

花草茶水萃取物對痤瘡丙酸桿菌生長之影響

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摘要

痤瘡丙酸桿菌(*Propionibacterium acnes*)是痤瘡致病的主要原因之一，如存在於人體毛囊中會分泌脂解酶(lipase)分解毛囊皮脂成分中的三酸甘油酯(triglyceride)而釋放出乙酸(acetic acid)、丙酸(propionic acid)和丁酸(butyric acid)導致皮膚潰爛發炎。本研究利用氣相層析儀(Gas Chromatography, GC)進行乙酸、丙酸和丁酸含量分析，探討添加5和10 mg/mL的十二種花草茶水萃取物對*P. acnes*的抑制效用。添加5 mg/mL的花草茶水萃取物都能有效抑制*P. acnes*生長。而薰衣草、香蜂葉及金盞花水萃取物之乾菌重為0.2-0.4 mg，具有高度抑制*P. acnes*生長的效果。在10 mg/mL方面，僅添加金盞花水萃取物的菌重為18.61 ± 1.33 mg顯著高於控制組(P

關鍵詞：痤瘡丙酸桿菌、花草茶水萃取物、乙酸、丙酸、丁酸

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參考文獻

- 1.吳敏綺、邱琬婷、徐自菱和林文勝。2004。中西醫會診 - 青春痘。第9-83頁。書泉出版社，台北。
- 2.洪偉章、李金枝和陳榮秀。2000。化妝品原料及功能。第64-65頁。藝軒圖書出版社。台北。
- 3.徐雅芬、廖美智和羅淑慧。2005。天然萃取物應用在保養品、化妝品及醫藥產業之發展契機。第53-79頁。財團法人生物技術開發中心。台北。
- 4.陳柏熹(譯)。1996。微生物診斷學。第445-449頁。合記圖書出版社。台北。
- 5.陳豪勇(譯)。2002。最新醫用微生物學。第356-357頁。藝軒圖書出版社。台北。
- 6.陳聰敏。1993。厭氧菌-感染與診療。第211-212頁。藝軒圖書出版社。台北。
- 7.曾文楷。2002。中草藥對於痤瘡病原菌與黑色素生成的影響。靜宜大學應用化學研究所碩士論文。台中。
- 8.曾銘儀。2004。彩色圖解皮膚學。第60-61頁。合記圖書出版社，台北。
- 9.黃鶴群。2006a。台灣藥妝保養品品牌手冊。第14-180頁。合記圖書出版社。台北。
- 10.黃鶴群。2006b。藥妝保養品與醫學美容諮詢手冊。第7-261頁。藝軒圖書出版社。台北。
- 11.楊國藩。1997。化妝品技術師和醫師的皮膚科學。第80-81頁。國興出版社，新竹。
- 12.楊麗珍。2003。皮膚疾病彩色圖譜。第91-97頁。合記圖書出版社，台北。
- 13.趙昭明。2004。還我一張潔淨的臉。第50-51頁。大樹林出版社，台北。
- 14.羅淑慧。2003。藥妝品之發展趨勢。第54-145頁。財團法人生物技術開發中心，台北。
- 15.Akerstedt, J. and Vollset, I. 1996. *Malassezia* *Pachydermatitis* with special

