

REFERENCES

ภาษาไทย

- คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล. 2535. สมุนไพรสวนสิริรุกชาติ. กรุงเทพมหานคร: บริษัทอมรินทร์
พรินติ้งกรุ๊ป จำกัด.
- เต็ม สมิตินันท์. 2544. ชื่อพรรณไม้แห่งประเทศไทย. พิมพ์ครั้งที่ 2. กรุงเทพมหานคร: ส่วนพฤกษศาสตร์ป่าไม้
สำนักวิชาการป่าไม้ กรมป่าไม้.
- นันทวัน บุญยะประภัศร และอรนุช โชคชัยเจริญพร, บรรณาธิการ. 2539. สมุนไพรพื้นบ้าน (1).
กรุงเทพมหานคร: สำนักงานข้อมูลสมุนไพร คณะเภสัชศาสตร์ มหาวิทยาลัยมหิดล.

ภาษาอังกฤษ

- Abe, I., Oguro, S., Utsumi, Y., Sano, Y., and Noguchi, H. 2005a. Engineered biosynthesis of plant polyketides: chain length control in an octaketide-producing plant type III polyketide synthase. J. Am. Chem. Soc. 127: 12709-12716.
- Abe, I., Takahashi, Y., Morita, H., and Noguchi, H. 2001. Benzalacetone synthase, a novel polyketide synthase that plays a crucial role in the biosynthesis of phenylbutanones in *Rheum palmatum*. Eur. J. Biochem. 268: 3354-3359.
- Abe, I., Utsumi, Y., Oguro, S., and Noguchi, H. 2004. The first plant type III polyketide synthase that catalyzes formation of aromatic heptaketide. FEBS Lett. 562: 171-176.
- Abe, I., Utsumi, Y., Oguro, S., Morita, H., Sano, Y., and Noguchi, H. 2005b. A plant type III polyketide synthase that produces pentaketide chromone. J. Am. Chem. Soc. 127: 1362-1363.
- Abe, I., Watanabe, T., Lou, W., and Noguchi, H. 2006. Active site residues governing substrate selectivity and polyketide chain length in aloesone synthase. FEBS J. 273: 208-218.
- Akiyama, T., Shibuya, M., Liu, H. M., and Ebizuka, Y. 1999. *p*-Coumaroyltriacetic acid synthase, a new homologue of chalcone synthase, from *Hydrangea macrophylla* var. *thunbergii*. Eur. J. Biochem. 263: 834-839.

- Anh, N. H., Ripperger, H., Porzel, A., Sung, T. V., and Adam, G. 1997. Tetralones from *Ancistrocladus cochinchinensis*. Phytochemistry 44: 549-551.
- Aung, H. H., Chia, L. S., Goh, N. K., Chia, T. F., Ahmed, A. A., Pare, P. W., and Mabry, T. J. 2002. Phenolic constituents from the leaves of the carnivorous plant *Nepenthes gracilis*. Fitoterapia 73: 445-447.
- Austin, M. B., and Noel, J. P. 2003. The chalcone synthase superfamily of type III polyketide synthases. Nat. Prod. Rep. 20: 79-110.
- Bendz G., and Lindberg G. 1968. Naphthoquinones and anthocyanins from *Drosera* species. Acta Chem. Scand. 22: 2722-2723.
- Beerhues, L. 1996. Benzophenone synthase from cultured cells of *Centaureum erythraea*. FEBS Lett. 383: 264-266.
- Bhargava, S. K. 1984. Effect of plumbagin on reproductive function of male dog. Indian J. Exp. Biol. 22: 153-156.
- Borejsza-Wysocki, W., and Hrazdina, G. 1996. Aromatic polyketide synthases: purification, characterization, and antibody development to benzalacetone synthase from raspberry fruits. Plant Physiol. 110: 791-799.
- Bradford, M. M. 1976. A rapid and sensitive method for quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. Anal. Biochem. 72: 248-254.
- Bringmann, G., and Feineis, D. 2001. Stress-related polyketide metabolism of Dioncophyllaceae and Ancistrocladaceae. J. Exp. Bot. 52: 2015-2021.
- Bringmann, G., Schlauer, J., Rückert, M., Wiesen, B., Ehrenfeld, K., Proksch, P., and Czygan, F. C. 1999. Host-derived acetogenins involved in the incompatible parasitic relationship between *Cuscuta reflexa* (Convolvulaceae) and *Ancistrocladus heyneanus* (Ancistrocladaceae). Plant Biol. 1: 581-584.
- Bringmann, G., Wohlfarth, M., Rischer, H., Rückert, M., and Schlauer, J. 1998. The polyketide folding mode in the biogenesis of isoshinanolone and plumbagin from *Ancistrocladus heyneanus* (Ancistrocladaceae). Tetrahedron Lett. 39: 8445-8448.
- Budavari, S., O' Neil, M. J., and Smith, A., eds. 1989. The Merck index: an encyclopedia of chemicals, drugs, and biologicals. 11th ed. New Jersey: Merck & CO.
- Budzianowski, J. 1996. Naphthohydroquinone glucosides of *Drosera rotundifolia* and *D. intermedia* from *in vitro* cultures. Phytochemistry 42: 1145-1147.

