REFERENCES

Angiolillo, A., Mencuccini, M., Baldoni, L. 1999. Olive genetic diversity assessed using amplified fragment length polymorphisms. Theor. Appl. Genet. 98: 411-421.

Aradhya, M. K., Weeks, C., Simon, C. J. 2004. Molecular characterization of variability and relationships among seven cultivated and selected wild species of *Prunus* L. using amplified fragment length polymorphism. Sci. Hortic. 103: 131-144.

Asquith T. N. and Butler L. G. 1986. Interaction of condensed tannins with selected proteins. Phytochemistry. 25(7): 1591-1593.

Baker, J. H. A., Matthes, M., Arnold, G. M., Edwards, K. J., Ahman, I., Larsson, S., Karp, A. 1999. Characterization of genetic diversity in potential biomass willows (*Salix* spp.) by RAPD and AFLP analyses. Genome. 42:173-183.

Baraket, G., Chatti, K., Saddoud, O., Mars, M., Marrakchi, M., Trifi, M., Salhi-Hannachi, A. 2009. Genetic analysis of Tunisian fig (*Ficus carica* L.) cultivars using amplified fragment length polymorphism (AFLP) markers. Sci. Hortic. 120: 487-492.

Bassam, B. J., Caetano-Anolles, G., Gresshoff, P. M. 1991. Fast and sensitive silver staining of DNA in polyacrylamide gels. Anal. Biochem. 196: 80-83.

Breyne, P., Boerjan, W., Gerats, T., van Montagu, M., van Gysel, A. 1997. Application of AFLP in plant breeding, molecular biology and genetics. Belg. J. Bot. 129: 107-117.

Choi, Y.-E., Ahn, C. H., Kim, B.-B., Yoon, E.-S. 2008. Development of species specific AFLP-derived SCAR marker for authentication of *Panax japonicus* C.A. Meyer. Biol. Pharm. Bull. 31: 135-138.

Cresswell, A., Sackville H.N.R., Roy, A.K., Viegas, B.M.F. 2001. Use of amplified fragment length polymorphism markers to assess genetic diversity of *Lolium* species from Portugal. Mol. Ecol. 10: 229-241.

Crouch, J. H., Crouch, H. K., Constandt, H., Van Gysel, A., Breyne, P., Van Montagu, M., et. Al. 1999. Comparison of PCR-base molecular marker analyses of *Musa* breeding populations. Mol. Breeding. 5: 233-244.

Das, S., Rajagopal, J., Bhatia, S., Srivastava, P.S., Lakshmikumaran, M. 1999. Assessment of genetic variation with *Brassica compestris* cultivars using AFLP and RAPD markers. J. Biosci. 24: 433-440.

Doyle, J. J. and Doyle, J. L. 1990. Isolation of plant DNA from fresh tissue. Focus. 12: 13-15.

Eames, A. J. and MacDansls, L. H. 1974. An Introduction to Plant Anatomy. 2nd ed. New York: McGraw-Hill.

Esau, K. 1960. Anatomy of Seed Plants. USA: John Wiley & Sons.

Everette, B. and Whitmore, T. C. 1972. Tree flora of Malaya Vol. 2. pp.277.

Farnsworth, N. R. 1966. Biological and phytochemical screening of plants. J. Pharm. Sci. 55: 225-275

Fukushima, M., Matsuyama, F., Ueda, N., Eqawa, K., Takemoto, J., Kajimoto, Y., Yonaha, N., Miura, T., Kaneko, T., Nishi, Y., Mitsui, R., Fujita, Y., Yamada, Y., Seino, Y. 2006. Effect of corosolic acid on postchallenge plasma glucose levels. Diabetes Res. Clin. Pract. **73**: 174-177.

Gardner, S., Sidisunthorn, P., Anusarnsunthron, V. 2007. A field Guide to Forest trees of Northern Thailand. pp. 202-206.

Ha, W. Y., Shaw, P. C., Lui, J., Yan, F. C., Wang, J. 2002. Authentication of *Panax gingseng* and *Panax quinquefolius* using amplified fragment length polymorphism (AFLP) and directed amplification of minisatellite region DNA (DAMD). Nucleic Acids Res. 99: 123-131.

Han, J., Zhang, W., Cao, H., Chen, S., Wang, Y. 2007. Genetic diversity and biogeography of the traditional Chinese medicine, *Gardenia jasminoides*, based on AFLP markers. Biochem. Syst. Ecol. 35: 138-145.

Hattori, K., Sukenobu, N., Sasaki, T., Takasuga, S., Hayashi, T., Kasai, R., Yamasaki, K., Hazeki, O. 2003. Activation of insulin receptors by lagerstroemin. J. Pharmacol Sci. 93: 69-73

Hayashi, T., Maruyama, H., Kasai, R., Hattori, K., Takasuga, S., Hazeki, O., Yamasaki, K., Tanaka, T. 2002. Ellagitannins from Lagerstroemia speciosa as activators of glucose transport in fat cells. Planta Med. 68: 173-175

He, D., Chen, B., Tian, Q., Yao, S. 2009. Simultaneous determination of five anthraquinones in medicinal plants and pharmaceutical preparations by HPLC with fluorescence detection. J. Pharmaceut. Biomed. 49(4): 1123-1127.

He, J., Ke, L., Hong, D., Xie, Y., Wang, G., Lui, P., Yang, G. 2008. Fine mapping of a recessive genic male sterility gene (Bnms3) in rapeseed (*Brassica napus*) with AFLP- and *Arabidopsis*-derived PCR markers. Theor. Appl. Genet. 117: 11-18.

Jaccard, P. 1908. Nouvelles researches sur la distribution florale. Bull. Soc. Vaud. Sci. Nat. 44: 223-270.

Jbir, R., Hasnaoui, N., Mars, M., Marrakchi, M., Trifi, M. 2008. Characterization of Tunisian pomegranate (*Punica granatum* L.) cultivars using amplified fragment length polymorphism analysis. Sci. Hort. 115: 231-237.

Jia, J. H., Zhang, D. S., Li, C. Y., Qu, X. P., Wang, S. W., Chamarerk, V., Nguyen, H. T., Wang, B. 2001. M olecular mapping of the reverse thermo-sensitive genic male-sterile gene (rtms1) in rice. Theor. Appl. Genet. 103: 607-612.

Johnson, E. L., Saunders, J. A., Mischke, S., Helling, C. S., Emche, S. D. 2003. Identification of *Erythroxylum* taxa by AFLP DNA analysis. Phytochemistry. 64(1): 187-97.

Jones, C. J., Edwards, K. J., Castagllone, S., Winfield, M. O., Sala, F., van de Wiel, C., Bredemeljer, G., Vosman, B., Matthes, M., Daly, A. 1997. Reproducibility testing of RAPD, AFLP and SSR markers in plants by a network of Europeans laboratories. Mol. Breed. 3: 381-390.

Joshi, K., Chavan, P., Warude, D., and Patwardhan, B. 2004. Molecular Markers in Herbal Drug Technology. **Curr. Sci.** 87(2): 159-163.

Judy, W. V., Hari, S. P., Stogsdilla, W. W., Judy, J. S., Naguib, Y. M. A., Passwater R. 2003. Antidiabetic activity of a standardized extract (Glucosol) from *Lagerstroemia speciosa* leaves in type II diabetics. A dose-dependence study. J. Ethnopharmacol. 87: 115-117.

Kakuda, T., Sakane, I., Takihara, T., Ozaki, Y., Takeuchi, H., Kuroyanagi, M. 1996. Hypoglycemic effect of extracts from *Lagerstroemia speciosa* L. leaves in genetically diabetic kk-Ay mice. Biosci. Biotechnol. Biochem. 60: 204-208.

Kim, S.-C., Graham, S. A., Graham, A. 1994. Palynology and pollen dimorphism in the genus *Lagerstroemia* (Lythraceae). Grana. 33: 1-20.

Kwon, H.-K., Ahn, C.-H., Choi, Y.-E. 2009. Molecular authentication of Panax notoginseng by specific AFLP-derived SCAR marker. J. Med. Plant Res. 3: 957-966.

Li, P., Pu, Z. M., Jiang, X., Liu, H. J., and Xu, G. J. 1994. Identification of *Fritillaria* spp. (Beimu) on commercial markets. J. Plant Res. 3: 60-63.

Liu, J. 1995. Pharmacology of oleanolic acid and ursolic acid. J. Ethnopharmacol. 49(2): 57-68.

Lui, F., Kim, J., Li, Y., Lui, X., Li, J., Chen, X. 2001. An extract *of Lagerstroemia speciosa* L. has insulin-like glucose uptake-stimulatory and adipocyte differentiation-inhibitory activities in 3T3-L1 cells. J. Nutr. 131: 2242-2247.

Lui, X., Kim, J., Li, Y., Li, J., Lui, F., Chen, X. 2005. Tannic acid stimulates glucose transport and inhibits adipocyte differentiation in 3T3-L1 cells. J. Nutr. 135: 165-171.

Malaisree, M., Srisomang, R., Boonphong, S. 2006. Chemical constituents of *Lagerstroemia loudonii* flower and their antioxidant activities. NU Sci Jour. 2(2): 231-240.

Matsuyama E. 2001. Composition for inhibiting increase of blood sugar level or lowering blood sugar level. United States Patent Application No. 09/730, 741.