reference to canine skin disease. *The British Veterinary Journal* 152:269-281. 16.Ashkenazi, H., Malik, Z., Harth, Y. and Nitzan, Y. 2003. Eradication of *Propionibacterium acnes* by its endogenous porphyrins after illumination with high intensity blue light. *Immunology and Medical Microbiology* 35:17-24. 17.Bojar, R. A. and Holland, K. T. 2004. Acne and *Propionibacterium acnes*. *Clinics in Dermatology* 22:375-379. 18.Bunch, J. E. and Clark, T. J. 1997. Determination of volatile acids in tobacco, tea, and coffee using derivatization-purge and trap gas chromatography-selected ion monitoring mass spectrometry. *Journal of Chromatographic Science* 35:206-208. 19.Farrar, M. D. and Ingham, E. 2004. Acne: Inflammation. *Clinics in Dermatology* 22: 380 – 384. 20.Gibbs, B. F., Itiaba, K., Crawhall, C., Cooper, B. A. and Mamer, O. A. 1973.A rapid gas chromatographic method for the quantitation of volatile fatty acids in urine propionic acid excretion in vitamin B12 deficiency. *Journal of Chromatography* 81:65-69. 21.Guy, R., Green, M. and Kealey, T. 1996. Modeling of acne in vitro. *The Journal of Investigative Dermatology* 106: 176-182. 22.Higaki, S. 2003. Lipase inhibitors for the treatment of acne. *Journal of Molecular Catalysis B: Enzymatic* 22:377-384. 23.Higaki, S., Kitagawa, T., Kagoura, M., Morohashi, M. and Yamagishi, T. 2000. Relationship between *Propionibacterium acnes* biotypes and Jumi-haidoku-to. *The Journal of Dermatology* 27:635-638. 24.Higaki, S. and Morohashi, M. 2003. *Propionibacterium acnes* lipase in seborrheic dermatitis and other skin diseases and unsei-in. *Drugs Under Experimental & Clinical Rese* 4:157-159. 25.Higaki, S., Nakamura, M., Morohashi, M., Hasegawa, Y. and Yamagishi, T. 1996a. Anti-lipase activity of kampo formulations *Coptidis Rhizoma* and alkaloids against *Propionibacterium acnes*. *The Journal of Dermatology* 23:310-314. 26.Higaki, S., Nakamura, M., Morohashi, M., Hasegawa Y. and Yamagishi, T. 1996b. Activity of eleven kampo formulations and eight kampo crude drugs against *Propionibacterium acnes* isolated from acne patients: retrospective evaluation in 1990 and 1995. *The Journal of Dermatology* 23:871-875. 27.Higaki, S., Nakamura, M., Morohashi, M., and Yamagishi, T. 2004. *Propionibacterium acnes* biotypes and susceptibility to minocycline and Keigai-rengyo-to. *The Journal of Dermatology* 43:103-107. 28.Holland, K.T., Ingham, E. and Cunliffe, W. J. 1981. A review the microbiology of acne. *Journal of Applied Bacteriology* 51:195-215. 29.Holt, J. G., Krieg, N. R., Sneath, P. H. A., Staley, J. T. and Williams, S. T. 1994. *Bergey 's manual of determinative bacteriology*. p. 580-596. Williams & Wilkins, Baltimore, MD, USA. 30.Ingham, E., Holland, K. T., Gowland, G. and Cunliffe, W. J. 1981. Partial purification and characterization of lipase (EC 3.1.1.3) from *Propionibacterium acnes*. *Journal of Microbiology* 124: 393-401. 31.Karen, W. M. and Edzard E. 2003. Herbal medicines for treatment of bacterial infections: a review of controlled clinical trials. *Journal of Antimicrobial Chemotherapy* 51:241-246 32.Katsambas, A. D., Stefanaki, C. and Cunliffe W. J. 2004. Guidelines for treating acne. *Clinics in Dermatology* 22:439-444. 33.Kolodney, M. S. and Marvi I. 2005. Acne fulminans with synovitis-acne-pustulosis-hyperostosis-osteitis (SAPHO) syndrome treated with infliximab. *Journal of the American Academy of Dermatology* 52:118-120. 34.Krauthaim, A. and Gollnick, H. P. 2004. Acne: topical treatment. *Clinical Dermatology* 22:398-407. 35.Liao, S. 2001. The medicinal action of androgend and green tea epigallocatechin gallate. *Hong Kong Medical Journa*. 7: 369-374. 36.Lim, Y. H., Kim, I. H. and Seo, J. J. 2007. In vitro activity of kaempferol isolate from the *Impatiens balsamina* alone and in combination with erythromycin or clindamycin against *Propionibacterium acnes*. *The Journal of Microbiology*. 45: 473-477. 37.Lindor, N. M., Arsenault, M. T., Solomon, H., Seidman, E. C. and Mcevoy, T. M. 1997. A new autosomal dominant disorder of pyogenic sterile arthritis, pyoderma gangrenosum, and acne: PAPA syndrome. *Mayo Clinic Proceedings* 72:611-615. 38.Ljubojevic, S., Skerlev, M., Lipozencic, J. and Basta, J. A. 2002. The Role of *Malassezia furfur* in Dermatology. *Clinics in Dermatology* 20: 179-182. 39.Nam, C., Kim, S., Sim, Y. and Chang, I. 2003. Anti-acne effects of oriental herb extracts: anovel screening method to select anti-acne agents. *Skin Pharmacology and Applied Skin Physiology* 16: 84-90. 40.Orafidiya, L. O., Agbani, E. O., Oyedele, A. O., Babalola, O. O. and Onayemi, O. 2002. Preliminary clinical tests on topical preparations of *Ocimum gratissimum* Linn leaf essential oil for the treatment of acne vulgaris. *Clinical Drug Investigations* 22: 313-319. 41.Raman, A., Weir, U. and Bloomfield, S. F. 1995. Antimicrobial effects of tea-tree oil and its major components on *Staphylococcus aureus*, *Staph. Epidermidis* and *Prpionibacterium acnes*.1995. *Letters in Applied Microbiology* 21:242-245. 42.Ross, J. I., Snelling, A. M., Eady, E. A., Cove, J. H., Cunliffe, W. J., Leyden, J. J., Collignon, P., Dreno, B., Reynaud, A., Fluhr, J. and Oshima, S. 2001. Phenotypic and genotypic characterization of antibiotic-resistant *Propionibacterium acnes* isolated from acne patients attending dermatology clinics in Europe, the USA, Japan, and Australia. *British Journal for Dermatology* 144: 339-346. 43.Wang, L., Tu, Y. C., Lian, T. W., Hung, J. T., Yen, J. H., and Wu, M. J. 2006. Distinctive anti-inflammatory effects of flavonols. *Journal of Agricultural and Food Chemistry* 54: 9798-9804. 44.Webster, G. F. 2002. Acne vulgaris. *British Medical Journal* 325:475-479. 45.White, G. M. 1999. Acne therapy. *Disease-a-Month* 45:305-328. 46.Yang, M. H. and Choong, Y. M. 2001. A rapid gas chromatographic method for direct determination of short-chain (C2-C12) volatile organic acids in foods. *Food chemistry* 75:101-108. 47.Yang, X., Summerhurst, D. K., Koval, S. F., Ficker, M. L., Smith, M. L., and Bernards, M. A. 2001. Isolation of an antimicrobial compound from *Impatiens balsamina* L. using bioassay-guided fraction. *Phytotherapy Research* 15: 676-680