- Budzianowski, J. 2000. Naphthoquinone glucosides of *Drosera gigantea* from *in vitro* cultures. Planta Med. 66: 667-669.
- Cannon, J. R., Lojanapiwatna, V., Raston, C. L., Sinchai, W., and White, A. H. 1980. The quinones of *Nepenthes rafflesiana*. The Crystal structure of 2,5-dihydroxy-3,8-dimethoxy-7-methylnaphtho-1,4-quinone (Nepenthone-E) and a synthesis of 2,5-dihydroxy-3-methoxy-7-methylnaphtho-1,4-quinone (Nepenthone-C). Aust. J. Chem. 33: 1073-1093.
- Christensen, A. B., Gregersen, P. L., Schröder, J., and Collinge, D. B. 1998. A chalcone synthase with an unusual substrate preference is expressed in barley leaves in response to UV-light pathogen attack. Plant Mol. Biol. 37: 849-857.
- Cooke, R. G. and Dowd, H. 1952. Naphthoquinones from *Diospyros hebecarpa* A. Cunn. Aus. J. Sci. Res. 5A: 760-767.
- Dinda, B. and Chel, G. 1992. 6-Hydroxyplumbagin, a naphthoquinone from *Plumbago indica*. Phytochemistry 31: 3652-3653.
- Dinda, B., Chel, G., and Achari, B. 1994. A dihydroflavonol from *Plumbago indica*. Phytochemistry 35: 1083-1084.
- Dinda, B., Das, S. K., and Hajra, A. K. 1995. Naphthoquinones from the roots of *Plumbago rosea* Linn. Indian J. Chem. 34B: 525-528.
- Didry, N., Dubreuil, L., and Pinkas, M. 1994. Activity of anthraquinonic and naphthoquinonic compounds on oral bacteria. Pharmazie 49: 681-683.
- Dixon, R. A., ed. 1985. Plant cell culture: a practical approach. Oxford: IRL Press.
- Durga, R., Sridhar, P., and Polasa, H. 1990. Effects of plumbagin on antibiotic resistance in bacteria. Indian. J. Med. Res. 91: 18-20.
- Durand, R., and Zenk, M. H. 1971. Biosynthesis of plumbagin (5-hydroxy-2-methyl-1,4-naphthoquinone) via the acetate pathway in higher plants. Tetrahedron Lett. 32: 3009-3012.
- Eckermann, S., Schröder, G., Schmidt, J., Strack, D., Edroda, R. A., Helariutta, Y., Elomaa, P., Kotilainen, M., Kilpeläinen, I., Proksch, P., Teeri, T. H., and Schröder, J. 1998. New pathway to polyketides in plants. Nature. 396: 387-390.
- Evans, P. H., Bowers, W. S., Litaudon, M., and Sevenet, T. 1999. Plumbagin from *Diospyros olen*. Molecules. 4: M93.
- Fallas, A. L., and Thomson, R. H. 1968. Ebenaceae extractives. Part III. Binaphthaquinones from *Diospyros* species. J. Chem. Soc. (C): 2279-2282.