Maughan, P. J., Saghai Maroof, M. A., Buss, G. R., Huestis, G. M. 1996. Amplified fragment length polymorphism (AFLP) in soybean: species variation, inheritance and near-isogenic line analysis. Theor. Appl. Genet. 93: 392-401.

Maxam, A.M. and Gilbert, W. 1977. A new method for sequencing of DNA. Proc. Natl. Acad. Sci. 74:560-564.

Meudt, H. M. and Clarke, A. C. 2007. Almost forgotten or latest practice? AFLP applications, analyses and advances. Trends Plant Sci. 12(3): 106-17.

Miura, T., Itoh, Y., Kaneko, T., Ueda, N., Ishida, T., Fukushima, M., Matsuyama, F., Seino, Y. 2004. Corosolic acid induces GLUT4 translocation in genetically type 2 diabetic mice. Biol. Pharm. Bull. 27: 1103-1105.

Miura, T., Ueda, N., Yamada, K., Fukushima, M., Ishida, T., Kaneko, T., Matsuyama, F., Seino, Y. 2006. Antidiabetic effects of corosolic acid in kk-Ay diabetic mice. Biol. Pharm. Bull. 29: 585-587.

Muller, U. G. and Wolfenbarger, L. L. 1999. AFLP genotyping and fingerprinting. Trends Ecol. Evol. 14: 389-304.

Mullis, K. B. and Faloona, F. A. 1987. Specific synthesis of DNA *in vitro* via a polymerase-catalyzed chain reaction. Meth. Enzymol. 155: 335-350.

Murakami, C., Myoga, K., Kasai, R., Ohtani, K., Kurokawa, T., Ishibashi, S., Dayrit, F., Padolina, W.G., Yamasaki, K. 1993. Screening of plant constituents for effect on glucose transport activity in Ehrlich ascites tumour cells. Chem. Pharm. Bull. 41: 2129-2131.

Powell, W., Morgante, M., Andre, C., Hanafey, M., Vogel, J., Tingey, S., Rafalaski, A. 1996. The comparison of RFLP, RAPD, AFLP and SSR (microsatellite) markers for germplasm analysis. Mol. Breed. 3: 225-238.

Quisumbing. E. 1978. Medicinal Plants of the Philippines. Katha Publishing, Quezon City, pp. 640-642.

Radhika, B., Begum, N., Keshetti, S. 2010. Pharmacognostic and preliminary phytochemical evalution of the leaves of *Bixa orellana*. Phcog J. 2(7): 132-136.

Radisek, S., Jakse, J., Javornik, B. 2004. Development of pathotype-specific SCAR markers for detection of *Verticillium alboatrum* isolates from hop. Plant Dis. 88: 1115-1122.

Ragasa, C. Y.,Ngo, H. T., Rideout, J. A. 2005. Terpenoids and sterols from *Lagerstroemia speciosa.* J. Asian Nat. Prod. Res. 7: 7-12.

Rohlf, F. J. 2000. NTSYS-pc: Numerical Taxonomy and Multivariate Analysis System, Version 2.11T. Exeter Software. Setauket; New York.

Ruch, R. J., Cheng, S. J., Klaunig, J. E. 1989. Prevention of cytotoxicity and inhibition of intracellular communication by antioxidant catechins isolated form Chinese green tea. Carcinogenesis. 10: 1003-1008.

Russell, J. R., Fuller, J. D., Macaulay, M., Hatz, B. G., Jahoor, A., Powell,W., Waugh, R. 1997. Direct comparison of the levels of genetic variation among barley accessions detected by RFLPs, AFLPs, SSRs and RAPDs. Theor. Appl. Genet. 95: 714-722.

Sanger, F., Nicklen, S., Coulson, A.R. 1977. DNA sequencing with chain-terminating inhibitors. Proc. Natl. Acad. Sci. USA. 74: 5463-5467.

Sato, T., Takahashi, M. and Ueda, J. 1981. The components of the plants of *Lagerstroemia* genus. VII. The components in the stems. Annu. Rep. Tohoku Coll. Pharm. 28: 85-87.

Schnell, R. J., Olano, C. T., Campbell, R. J., Brown, J. S. 2001. AFLP analysis of genetic diversity within a jackfruit germplasm collection. Sci. Hortic. 91: 261-274.

Semagn, K., Bjørnstad, Å., and Ndjiondjop, M.N. 2006. An overview of molecular marker methods for plants. Afr. J.Biotechnol. 5(25): 2540-2568.

Sherma, J. 1991. Basic Techniques, Materials and Apparatus. In Sherma, J. and Fried, B. (eds.). Handbook of Thin-Layer Chromatography. New York: Marcel Dekker. pp. 3-41.

Shi, L., Zhang, W., Zhou, Y., Zhang, Y., Li, J., Hu, L., Li, J. 2008. Corosolic acid stimulates glucose uptake via enhancing insulin receptor phosphorylation. Eur. J. Pharmacol. 584: 21-29.

Shim, Y. H., Choi, J. H., Park, C. D., Lim, C. J., Cho, J. H., and Kim, H. J. 2003. Molecular differentiation of *Panax* species by RAPD analysis. Arch. Pharm. Res. 26: 601-605.

Singh, A., Chaudhury, A., Srivastava, P. S., Lakshmikumaran, M. 2002. Comparison of AFLP and SAMPL markers for assessment of intra-population genetic variation in *Azadirachta indica* A. Juss. Plant Sci. 162(1): 17-25.

Smitinand, T. 2001. Thai Plant Names (Botanical Names – Vernacular Names) revised Edition. Bangkok: The Forest Herbarium, Royal Forest Department.

Sneath, P. H. A., Sokal, R. R. 1973. Numerical Taxonomy: The principles and practice of numerical classification. Freeman; San Francisco.

Steiger, D.L., Nagai, C., Moore, P.H., Morden, C.W., Osgood, R.V., Ming, R. 2002. AFLP analysis of genetic diversity within and among *Coffea Arabica* cultivars. Theor. Appl. Genet. 105: 209-215.

Suzuki, Y., Unno, T., Ushitani, M., Hayasi, K., Kakuda, T. 1999. Anti 0besity activity of extracts from *Lagerstroemia speciosa* L. leaves on female kk-Ay mice. J. Nutr. Sci. Vitaminol. 45: 791-795

Takahashi, M., Ueda, J., Sasaki, J. 1977. The components of the plants of *Lagerstroemia* genus. IV: on the presence of the ellagic acid derivatives from the leaves of *Lagerstroemia subcostata* Koehne. and *L. speciosa* (L.) Pers. and the synthesis of 3, 4-di-O-methylellagic acid. Yaku Gaku Zasshi. 97: 880-882.

Tanaka, T., Tong, H. H., Xu, Y.M., Ishimaru, K., Nonaka, G., Nishioka, I. 1992. Tannins and related compounds. CXVII. Isolation and characterization of three new ellagitannins, lagerstannins A, B, and C, having a gluconic acid core, from *Lagerstroemia speciosa* (L.) Pers. Chem. Pharm. Bull. 40: 2975-2980.

Tautz, M., Renz, M. 1984. Simple sequence are ubiquitous repetitive components of eukaryotic genomes. Nucleic Acids Res. 12: 4127-4138.

Techaprasan, J., Klinbunga, S., Jenjittikul, T. 2008. Genetic relationships and species authentication of *Boesenbergia* (Zingiberaceae) in Thailand based on AFLP and SSCP analyses. Biochem. Syst.Ecol. 36: 408-416.

Thai Herbal Pharmacopoeia committee. 1995. Thai Pharmacopoeia Vol. I. Bangkok: Prachachon Co., Ltd.

Thai Herbal Pharmacopoeia committee. 2000. Thai Pharmacopoeia Vol. II. Bangkok: Prachachon Co., Ltd.

Trease. G.E., and Evan, W.C. 2009. Pharmacognosy. 16th ed. London: W.B. Saunders Press.

Unno, T., Sakane, I., Masumizu, T., Kohno, M., Kakuda, T. 1997. Antioxidative Activity of Water Extracts of *Lagerstroemia speciosa* Leaves. Biosci. Biotechnol. Biochem. 4(10): 1772-1774.

Unno, T., Sugimoto, A. Kakuda, T. 2004. Xanthine oxidase inhibitors from leaves of *Lagerstroemia speciosa* (L.) Pers. J Ethonopharmacol. 93: 391-395.

Vasudevan, H. 2007. DNA fingerprinting in the standardization of herbal and nutraceuticals [Online]. Available from: http://www.scq.ubc.ca/?p=286 [cited 15-March-2010].

Vikas, K., Pankajkumar, Y.S., Singh, P.U., Hans, B.R., Amar, R., Kamaruz, Z.M. 2010. Pharmacognostic evaluation of *Cuscuta reflexa* Roxb. Phcog J. 2(6): 74-82

Vos, P., Hogers, R., Bleeker, M., Reijans, M., De lee, T.V., Hornes, M., Frijters, A., Pot, J., Peleman, J., Kuiper, M., Zabeau, M. 1995. AFLP: a new techniques for DNA fingerprinting. Nucleic Acids Res. 23: 4407-4414.

Wallis, T.E. 1960. Textbook of Pharmacognosy. 14th ed. London: J. & A. Churchill.

Weising, K., Nybom, H., Wolff, K., and Kahl, G. 2005. DNA fingerprinting in plants: principles, methods, and applications. 2nd ed. Florida: CRC Press.

