酸甘油酯(Triglycerides)皆有統計上明顯的下降，對於高密度膽固醇(HDL-C)則有統計上的增加(表4)。對於血糖指標糖化血色素(HbA1c)油甘水萃物組別也有回復至趨近正常值範圍內(表5)(Usharani *et al.*, 2013)。

表4. 油甘水萃物臨床血脂作用

Table 4 Effect of *P. emblica* 250 mg, *P. emblica* 500 mg, atorvastatin 10 mg, and placebo on lipid profile

Parameter	<i>P. emblica</i> 250 mg twice daily (n=20)		<i>P. emblica</i> 500 mg twice daily (n=20)		Atorvastatin 10 mg + placebo each once daily (n=20)		Placebo twice daily (n=20)	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
	A	B	C	D	E	F	G	H
TC (mg/dL)	183.7±30.04	161.8±19.81	193.2±24.90	164.5±22.53	183.7±37.41	135.6±26.94	188.9±35.20	192.2±32.73
HDL-C (mg/dL)	39.10±4.12	42.10±5.58	41.45±6.73	47.70±6.17	40.44±6.76	47.95±5.34	38.35±5.21	37.50±5.68
LDL-C (mg/dL)	116.9±28.24	95.90±19.43	124.3±27.49	92.60±25.35	126.00±34.90	78.50±16.71	126.2±39.45	135.5±45.27
Triglycerides (mg/dL)	150.8±42.50	132.0±39.82	164.5±70.54	123.8±41.52	155.0±56.51	106.5±30.79	164.3±21.70	169.0±19.85
VLDL-C (mg/dL)	27.25±7.12	24.20±5.86	31.35±10.58	24.45±5.73	25.20±6.57	19.90±3.64	26.40±5.17	25.6±4.98

Notes: TC,  $P < 0.001$  for B versus A, D versus C, and F versus E,  $P < 0.01$  for B versus H and D versus H,  $P < 0.001$  for F versus H; HDL-C,  $P < 0.01$  for B versus A and D versus C,  $P < 0.001$  for F versus E,  $P < 0.05$  for B versus H, and  $P < 0.001$  for D versus H and F versus H; LDL-C,  $P < 0.01$  for B versus A and D versus C,  $P < 0.001$  for F versus E,  $P < 0.001$  for B versus H and D versus H and F versus H; TG,  $P < 0.01$  for B versus A,  $P < 0.001$  for D versus C, F versus E, B versus H, D versus H, and F versus H; VLDL-C,  $P < 0.01$  for B versus A and D versus C,  $P < 0.001$  for F versus E, nonsignificant for B versus H and D versus H, and  $P < 0.001$  for F versus H; in the placebo group, no changes in any of the parameters were statistically significant for G versus H.

Abbreviations: *P. emblica*, *Phyllanthus emblica*; TC, total cholesterol; HDL-C, high-density lipoprotein cholesterol; TG, triglycerides; VLDL-C, very low-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol.

表5. 油甘水萃物臨床血糖作用

Table 5 Effect of *P. emblica* 250 mg, *P. emblica* 500 mg, atorvastatin 10 mg, and placebo on HbA<sub>1c</sub> levels

Parameter	<i>P. emblica</i> 250 mg twice daily (n=20)		<i>P. emblica</i> 500 mg twice daily (n=20)		Atorvastatin 10 mg + placebo each once daily (n=20)		Placebo twice daily (n=20)	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
	A	B	C	D	E	F	G	H
HbA <sub>1c</sub> (%)	7.79±0.48	7.57±0.54	7.56±0.5	7.09±0.88	7.62±0.33	6.99±0.39	7.64±0.44	7.66±0.46

Notes:  $P < 0.01$  compared between B and A, D and C;  $P < 0.001$  between F and E and between F and H;  $P < 0.05$  between D and H; nonsignificant when compared between G and H and between B and H.

Abbreviations: HbA<sub>1c</sub>, glycosylated hemoglobin; *P. emblica*, *Phyllanthus emblica*.