- Ferrer, J. L., Jez, J. M., Bowman, M. E., Dixon, R. A., and Noel, J. P. 1999. Structure of chalcone synthase and the molecular basis of plant polyketide biosynthesis. Nat. Struct. Biol. 6: 775-784.
- Fliegmann, J., Schroder, G., Schanz, S., Britsch, L., and Schroder, J. 1992. Molecular analysis of chalcone and dihydropinosylvin synthase from Scots pine (*Pinus sylvestris*), and differential regulation of these and related enzyme activities in stressed plants. Plant Mol. Biol. 3: 489-503.
- Fujii, N., Yamashita, Y., Arima, Y., Nagashima, M., and Nakano, H. 1992. Induction of topoisomerase II-mediate DNA cleavage by the plant naphthoquinones plumbagin and shikonin. Antimicrob. Agents Chemotherapy 36: 2589-2594.
- Gamborg, O. L., Miller, R. A., and Ojima, K. 1968. Nutrient requirements of suspension cultures of soybean root cells. Exp. Cell. Res. 50: 148-151.
- Gehlert, R. and Kindl, H. 1991. Induced formation of dihydrophenanthrenes and bibenzyl synthase upon destruction of orchid mycorrhiza. Phytochemistry 30: 457-460.
- Gujar, G. T. 1990. Plumbagin, a naturally occurring naphthoquinone. Its pharmacological and pesticidal activity. Fitoterapia LXI: 387-394
- Harborne, J. B. 1967. Comparative biochemistry of the flavonoids-IV. Correlations between chemistry, pollen morphology and systematics in the family Plumbaginaceae. Phytochemistry 6: 1415-1428.
- Helariutta, Y., Elomaa, P., Kotilainen, M., Griesbach, R. J., Schröder, J., and Teeri, T. H. 1995. Chalcone synthase-like genes active during corolla development are differentially expressed and encode enzymes with different catalytic properties in *Gerbera hybrida* (Asteraceae). Plant Mol. Biol. 28: 47-60.
- Herath, W. H. M. W., Rajasekera, N. D. S., Sultanbawa, M. U. S., Wannigama, G. P., and Balasubramaniam, S. 1978. Triterpenoid, coumarin and quinone constituents of eleven *Diospyros* species (Ebenaceae). Phytochemistry 17: 1007-1009.
- Higa, M., Ogihara, K., and Yogi, S. 1998. Bioactive naphthoquinone derivatives from *Diospyros maritime* Blume. Chem. Pharm. Bull. 46: 1189-1193.
- Hyam, R. and Pankhurst, R. 1995. Plants and their names: a concise dictionary. Oxford: Oxford University Press.
- Jez, J. M., Austin, M. B., Ferrer, J., Bowman, M. E., Schröder, J., and Noel, J. P. 2000a. Structural control of polyketide formation in plant-specific polyketide synthases. Chem. Biol. 7: 919-930.