Williams, K., Kubelik, A.R., Rafalski, J.A., Tingey, S.V. 1990. DNA polymorphisms amplified by arbitrary primers are useful as genetic markers. Nucleic Acids Res. 18: 6231-6235.

Winfield, M.O., Arnold, G.M., Copper, F., Le Ray, M., White, J., Karp, A., Edwards, K.J. 1998. A study of genetic diversity in *Populus nigra* subsp. Betulifolia in the upper severn area of the UK using AFLP markers. Mol. Ecol. 7: 3-10.

World Health Organiztion (WHO). 1998. Quality control methods for medicinal plant materials. Geneva: A.I.T.B.S. & Distributors (Regd.).

Xu, Y.-M., Sakai, T., Tanaka, T., Nonaka, G., Nishioka, I. 1991. Tannins and related compounds. CVI. Prevention of aminialditol derivatives of hydrolysable tannins having α- and β- glucopyranise cores, and its application to the structure elucidation of new tannins, reginins A and B and flosin A, isolated from *Lagerstroemia flos-reginae* Retz. Chem. Pharm. Bull. 39: 639-646.

Xu, Y.-M., Tanaka, T., Nonaka, G., Nishioka, I. 1991. Tannins and related compounds. CVII. Structure elucidation in three new monomeric and dimeric ellagitannins, flosin B and reginin C and D, isolated from *Lagerstroemia flos-reginae* Retz. Chem. Pharm. Bull. 39: 647-650.

Xue, C. H., Li, D. Z., Lu, J. M., Yang, J. B., and Liu, J.Q. 2006. Molecular authentication of the traditional Tibetan medicinal plant *Swertia mussotii*. Planta Med. 72: 1223-1226.

Yamaguchi, Y., Yamada, K., Yashikawa, N., Nakamura, K., Haginaka J., Kunimoto, M. 2006. Corosolic acid prevents oxidative stress, inflammation and hypertension in SHR/NDmcr-cp rats, a model of metabolic syndrome. Life Sci. 79(26): 2474-2479.

Yii, P.C. 1996. Tree flora of Sabah and Sarawak Vol. 2. pp. 225-230.

Yip, P. Y., Chau, C. F., Mak, C. Y., Kwan, H. S. 2007. DNA methods for identification of Chinese medicinal materials. Chin Med 2: 9.

Youngken, H. W. 1948. Textbook of Pharmacognosy. 6th ed. The united state of America: Blakiston, Mcgraw-Hill Press.

Zhang, D.-Q., Gao, L.-M., Yang, Y.-P. 2010. Genetic diversity and structure of a traditional Chinese medicinal plant species, *Fritillaria cirrhosa* (Liliaceae) in southwest China and implications for its conservation. Biochem. Syst. Ecol. 38: 236-242.

APPENDICES

Appendix A

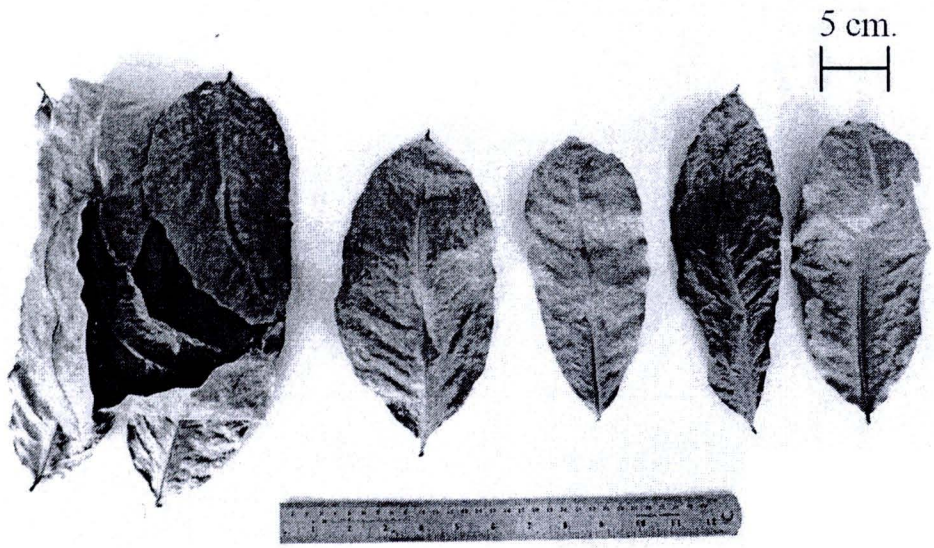

Figure A.1 Morphology of *L. speciosa* crude drug (LS1).

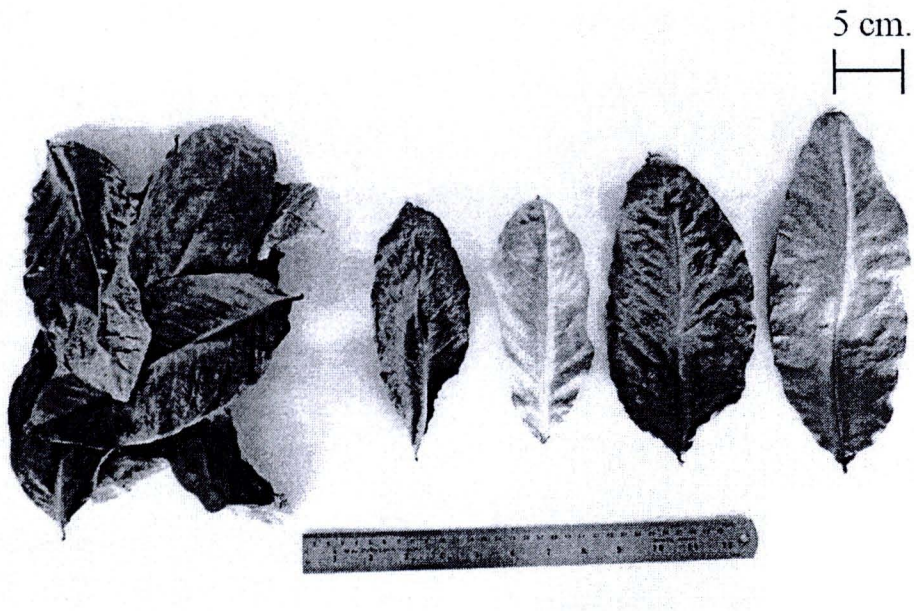

Figure A.2 Morphology of *L. speciosa* crude drug (LS2).

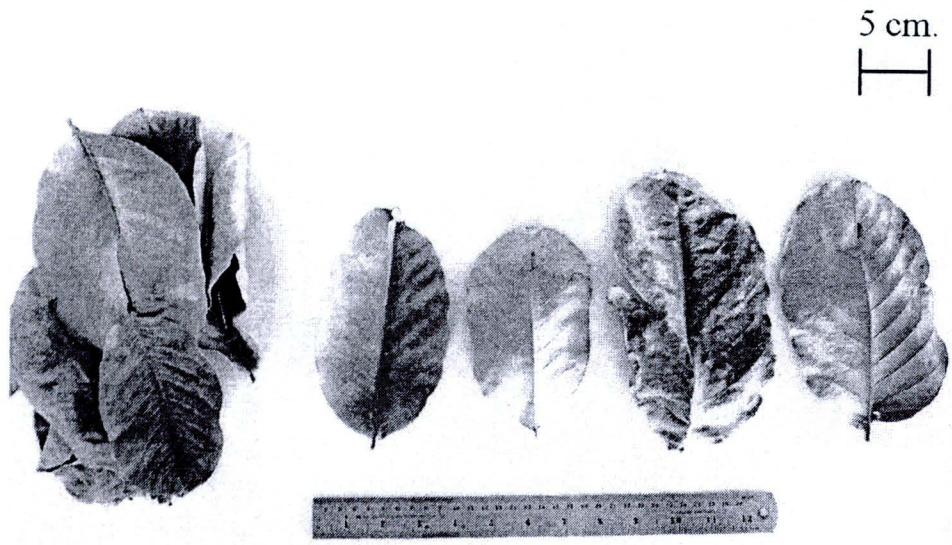

Figure A.3 Morphology of *L. speciosa* crude drug (LS3).

Figure A.4 Morphology of *L. speciosa* crude drug (LS4).

Figure A.5 Morphology of *L. speciosa* crude drug (LS5).

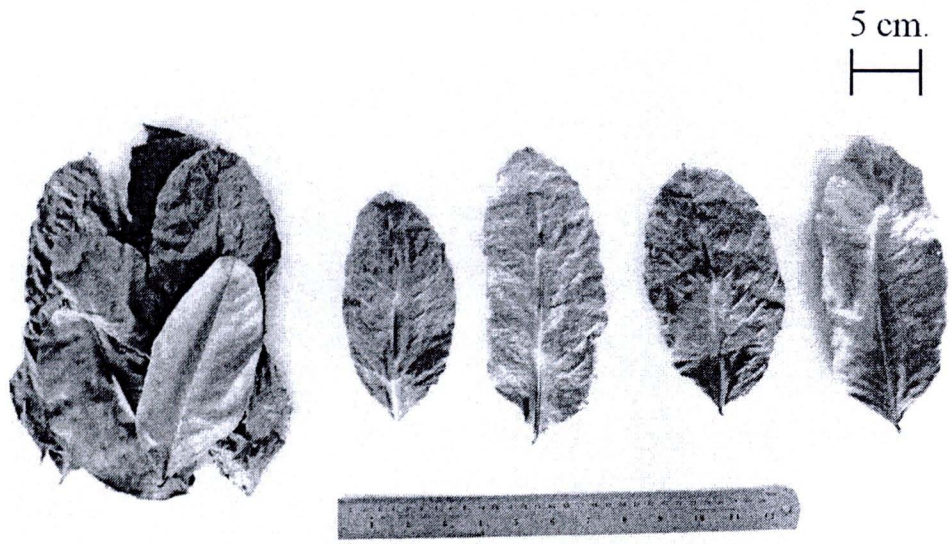

Figure A.6 Morphology of *L. speciosa* crude drug (LS6).