## 六、油甘之記憶力改善作用

老鼠實驗中單獨給予油甘萃物(Pe)300 mg/kg 15天後，針對老鼠行為模式測試學習力及記憶力皆有統計上明顯的增加(表6) (Harshad *et al.*, 2014)。

表6 油甘對於學習力及記憶力功效

Table 2: Effects on time taken to trace the food and number of errors committed in normal rats

Normal rats treated with vehicle/drug	Time taken (s)		Number of errors	
	Day 15 (learning)	Day 16 (memory)	Day 15 (learning)	Day 16 (memory)
Distilled water (15 days)	136.33±25.52	101.5±24.21	4.17±0.41	3.83±0.98
Rivastigmine (2.4 mg/kg for 15 days)	132.83±21.02	45.17***±15.74	3.67±0.52	2.33***±0.52
Distilled water (7 days) followed by Piracetam (200 mg/kg for 8 days)	136.33±23.53	73.17**±32.89	4.17±0.75	2***±0.63
Tc (100 mg/kg for 15 days)	127.67±28.6	71.5**±20.22	3.5±0.55	2.17***±0.41
Pe (300 mg/kg for 15 days)	121.33±16.74	71*±25.91	3.33±0.52	2.17***±0.41
H1 (Tc+Pe) (400 mg/kg for 15 days)	128.67±12.68	64.17***±16.15	3.67±0.52	2***±0.63
H2 (Tc+Pe+Os) (400 mg/kg for 15 days)	116.5±13.05	63.17**±20.38	3.83±0.75	1.83***±0.75

N=6/group. All values represent mean±SD; Paired t test; \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ . ANOVA followed by post hoc Tukey's test: \* $P < 0.05$ , \*\* $P < 0.01$ .

## 七、 油甘之抗癌作用

在抗癌老鼠實驗中，免疫缺陷老鼠在注射卵巢癌細胞後6天，分成對照組及實驗組，實驗組老鼠餵食油甘草提取物100 mg/kg，經過18天後發現實驗組老鼠在腫瘤的大小及重量明顯小於對照組老鼠(圖5) (Alok et al., 2013)。

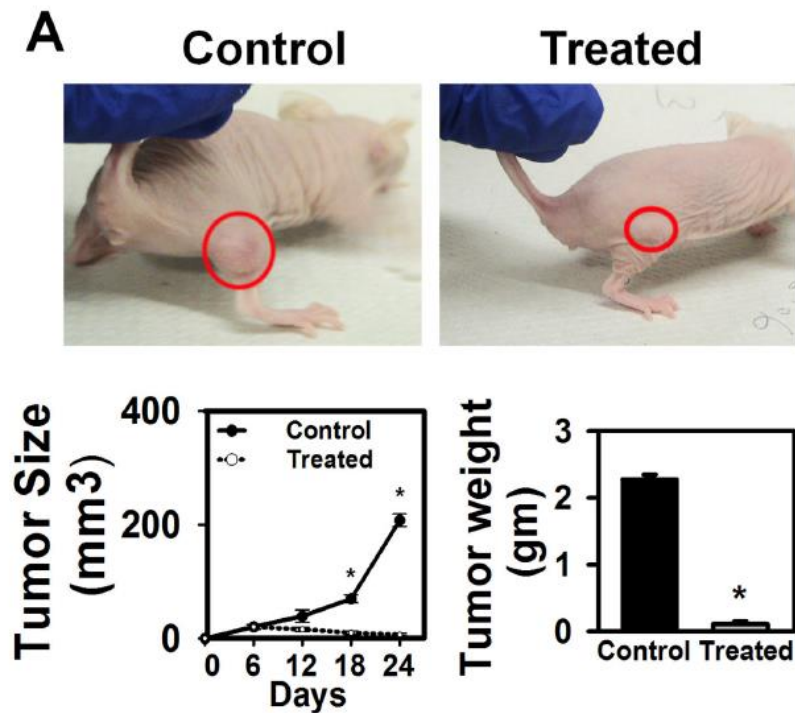


圖5 油甘對於抗癌功效

## 八、 結語

自古以來，在多個國家地區，油甘以植物藥的身分用於治療多種疾病。由於其果實營養豐富且有強大的抗氧化能力，吸引許多學者及研究人員興趣，就其抗氧化、抗癌、降血壓、降血糖等效用進行廣泛研究，結果顯示油甘在這些研究模式下有其預定之功效。聯合國衛生組織(World Health Organization, WHO)於20世紀末即認可傳統藥之醫療保健效果，引導有系統的開發有潛力之藥用植物，作為新藥來源(WHO, 1993)。歐洲食品安全機構(European Food Safety Authority, EFSA)指出，油甘之醫療效果，仍缺乏大量臨床研究證據，確立其所針對疾病之療效(EFSA Panel on Dietetic Products, Nutrition and Allergies, 2011)。若能經由臨床證據之建立，油甘除了作為中藥處方之一員及民眾養生保健之食品外，期能開發出新的醫療製劑，用於相關疾病之治療。

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