- Jez, J. M., Bowman, M. E., and Noel, J. P. 2001a. Structural-guided programming of polyketide chain length determination in chalcone synthase. Biochemistry 40: 14829-14838.
- Jez, J. M., Bowman, M. E., and Noel, J. P. 2002. Expanding the biosynthesis repertoire of plant type III polyketide synthases by altering starter molecule specificity. Proc. Natl. Acad. Sci. USA 99: 5319-5324.
- Jez, J. M., Ferrer, J. L., Bowman, M. E., Dixon, R. A., and Noel, J. P. 2000b. Dissection of malonyl-coenzyme a decarboxylation from polyketide formation in the reaction mechanism of a plant polyketide synthase. Biochemistry 39: 890-902.
- Jez, J. M., Ferrer, J. L., Bowman, M. E., Austin, M. B. Schröder, R. A., Dixon, R. A., and Noel, J. P. 2001b. Structure and mechanism of chalcone synthase-like polyketide synthases. J. Industrial Microb. Biotechnol. 27: 393-398.
- Jez, J. M., and Noel, J. P. 2000. Mechanism of chalcone synthase: pKa of the catalytic cysteine and the role of the conserved histidine in a plant polyketide synthase. J. Biol. Chem. 275: 39640-39646.
- Junghanns, K. T., Kneusel, R. E., Baumert, A., Maier, W., Gröger, D., and Matern, U. 1995. Molecular cloning and heterologous expression of acridone synthase from elicited *Ruta graveolens* L. cell suspension cultures. Plant Mol. Biol. 27: 681-692.
- Komaraiah, P., Jogeswar, G., Naga Amrutha, R., Sri Laxmi, P., Lavanya, B., Rama Krishna, S. V., and Kavi Kishor, P. B. 2003a. Influence of hormones and selection of stable cell lines of *Plumbago rosea* for accumulation of Plumbagin. J. Plant Biotechnol. 5: 181-185.
- Komaraiah, P., Naga Amrutha, R., Kavi Kishor, P. B., and Ramakrishna, S. V. 2002. Elicitor enhanced production of plumbagin in suspension cultures of *Plumbago rosea* L. Enzyme Microbiol. Technol. 31: 634-639.
- Komaraiah, P., Ramakrishna, S. V., Reddanna, P., and Kavi Kishor, P. B. 2003b. Enhanced production of plumbagin in immobilized cells of *Plumbago rosea* by elicitation and in situ adsorption. J. Biotechnol. 101:181-187.
- Krishnamoorthy, V., and Thomson, R. H. 1969. A new binaphthaquinone from *Drosera ramentacea*. Phytochemistry 8: 1591-1594.
- Kreher, B., Neszmélyi, A. and Wagner, H. 1990. Naphthoquinones from *Dionaea muscipula*. Phytochemistry 29: 605-606.

- Kreuzaler, F., and Hahlbrock, K. 1972. Enzymatic synthesis of aromatic compounds in higher plants: formation of naringenin (5,7,4'-trihydroxy-flavanone) from *p*-coumaroyl-coenzyme A and malonyl-CoA. FEBS Lett. 28: 69-72.
- Kreuzaler, F., and Hahlbrock, K. 1975. Enzymic synthesis of an aromatic ring from acetate units: partial purification and some properties of flavanone synthase from cell-suspension cultures of *Petroselinum hortense*. Eur. J. Biochem. 56: 205-213.
- Kubitzki, K., Rohwer, J. G., and Bittrich, V., eds. 1993. The families and genera of vascular plants Vol II. Berlin: Springer-Verlag.
- Kubo, I., Uchida, M. and Kloke, J. A. 1983. An insect esdysis inhibitor from the African medicinal plant, *Plumbago capsensis* (Plumbaginaceae). Agri Biol. Chem. 47: 911-913.
- Kuo, Y. H., Chang, C. I., Li, S. Y., Chou, C. J., Chen, C. F., Kuo, Y. H., and Lee, K. H. 1997. Cytotoxic contitutents from the stems of *Diosyros maritima*. Planta Med. 63: 363-365.
- Lanz, T., Tropf, S., Marnier, F.J., Schröder, J., and Schröder, G. 1991. The role of cysteines in polyketide synthases: Site-directed mutagenesis of resveratrol and chalcone synthases, two key enzymes in different plant-specific pathways. J. Biol. Chem. 266: 9971-9976.
- Lin, L. C., Yang, L. L., and Chou, C. J. 2003. Cytotoxic naphthoquinones and plumbagic acid glycosides from *Plumbago zeylanica*. Phytochemistry 62: 619-622.
- Linsmaier, E. M., and Skoog, F. 1965. Organic growth factor requirements for tobacco tissue culture. Physiol. Plant. 18: 100-127.
- Likhitwitayawuid, K., Kaewamatawong, R., Ruangrunsi, N., and Krungkrai, J. 1998. Antimalarial naphthoquinones from *Nepenthes thorelii*. Planta Med. 64: 237-241.
- Lukačín, R., Springob, K., Urbanke, C., Ernwein, C., Schröder, G., Schröder, J., and Matern, U. 1999. Native acridone synthases I and II from *Ruta graveolens* L. form homodimers. FEBS Lett. 448: 135-140.
- Lukačín, R., Schreiner, S., and Matern, U. 2001. Transformation of acridone synthase to chalcone synthase. FEBS Lett. 508: 413-417.
- Mallavadhani, U. V., Panda, A. K., and Rao, Y. R. 1998. Pharmacology and chemotaxonomy of *Diospyros*. Phytochemistry 49: 901-951.