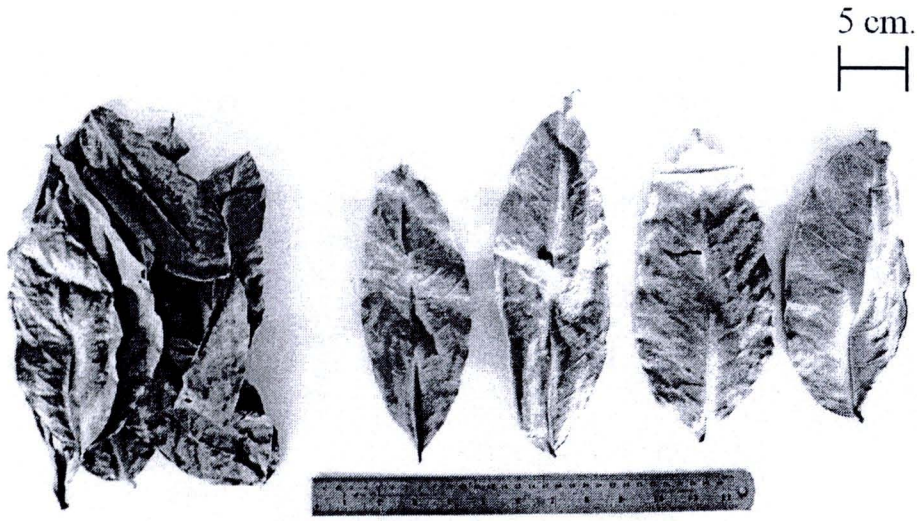

Figure A.7 Morphology of *L. speciosa* crude drug (LS7).

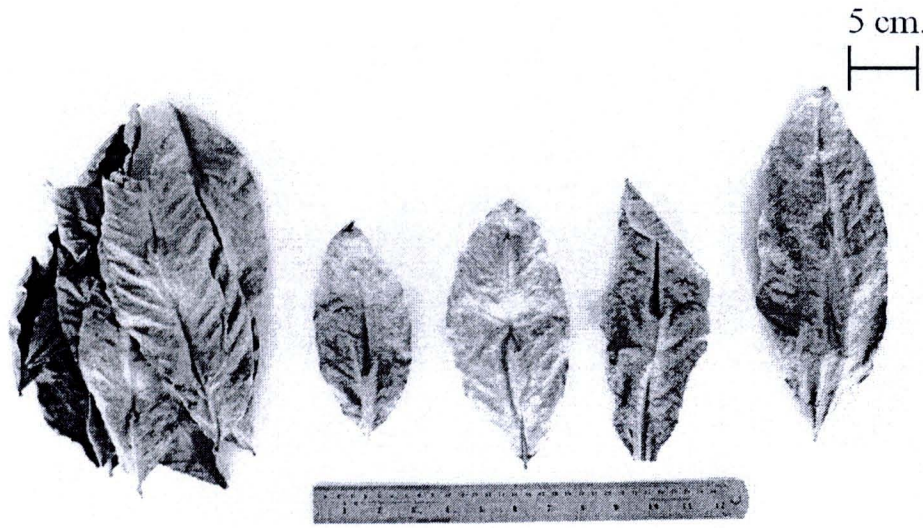

Figure A.8 Morphology of *L. speciosa* crude drug (LS8).

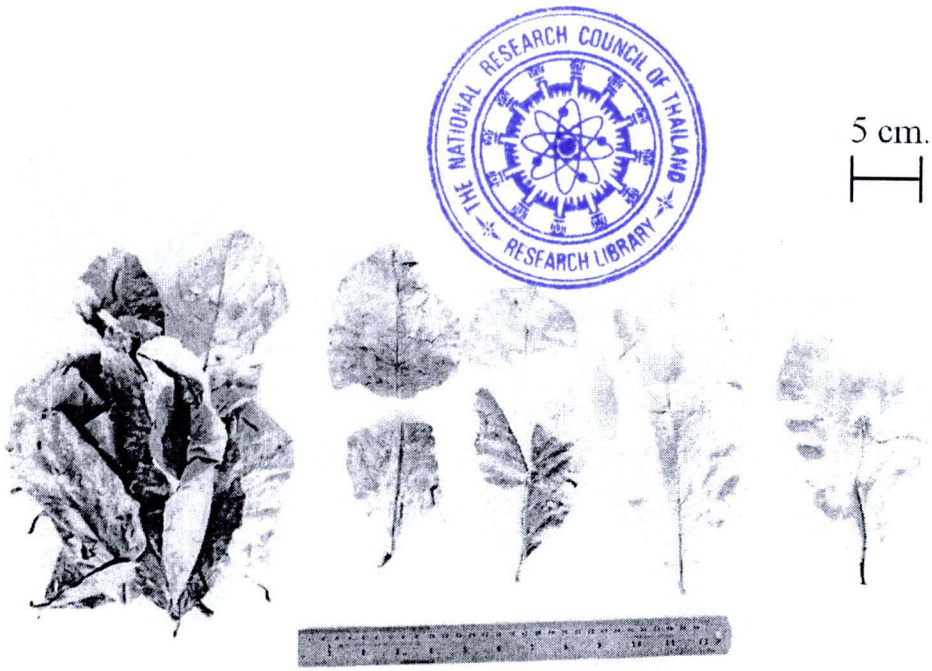

Figure A.9 Morphology of *L. speciosa* crude drug (LS9).

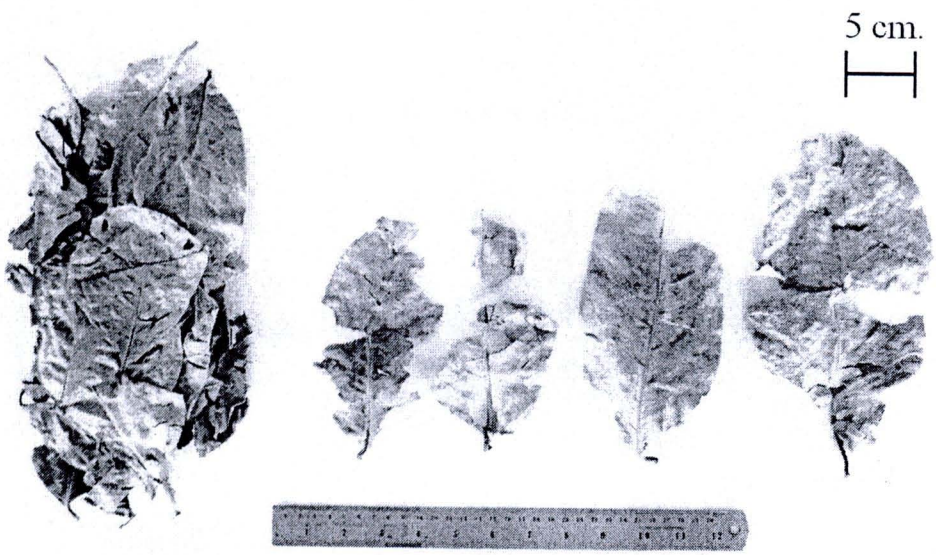

Figure A.10 Morphology of *L. speciosa* crude drug (LS10).

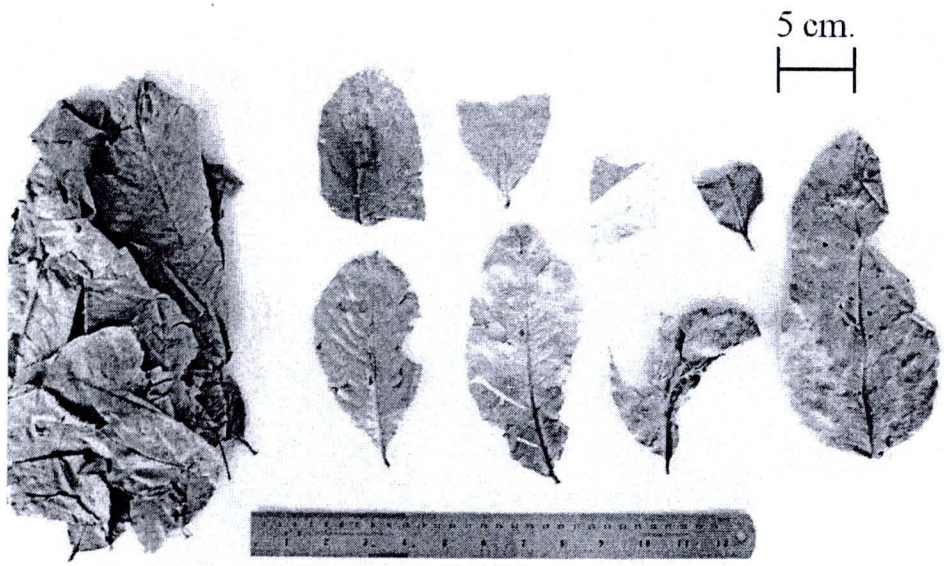

Figure A.11 Morphology of *L. speciosa* crude (LS11).

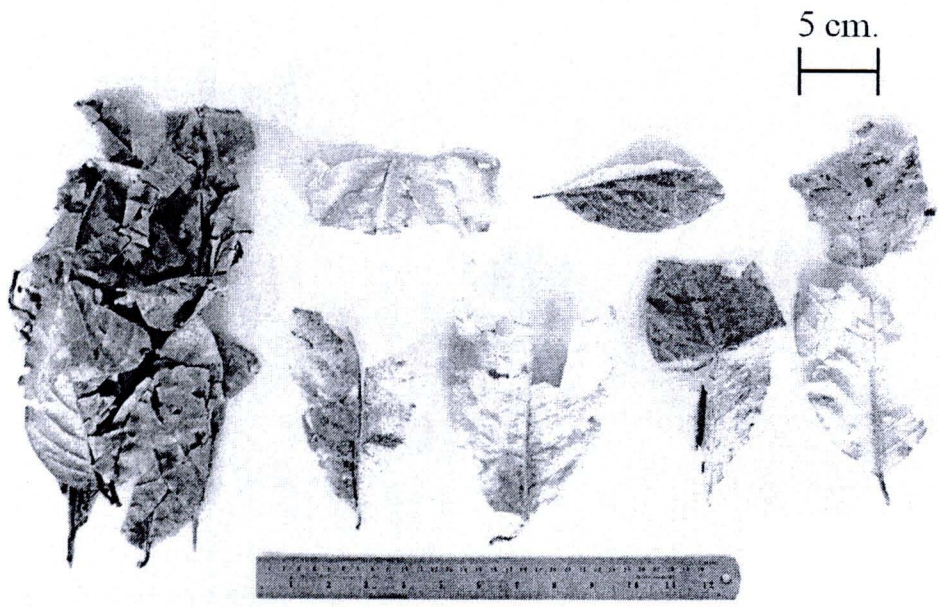

Figure A.12 Morphology of *L. speciosa* crude drug (LS12).

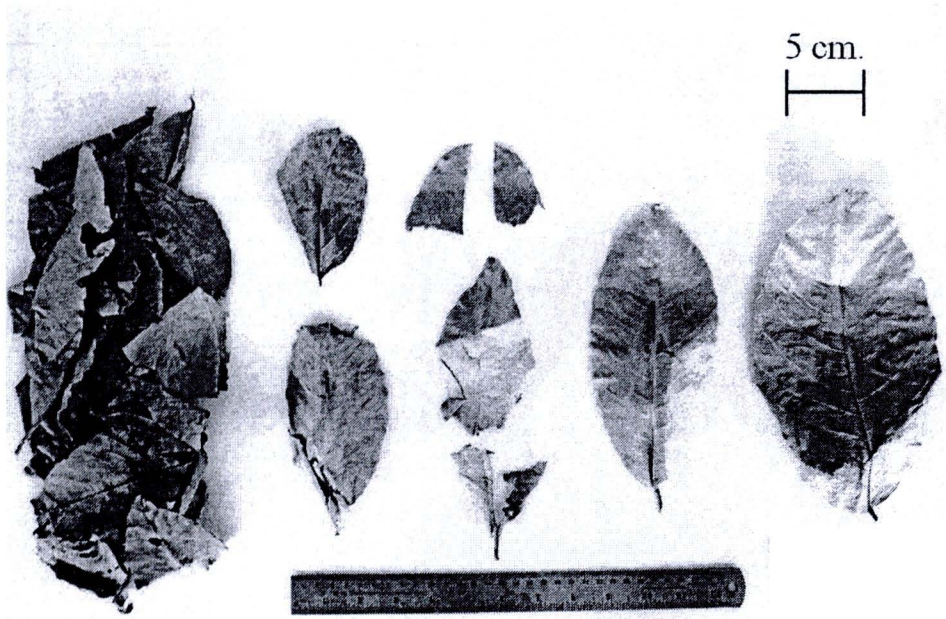

Figure A.13 Morphology of *L. speciosa* crude drug (LS13).

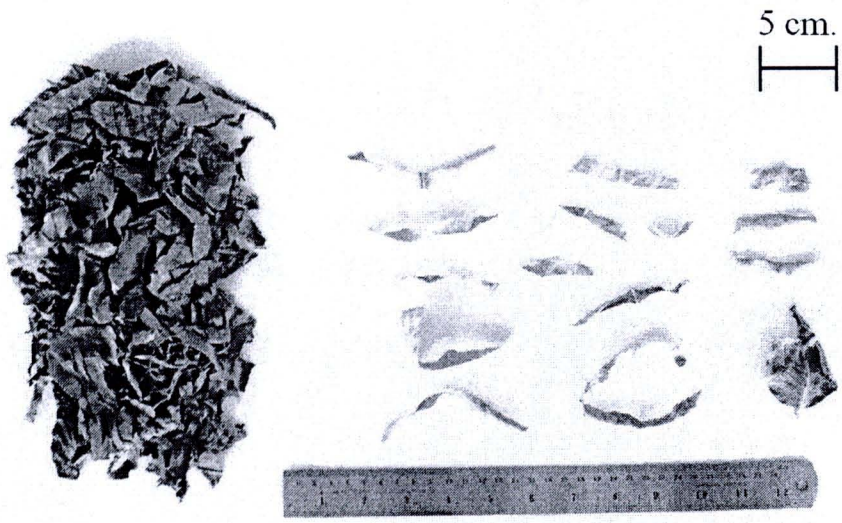

Figure A.14 Morphology of *L. speciosa* crude drug (LS14).

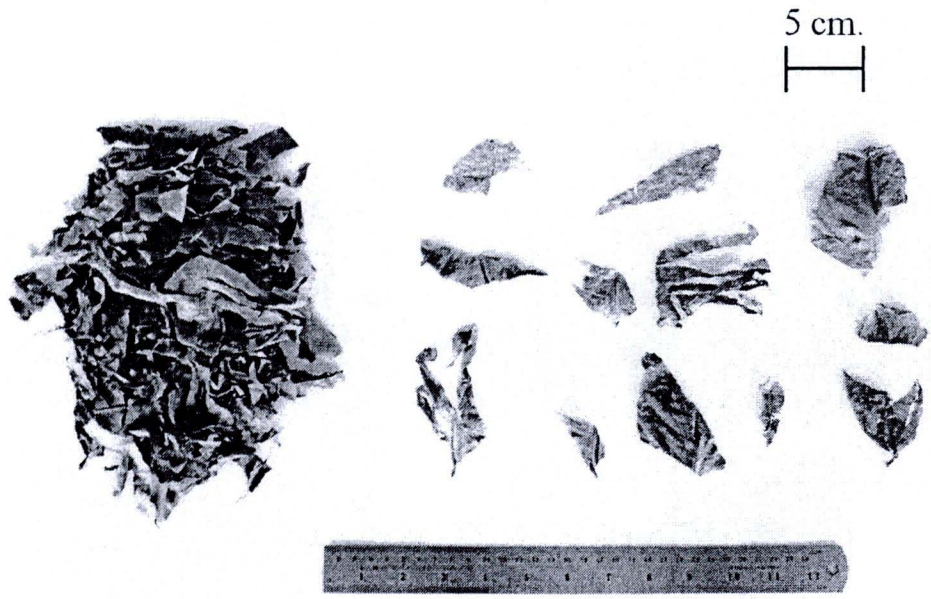

Figure A.15 Morphology of *L. speciosa* crude drug (LS15).

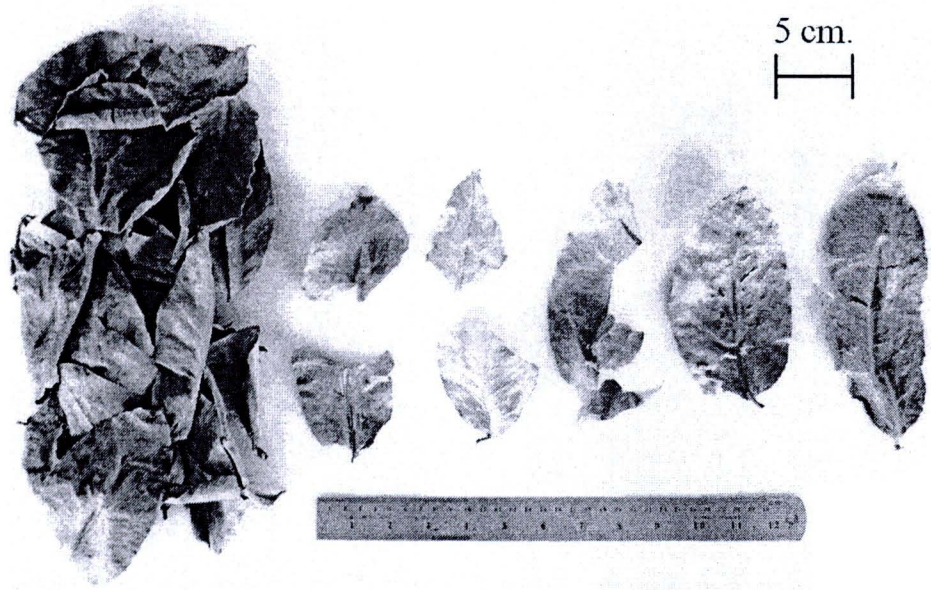

Figure A.16 Morphology of *L. speciosa* crude drug (LS16).