- Melchior, F., and Kindl, H. 1990. Grapevine stilbene synthase cDNA only slightly differing from chalcone synthase cDNA is expressed in *Escherichia coli* into a catalytically active enzyme. FEBS Lett. 268: 17-20.
- Mitchell, M. J., and Smith, S. L. 1988. Effects of the chitin synthetase inhibitor plumbagin and its 2-methyl derivative juglone on insect ecdysone 20-monooxygenase activity. Experientia. 44: 990-991.
- Murashige, T., and Skoog, F. 1962. A revised medium for rapid growth and bioassays with tobacco tissue culture. Physiol. Plant 15: 473-497.
- Nahálka, J., Blanárik, P., Gemeiner, G., Mutúšová, E., and Partlová, I. 1996. Production of plumbagin by cell suspension cultures of *Drosophyllum lusitanicum* Link. J. Biotechnol. 49: 153-161.
- Okada, Y., and Ito, K. 2001. Cloning and analysis of valerophenone synthase gene expressed specifically in lupulin gland of hop (*Humulus lupulus* L.). Biosci. Biotechnol. Biochem. 65: 150-155.
- Panichayupakaranant, P., and Tewtrakul, S. 2002. Plumbagin production by root cultures of *Plumbago rosea*. Electron J. Biotechnol. 5: 228-232.
- Paniego, N. B., Zuurbier, K. W. M., Fung, S. Y., van der Heijden, H., Scheffer, J. J. and Verpoorte, R. 1999. Phlorisovalerophenone synthase, a novel polyketide synthase from hop (*Humulus lupulus* L.) cones. Eur. J. Biochem. 262: 612-616.
- Parimala, R., and Sachdanandam, P. 1993. Effects of plumbagin on some glucose metabolising enzymes studied in rats in experimental hepatoma. Mol. Cell. Biochem. 125: 59-63.
- Peters, S., Schmidt, W., and Beerhues, L. 1998. Regioselective oxidative phenol coupling of 2,3',4,6-tetrahydroxybenzophenone in cell cultures of *Centaurium erythraea* RAFN and *Hypericum androsaemum* L. Planta. 204: 64-69.
- Premakumari, P., Rathinam, K., and Santhakumari, G. 1977. Antifertility activity of plumbagin. Indian. J. Med. Res. 65: 829-838.
- Preisig-Müller, R., Gnau, P., and Kindl, H. 1995. The inducible 9,10-dihydrophenanthrene pathway: characterization and expression of bibenzyl synthase and s-adenosylhomocysteine hydrolase. Arch. Biochem. Biophys. 317: 201-207.