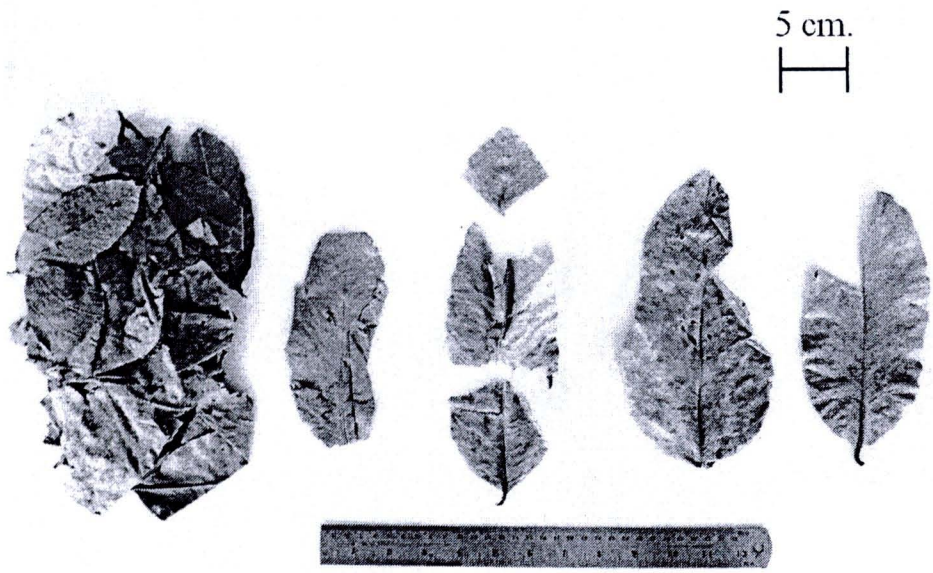

Figure A.17 Morphology of *L. speciosa* crude drug (LS17).

Appendix B

Table B.1 Stamatal number and stomatal index of *L. speciosa* (LS1). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
17	115	12.88	240.45
18	112	13.85	254.60
21	110	16.03	297.03
20	111	15.27	282.89
16	118	11.94	226.31
18	115	13.53	254.60
18	113	13.74	254.60
17	114	12.98	240.45
17	112	13.18	240.45
18	108	14.29	254.60
18	112	13.85	254.60
17	116	12.78	240.45
19	107	15.08	268.74
18	109	14.17	254.60
18	113	13.74	254.60
19	108	14.96	268.74
17	114	12.98	240.45
17	112	13.18	240.45
18	107	14.40	254.60
17	112	13.18	240.45
18	110	14.06	254.60
17	116	12.78	240.45
19	108	14.96	268.74
19	111	14.62	268.74
19	110	14.73	268.74
18	115	13.53	254.60
18	113	13.74	254.60
19	112	14.50	268.74
20	109	15.50	282.89
21	116	15.33	297.03
	Mean	**13.99**	**257.43**
	SD	**0.97**	**17.18**

Table B.2 Stamatal number and stomatal index of *L. speciosa* (LS2). Area of determination = 0.0707 mm^2

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
21	105	16.67	297.03
17	116	12.78	240.45
18	112	13.85	254.60
18	115	13.53	254.60
18	113	13.74	254.60
19	110	14.73	268.74
18	115	13.53	254.60
19	107	15.08	268.74
17	117	12.69	240.45
20	109	15.50	282.89
21	104	16.80	297.03
20	110	15.38	282.89
20	106	15.87	282.89
19	111	14.62	268.74
18	115	13.53	254.60
18	112	13.85	254.60
19	109	14.84	268.74
17	118	12.59	240.45
21	102	17.07	297.03
18	119	13.14	254.60
17	116	12.78	240.45
19	111	14.62	268.74
18	109	14.17	254.60
17	116	12.78	240.45
17	114	12.98	240.45
18	112	13.85	254.60
18	111	13.95	254.60
18	116	13.43	254.60
19	110	14.73	268.74
18	116	13.43	254.60
	Mean	**14.22**	**261.67**
	SD	**1.26**	**17.32**

Table B.3 Stamatal number and stomatal index of *L. speciosa* (LS3). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
22	106	17.19	311.17
21	110	16.03	297.03
18	113	13.74	254.60
17	116	12.78	240.45
19	101	15.83	268.74
19	106	15.20	268.74
18	116	13.43	254.60
19	113	14.39	268.74
18	114	13.64	254.60
18	117	13.33	254.60
17	119	12.50	240.45
19	111	14.62	268.74
17	121	12.32	240.45
18	115	13.53	254.60
19	113	14.39	268.74
20	109	15.50	282.89
18	112	13.85	254.60
18	114	13.64	254.60
19	110	14.73	268.74
17	114	12.98	240.45
18	112	13.85	254.60
19	114	14.29	268.74
21	108	16.28	297.03
20	110	15.38	282.89
17	116	12.78	240.45
18	114	13.64	254.60
18	111	13.95	254.60
19	116	14.07	268.74
17	118	12.59	240.45
17	115	12.88	240.45
	Mean	**14.11**	**261.67**
	SD	**1.22**	**18.48**

Table B.4 Stamatal number and stomatal index of *L. speciosa* (LS4). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
17	118	12.59	240.45
18	116	13.43	254.60
17	121	12.32	240.45
22	109	16.79	311.17
18	101	15.13	254.60
19	113	14.39	268.74
17	118	12.59	240.45
18	115	13.53	254.60
21	107	16.41	297.03
19	111	14.62	268.74
18	114	13.64	254.60
19	108	14.96	268.74
18	110	14.06	254.60
21	108	16.28	297.03
18	119	13.14	254.60
17	121	12.32	240.45
16	125	11.35	226.31
19	115	14.18	268.74
18	117	13.33	254.60
19	115	14.18	268.74
20	112	15.15	282.89
21	106	16.54	297.03
20	108	15.63	282.89
22	103	17.60	311.17
21	106	16.54	297.03
18	117	13.33	254.60
19	114	14.29	268.74
17	120	12.41	240.45
18	111	13.95	254.60
17	118	12.59	240.45
	Mean	**14.24**	**264.97**
	SD	**1.59**	**22.88**

Table B.5 Stamatal number and stomatal index of *L. speciosa* (LS5). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
18	115	13.53	254.60
17	118	12.59	240.45
17	121	12.32	240.45
18	116	13.43	254.60
18	114	13.64	254.60
19	112	14.50	268.74
18	117	13.33	254.60
19	114	14.29	268.74
22	110	16.67	311.17
18	118	13.24	254.60
19	117	13.97	268.74
21	108	16.28	297.03
17	117	12.69	240.45
19	114	14.29	268.74
17	119	12.50	240.45
16	125	11.35	226.31
19	114	14.29	268.74
18	111	13.95	254.60
21	106	16.54	297.03
17	114	12.98	240.45
18	113	13.74	254.60
18	108	14.29	254.60
19	115	14.18	268.74
21	110	16.03	297.03
18	117	13.33	254.60
16	122	11.59	226.31
17	116	12.78	240.45
19	113	14.39	268.74
18	111	13.95	254.60
17	127	11.81	240.45
	Mean	**13.75**	**258.84**
	SD	**1.35**	**20.73**

Table B.6 Stamatal number and stomatal index of *L. speciosa* (LS6). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
17	116	12.78	240.45
17	114	12.98	240.45
18	112	13.85	254.60
19	108	14.96	268.74
16	120	11.76	226.31
22	106	17.19	311.17
23	103	18.25	325.32
18	117	13.33	254.60
18	115	13.53	254.60
21	112	15.79	297.03
19	115	14.18	268.74
17	116	12.78	240.45
17	119	12.50	240.45
16	121	11.68	226.31
19	117	13.97	268.74
18	116	13.43	254.60
17	118	12.59	240.45
15	125	10.71	212.16
18	116	13.43	254.60
17	118	12.59	240.45
18	114	13.64	254.60
17	119	12.50	240.45
18	115	13.53	254.60
19	112	14.50	268.74
17	113	13.08	240.45
17	111	13.28	240.45
18	109	14.17	254.60
19	113	14.39	268.74
22	114	16.18	311.17
19	119	13.77	268.74
	Mean	**13.71**	**257.43**
	SD	**1.57**	**25.41**

Table B.7 Stamatal number and stomatal index of *L. speciosa* (LS7). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
18	116	13.43	254.60
21	107	16.41	297.03
16	123	11.51	226.31
17	117	12.69	240.45
18	115	13.53	254.60
17	118	12.59	240.45
17	112	13.18	240.45
18	116	13.43	254.60
19	110	14.73	268.74
18	115	13.53	254.60
18	117	13.33	254.60
17	119	12.50	240.45
17	114	12.98	240.45
18	112	13.85	254.60
17	116	12.78	240.45
15	121	11.03	212.16
19	116	14.07	268.74
21	109	16.15	297.03
23	104	18.11	325.32
18	115	13.53	254.60
18	113	13.74	254.60
17	119	12.50	240.45
18	116	13.43	254.60
16	120	11.76	226.31
18	116	13.43	254.60
18	113	13.74	254.60
19	110	14.73	268.74
20	107	15.75	282.89
19	111	14.62	268.74
17	114	12.98	240.45
	Mean	**13.67**	**255.54**
	SD	**1.48**	**22.88**

Table B.8 Stamatal number and stomatal index of *L. speciosa* (LS8). Area of determination = 0.0707 mm^2.

Number of stomata	Number of epidermal cells	Stomatal index	Stomatal number
19	111	14.62	268.74
16	119	11.85	226.31
18	116	13.43	254.60
22	109	16.79	311.17
18	116	13.43	254.60
17	118	12.59	240.45
21	111	15.91	297.03
20	121	14.18	282.89
16	123	11.51	226.31
18	115	13.53	254.60
15	117	11.36	212.16
23	108	17.56	325.32
22	111	16.54	311.17
20	114	14.93	282.89
18	118	13.24	254.60
17	120	12.41	240.45
17	117	12.69	240.45
19	113	14.39	268.74
16	116	12.12	226.31
18	116	13.43	254.60
15	118	11.28	212.16
19	114	14.29	268.74
17	116	12.78	240.45
17	114	12.98	240.45
18	111	13.95	254.60
19	110	14.73	268.74
17	116	12.78	240.45
18	111	13.95	254.60
18	114	13.64	254.60
22	117	15.83	311.17
	Mean	**13.76**	**259.31**
	SD	**1.61**	**29.56**

Table B.9 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS1).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
21	5.25	58	14.50	28	7.00
22	5.50	62	15.50	26	6.50
20	5.00	54	13.50	24	6.00
23	5.75	57	14.25	32	8.00
23	5.75	61	15.25	30	7.50
21	5.25	55	13.75	29	7.25
21	5.25	58	14.50	30	7.50
21	5.25	60	15.00	28	7.00
22	5.50	62	15.50	26	6.50
20	5.00	55	13.75	25	6.25
21	5.25	58	14.50	27	6.75
19	4.75	60	15.00	31	7.75
24	6.00	57	14.25	28	7.00
23	5.75	56	14.00	27	6.75
22	5.50	51	12.75	31	7.75
22	5.50	55	13.75	26	6.50
21	5.25	63	15.75	28	7.00
18	4.50	57	14.25	25	6.25
22	5.50	59	14.75	22	5.50
21	5.25	58	14.50	31	7.75
22	5.50	61	15.25	28	7.00
22	5.50	63	15.75	26	6.50
22	5.50	59	14.75	24	6.00
21	5.25	55	13.75	31	7.75
22	5.50	58	14.50	30	7.50
22	5.50	62	15.50	28	7.00
21	5.25	56	14.00	27	6.75
22	5.50	59	14.75	30	7.50
21	5.25	62	15.50	28	7.00
20	5.00	60	15.00	27	6.75
Mean	**5.35**		**14.59**		**6.94**
SD	**0.31**		**0.74**		**0.61**

Table B.10 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS2).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
22	5.50	60	15.00	30	7.50
22	5.50	62	15.50	26	6.50
21	5.25	58	14.50	28	7.00
21	5.25	56	14.00	20	5.00
21	5.25	63	15.75	22	5.50
21	5.25	61	15.25	31	7.75
21	5.25	60	15.00	26	6.50
20	5.00	58	14.50	28	7.00
19	4.75	59	14.75	27	6.75
20	5.00	54	13.50	29	7.25
20	5.00	63	15.75	31	7.75
21	5.25	58	14.50	25	6.25
20	5.00	55	13.75	21	5.25
22	5.50	59	14.75	28	7.00
22	5.50	61	15.25	21	5.25
21	5.25	58	14.50	26	6.50
21	5.25	63	15.75	25	6.25
21	5.25	59	14.75	21	5.25
22	5.50	57	14.25	18	4.50
22	5.50	62	15.50	26	6.50
23	5.75	63	15.75	25	6.25
22	5.50	60	15.00	27	6.75
19	4.75	57	14.25	22	5.50
21	5.25	63	15.75	31	7.75
22	5.50	57	14.25	28	7.00
22	5.50	59	14.75	25	6.25
21	5.25	60	15.00	22	5.50
22	5.50	62	15.50	26	6.50
23	5.75	60	15.00	28	7.00
22	5.50	58	14.50	25	6.25
Mean	**5.31**		**14.88**		**6.40**
SD	**0.25**		**0.62**		**0.86**

Table B.11 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS3).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
22	5.50	58	14.50	23	5.75
22	5.50	55	13.75	26	6.50
21	5.25	62	15.50	21	5.25
22	5.50	65	16.25	33	8.25
23	5.75	58	14.50	28	7.00
19	4.75	59	14.75	32	8.00
22	5.50	58	14.50	30	7.50
20	5.00	62	15.50	27	6.75
22	5.50	59	14.75	28	7.00
21	5.25	60	15.00	26	6.50
21	5.25	55	13.75	25	6.25
21	5.25	58	14.50	28	7.00
21	5.25	63	15.75	26	6.50
22	5.50	57	14.25	24	6.00
21	5.25	60	15.00	22	5.50
20	5.00	62	15.50	18	4.50
22	5.50	57	14.25	26	6.50
22	5.50	61	15.25	28	7.00
21	5.25	60	15.00	25	6.25
21	5.25	57	14.25	29	7.25
20	5.00	60	15.00	31	7.75
22	5.50	58	14.50	26	6.50
18	4.50	63	15.75	28	7.00
22	5.50	62	15.50	25	6.25
22	5.50	59	14.75	21	5.25
21	5.25	60	15.00	30	7.50
20	5.00	58	14.50	29	7.25
22	5.50	63	15.75	25	6.25
22	5.50	65	16.25	27	6.75
22	5.50	57	14.25	28	7.00
Mean	**5.31**		**14.93**		**6.63**
SD	**0.27**		**0.66**		**0.84**

Table B.12 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS4).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
23	5.75	62	15.50	25	6.25
22	5.50	60	15.00	28	7.00
22	5.50	57	14.25	18	4.50
21	5.25	55	13.75	24	6.00
22	5.50	62	15.50	32	8.00
20	5.00	60	15.00	29	7.25
22	5.50	59	14.75	27	6.75
20	5.00	58	14.50	22	5.50
21	5.25	59	14.75	26	6.50
20	5.00	61	15.25	19	4.75
20	5.00	64	16.00	31	7.75
20	5.00	57	14.25	26	6.50
22	5.50	59	14.75	28	7.00
21	5.25	52	13.00	22	5.50
22	5.50	58	14.50	25	6.25
21	5.25	63	15.75	21	5.25
21	5.25	60	15.00	22	5.50
21	5.25	58	14.50	27	6.75
21	5.25	61	15.25	26	6.50
20	5.00	59	14.75	28	7.00
20	5.00	62	15.50	23	5.75
20	5.00	58	14.50	27	6.75
21	5.25	61	15.25	25	6.25
22	5.50	58	14.50	26	6.50
20	5.00	60	15.00	28	7.00
21	5.25	68	17.00	26	6.50
22	5.50	62	15.50	24	6.00
20	5.00	60	15.00	22	5.50
22	5.50	63	15.75	28	7.00
22	5.50	58	14.50	29	7.25
Mean	**5.27**		**14.95**		**6.37**
SD	**0.23**		**0.74**		**0.82**

Table B.13 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS5).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
21	5.25	59	14.75	24	6.00
22	5.50	64	16.00	29	7.25
21	5.25	57	14.25	31	7.75
21	5.25	55	13.75	22	5.50
20	5.00	63	15.75	25	6.25
21	5.25	58	14.50	28	7.00
21	5.25	60	15.00	26	6.50
22	5.50	62	15.50	29	7.25
21	5.25	57	14.25	31	7.75
22	5.50	65	16.25	18	4.50
24	6.00	63	15.75	27	6.75
22	5.50	59	14.75	29	7.25
22	5.50	61	15.25	30	7.50
21	5.25	56	14.00	22	5.50
21	5.25	62	15.50	25	6.25
18	4.50	60	15.00	27	6.75
20	5.00	58	14.50	24	6.00
21	5.25	63	15.75	28	7.00
22	5.50	59	14.75	21	5.25
22	5.50	56	14.00	25	6.25
22	5.50	58	14.50	28	7.00
21	5.25	59	14.75	31	7.75
21	5.25	63	15.75	28	7.00
19	4.75	65	16.25	29	7.25
21	5.25	61	15.25	25	6.25
21	5.25	60	15.00	28	7.00
21	5.25	62	15.50	32	8.00
22	5.50	59	14.75	19	4.75
19	4.75	60	15.00	25	6.25
22	5.50	63	15.75	28	7.00
Mean	**5.28**		**15.06**		**6.62**
SD	**0.28**		**0.68**		**0.89**