- Preisig-Müller, R., Gehlert, R., Melchior, F., Stietz, U., and Kindl, H. 1997. Plant polyketide synthases leading to stilbenoids have a domain catalyzing malonyl-CoA: CO₂ exchange, malonyl-CoA decarboxylation, and covalent enzyme modification and a site for chain lengthening. Biochemistry 36: 8349-8358.
- Reinecke, T., and Kindl, H. 1993. Characterization of bibenzyl synthase catalyzing the biosynthesis of phytoalexins of orchids. Phytochemistry 35: 63-66.
- Reimold, U., Kröger, M., Kreuzaler, F., and Hahlbrock, K. 1983. Coding and 3' non-coding nucleotide sequence of chalcone synthase mRNA and assignment of amino acid sequence of the enzyme. EMBO J. 2: 1801-1805.
- Ribeiro de Paiva, S., Figueiredo, M. R., Aragao, T. V., and Kaplan, M. A. C. 2003. Antimicrobial activity *in vitro* of plumbagin isolated from *Plumbago* species. Mem Inst Oswaldo Cruz, Rio de Janeiro 98: 959-961.
- Santhakumari, G., Rathinam, K., and Seshadri, C. 1978. Anticoagulant activity of plumbagin. Indian. J. Exp. Biol. 16: 485-487.
- Santhakumari, G., Saralamma, P. G., and Radhakrishnan, N. 1980. Effect of plumbagin on cell growth and mitosis. Indian. J. Exp. Biol. 18: 215-218.
- Saleh, N. A. M., Fritsch, H., Kreuzaler, F., and Grisebach, H. 1978. Flavanone synthase from cell suspension cultures of *Haplopappus gracilis* and comparison with the synthase from parsley. Phytochemistry 17: 183-186.
- Salzman, R. A., Fujita, T., Zhu-Salzman, K., Hasagawa, P. M., and Bressan, R. A., 1999. An improved RNA isolation method for plant tissues containing high levels of phenolic compounds or carbohydrates. Plant Mol. Biol. Rep. 17: 11-17.
- Samappito, S. 2002. Cloning and expression of polyketide synthase genes from *Cassia alata*, *Plumbago indica* and *Rheum tataricum*. Doctoral dissertation. Pharmaceutical Chemistry and Natural Product, Faculty of Pharmaceutical Sciences, Chulalongkorn University.
- Samappito, S., Page, J., Schmidt, J., De-Eknamkul, W., and Kutchan, T. M. 2003. Aromatic and pyrone polyketides synthesized by a stilbene synthase from *Rheum tataricum*. Phytochemistry 62: 313-323.
- Samappito, S., Page, J., Schmidt, J., De-Eknamkul, W., and Kutchan, T. M. 2002. Molecular characterization of root-specific chalcone synthases from *Cassia alata*. Planta 216: 64-71.
- Sambrook, J., Fritsch, E. F., and Maniatis, T. 1989. Molecular cloning: a laboratory manual. 2nd ed. New York: Cold Spring Harbor Laboratory Press.

- Satheeshkumar, K., and Seeni, S. 2003. *In vitro* mass multiplication and production of roots in *Plumbago rosea*. Planta Med. 69: 83-86.
- Schoppner, A., and Kindl, H. 1984. Purification and properties of a stilbene synthase from induced cell suspension cultures of peanut. J. Biol. Chem. 259: 6806-6811.
- Schröder, J. 1997. A family of plant-specific polyketide synthases: facts and predictions. Trends Plant Sci. 2: 373-378.
- Schröder, J. 2000. The family of chalcone synthase-related proteins: functional diversity and evolution. In J. T. Romeo, R. K. Ibrahim, L. Varin, and V. De Luca, eds. Evolution of metabolic pathways. Vol. 34. pp. 55-89. Amsterdam: Pergamon Press.
- Schröder, G., Brown, J. W., and Schröder, J. 1988. Molecular analysis of resveratrol synthase. cDNA, genomic clones and relationship with chalcone synthase. Eur. J. Biochem. 15: 161-169.
- Shen, B. 2003. Polyketide biosynthesis beyond the type I, II and III polyketide synthase paradigms. Curr. Opin. Chem. Biol. 7: 285-295.
- Springob, K., Lukačín, R., Ernwein, C., Gröning, I. and Matern, U. 2000. Specificities of functionally expressed chalcone and acridone synthases from *Ruta graveolens*. Eur. J. Biochem. 267: 6552-6559.
- Suh, D. Y., Fukuma, K., Kagami, J., Yamazaki, Y., Shibuya, M., Ebizuka, Y., and Sankawa, U. 2000. Identification of amino acid residues important in the cyclization reactions of chalcone and stilbene synthase. Biochem. J. 350: 229-235.
- Tezuka, M., Takahasi, C., Kuroyanagi, M., Satake, M., Yoshihira, K., and Natori, S. 1973. New naphthoquinones from *Diospyros*. Phytochemistry 12:175-183.
- Thomson, R.H. 1971. Naturally occurring quinines. 2nd ed. London: Academic press.
- Tropf, S., Lanz, T., Rensing, S. A., Schröder, J., and Schröder, G. 1994. Evidence that stilbene synthase have developed from chalcone synthase several times in the course of evolution. J. Mol. Evol. 38: 610-618.
- Tropf, S., Karcher, B., Schroder, G. and Schroder, J. 1995. Reaction mechanisms of homodimeric plant polyketide synthase (stilbenes and chalcone synthase): a single active site for the the condensing reaction is sufficient for synthesis of stilbenes, chalcones, and 6'-deoxychalcones. J. Biol. Chem. 270: 7922-7928.
- Van de Peer, Y., and De Wachter, Y. 1994. TREECON for windows: a software package for the construction and drawing of evolutionary trees for the Microsoft Windows environment. Comput. Applic. Biosci. 10: 569-570.

- Van Der Vijver, L. M. 1972. Distribution of plumbagin in the Plumbaginaceae. Phytochemistry 11:3247-3248.
- Van Der Vijver, L. M., and Lötter, A.P. 1971. The constituents in the roots of *Plumbago auriculata* Lam. and *Plumbago zeylanica* L. responsible for antibacterial activity. Planta Med. 20: 8-13.
- Verma, P. C., Singh, D., Rahman, L., Gupta, M. M., and Banerjee, S. 2002. *In vitro*-studies in *Plumbago zeylanica*: rapid micropropagation and establishment of higher plumbagin yielding hairy root cultures. J. Plant Physiol. 159: 547-552.
- Yamaguchi, T., Kurosaki, F., Suh, D. Y., Sankawa, U., Nishioka, M., Akiyama, T., Shibuya, M., and Ebizuka, Y. 1999. Cross-reaction of chalcone synthase and stilbene synthase overexpressed in *Escherichia coli*. FEBS Lett. 460: 457-461.
- Yamazaki, Y., Shu, D. Y., Sitthithaworn, W., Ishiguro, K., Kobayashi, Y., Shibuya, M., Ebizuka, Y., and Sankawa, U. 2001. Diverse chalcone synthase superfamily enzymes from the most primitive vascular plant, *Psilotum nudum*. Planta 214: 75-84.
- Yue, J., Lin, Z., Wang, D., Feng, Y., and Sun, H. 1994. Plumbasides A-C three naphthoquinone derivatives from *Ceratostigma minus*. Phytochemistry 35: 1023-1025.
- Yue, J. M., Xu, J., Zhao, Y., Sun, H. D., and Lin, Z. W. 1997. Chemical components from *Ceratostigma willmottianum*. J. Nat. Prod. 60: 1031-1033.
- Zakaria, M. B., Jeffreys, J. A. D., Waterman, P. G., and Zhou, S. M. 1984. Naphthoquinones and triterpenes from some Asian *Diospyros* species. Phytochemistry 23: 1481-1484.
- Zenk, M. H. 1972. Biosynthesis of naphthoquinones in higher plants. Hoppe-Seyler's Z. Physiol. Chem. 353: 123.
- Zenk, M. H., Fürbringer, M., and Steglich, W. 1969. Occurrence and distribution of 7-methyljuglone and plumbagin in the Droseraceae. Phytochemistry 8: 2199-2200.
- Zhong, S. M., Waterman, P. G., and Jeffreys, J. A. D. 1984. Naphthoquinones and triterpenes from African *Diospyros* species. Phytochemistry 23: 1067-1072.
- Zurbier, K. W. M., Leser, J., Berger, T., Hofte, A. J. P., Schröder, G., Verpoorte R. and Schröder, J. 1998. 4-Hydroxy-2-pyrone formation by chalcone and stilbene synthase with nonphysiological substrates. Phytochemistry 49: 1945-195

VITA

Mrs. Aphacha Jindaprasert was born on June 12, 1969 in Samutsakhon, Thailand. She received her Bachelor degree of Science (Biotechnology) (second class honors) in 1991 from Khon Kaen University. After that, she received her Master degree of Science (Biotechnology) in 1994, from Chulalongkorn University. At present, she is an instructor at the Faculty of Agricultural Industry, King Mongkut's Institute of Technology Ladkrabang, Thailand.