Table B.14 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS6).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
22	5.50	55	13.75	28	7.00
22	5.50	57	14.25	25	6.25
22	5.50	59	14.75	31	7.75
21	5.25	58	14.50	26	6.50
22	5.50	51	12.75	24	6.00
20	5.00	50	12.50	29	7.25
22	5.50	56	14.00	26	6.50
21	5.25	58	14.50	26	6.50
22	5.50	59	14.75	21	5.25
21	5.25	59	14.75	29	7.25
21	5.25	56	14.00	30	7.50
21	5.25	58	14.50	24	6.00
21	5.25	63	15.75	18	4.50
21	5.25	59	14.75	21	5.25
21	5.25	57	14.25	27	6.75
19	4.75	59	14.75	29	7.25
20	5.00	58	14.50	19	4.75
22	5.50	60	15.00	22	5.50
21	5.25	58	14.50	18	4.50
22	5.50	58	14.50	29	7.25
22	5.50	54	13.50	26	6.50
22	5.50	48	12.00	28	7.00
21	5.25	59	14.75	25	6.25
22	5.50	57	14.25	22	5.50
22	5.50	49	12.25	25	6.25
22	5.50	51	12.75	26	6.50
23	5.75	60	15.00	28	7.00
19	4.75	51	12.75	27	6.75
22	5.50	59	14.75	26	6.50
22	5.50	53	13.25	22	5.50
Mean	**5.34**		**14.08**		**6.31**
SD	**0.23**		**0.94**		**0.88**

Table B.15 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS7).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
21	5.25	52	13.00	22	5.50
21	5.25	60	15.00	21	5.25
20	5.00	57	14.25	18	4.50
22	5.50	61	15.25	22	5.50
21	5.25	56	14.00	26	6.50
21	5.25	58	14.50	25	6.25
22	5.50	46	11.50	27	6.75
21	5.25	60	15.00	24	6.00
22	5.50	52	13.00	22	5.50
21	5.25	57	14.25	26	6.50
22	5.50	58	14.50	23	5.75
20	5.00	60	15.00	21	5.25
21	5.25	53	13.25	17	4.25
22	5.50	54	13.50	22	5.50
19	4.75	57	14.25	25	6.25
22	5.50	55	13.75	28	7.00
22	5.50	59	14.75	30	7.50
22	5.50	51	12.75	25	6.25
21	5.25	57	14.25	26	6.50
22	5.50	60	15.00	23	5.75
21	5.25	58	14.50	21	5.25
22	5.50	52	13.00	24	6.00
21	5.25	56	14.00	26	6.50
21	5.25	57	14.25	22	5.50
20	5.00	61	15.25	28	7.00
18	4.50	59	14.75	19	4.75
22	5.50	54	13.50	26	6.50
22	5.50	48	12.00	24	6.00
21	5.25	57	14.25	27	6.75
24	6.00	52	13.00	28	7.00
Mean	**5.31**		**13.98**		**5.98**
SD	**0.28**		**0.95**		**0.78**

Table B.16 Palisade ratio, Vein-islet number and veinlet termination of *L. speciosa* (LS8).

Palisade cell		Vein-islet		Veinlet termination	
Number beneath 4 epidermal cell	**Palisade ratio**	**Count in 4 mm^2**	**Vein-islet number**	**Count in 4 mm^2**	**Veinlet termination number**
22	5.50	56	14.00	28	7.00
21	5.25	59	14.75	25	6.25
22	5.50	62	15.50	22	5.50
21	5.25	61	15.25	19	4.75
21	5.25	58	14.50	28	7.00
21	5.25	60	15.00	31	7.75
21	5.25	57	14.25	22	5.50
20	5.00	58	14.50	25	6.25
19	4.75	63	15.75	27	6.75
19	4.75	60	15.00	28	7.00
22	5.50	62	15.50	31	7.75
22	5.50	59	14.75	22	5.50
23	5.75	60	15.00	24	6.00
22	5.50	63	15.75	28	7.00
22	5.50	57	14.25	29	7.25
21	5.25	58	14.50	27	6.75
21	5.25	60	15.00	31	7.75
20	5.00	59	14.75	28	7.00
21	5.25	53	13.25	26	6.50
21	5.25	66	16.50	27	6.75
22	5.50	57	14.25	22	5.50
20	5.00	55	13.75	19	4.75
22	5.50	63	15.75	24	6.00
21	5.25	58	14.50	22	5.50
21	5.25	60	15.00	19	4.75
22	5.50	62	15.50	27	6.75
23	5.75	58	14.50	23	5.75
21	5.25	60	15.00	27	6.75
22	5.50	57	14.25	29	7.25
22	5.50	59	14.75	28	7.00
Mean	**5.32**		**14.83**		**6.40**
SD	**0.25**		**0.68**		**0.88**

Appendix C

Table C.1 Physiocochemical values of *L. speciosa* leaves (LS1).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	6.7233	6.3936	7.4445	1.4809	12.0976	13.7353	5.2594
2	6.7016	6.1440	7.2920	1.4824	12.0956	13.6167	5.2089
3	6.7566	6.5655	7.4062	1.4832	12.0861	13.4792	5.2795
mean	**6.7272**	**6.3677**	**7.3809**	**1.4822**	**12.0931**	**13.6080**	**5.2492**
SD	**0.0277**	**0.2119**	**0.0793**	**0.0012**	**0.0061**	**0.1362**	**0.0364**

Table C.2 Physiocochemical values of *L. speciosa* leaves (LS2).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	7.4789	7.0366	7.1483	1.4063	8.5095	12.1773	3.3491
2	7.4583	7.1619	7.1678	1.4109	8.5176	12.1490	3.3199
3	7.4146	7.2087	7.0434	1.4093	8.5595	12.1251	3.3896
mean	**7.4506**	**7.1357**	**7.1198**	**1.4089**	**8.5289**	**12.1505**	**3.3529**
SD	**0.0328**	**0.0890**	**0.0669**	**0.0023**	**0.0268**	**0.0922**	**0.0350**

Table C.3 Physiocochemical values of *L. speciosa* leaves (LS3).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	6.4844	6.5303	7.2941	1.4415	11.1889	13.5767	4.7290
2	6.5048	6.5165	7.1586	1.4363	11.4775	13.7348	4.7090
3	6.5484	6.4181	7.1821	1.4384	11.1449	13.5967	4.6693
mean	**6.5125**	**6.4883**	**7.2116**	**1.4388**	**11.2704**	**13.6328**	**4.7024**
SD	**0.0327**	**0.0612**	**0.0724**	**0.0026**	**0.1807**	**0.0138**	**0.0303**

Table C.4 Physiocochemical values of *L. speciosa* leaves (LS4).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	7.5570	7.5664	7.7338	1.6394	7.6242	11.6770	2.4250
2	7.7707	7.6410	7.7971	1.6294	7.8234	11.7569	2.4096
3	7.9356	7.3835	7.7197	1.6333	7.2493	11.6988	2.4199
mean	**7.7544**	**7.5303**	**7.7502**	**1.6430**	**7.5656**	**11.7109**	**2.4181**
SD	**0.1899**	**0.1325**	**0.0412**	**0.0050**	**0.2915**	**0.0109**	**0.0079**

Table C.5 Physiocochemical values of *L. speciosa* leaves (LS5).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	7.8849	7.3461	8.4328	0.4266	7.4000	11.9786	2.3243
2	8.1593	7.6561	8.4967	0.4267	7.4470	11.9878	2.3300
3	8.4341	7.4188	8.4504	0.4262	7.3496	12.0566	2.3395
mean	**8.1594**	**7.4736**	**8.4600**	**0.4265**	**7.3989**	**12.0077**	**2.3313**
SD	**0.2746**	**0.1621**	**0.0330**	**0.0003**	**0.0487**	**0.0490**	**0.0077**

Table C.6 Physiocochemical values of *L. speciosa* leaves (LS6).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	8.1651	7.9709	8.9072	1.0555	7.0968	12.4078	2.2492
2	8.4470	8.1328	8.8245	1.0556	7.0986	12.5777	2.2396
3	8.6676	8.1336	8.8785	1.0565	7.2471	12.4080	2.2292
mean	**8.4266**	**8.0791**	**8.8701**	**1.0559**	**7.1475**	**12.4645**	**2.2393**
SD	**0.2519**	**0.0937**	**0.0420**	**0.0005**	**0.0863**	**0.0981**	**0.0100**

Table C.7 Physiocochemical values of *L. speciosa* leaves (LS7).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	8.5415	8.7367	8.2097	2.4733	8.5750	10.0494	2.2747
2	8.8451	8.3184	8.3183	2.4995	8.5496	10.0082	2.2395
3	9.1063	8.5148	8.2317	2.4862	8.8250	9.9998	2.2294
mean	**8.8310**	**8.5233**	**8.2532**	**2.4863**	**8.6499**	**10.0191**	**2.2478**
SD	**0.2827**	**0.2093**	**0.0574**	**0.0131**	**0.1522**	**0.0248**	**0.0238**

Table C.8 Physiocochemical values of *L. speciosa* leaves (LS8).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	8.4916	8.1961	6.8808	0.1766	7.2246	13.5959	2.2745
2	8.5728	8.3302	6.8960	0.1766	7.5750	13.6373	2.2896
3	8.4324	8.1280	6.8895	0.1700	7.0000	13.5986	2.2595
mean	**8.4989**	**8.2181**	**6.8888**	**0.1844**	**7.2665**	**13.6106**	**2.2746**
SD	**0.0705**	**0.1029**	**0.0076**	**0.0038**	**0.2898**	**0.0167**	**0.0151**

Table C.9 Physiocochemical values of *L. speciosa* leaves (LS9).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	9.9055	9.3121	6.3959	0.9089	10.9451	14.9567	2.6989
2	9.9510	9.1123	6.3845	0.8983	11.3750	14.7241	2.6885
3	9.9310	9.3782	6.3714	0.9026	11.2994	14.9576	2.7085
mean	**9.9292**	**9.2675**	**6.3839**	**0.9033**	**11.2065**	**14.8795**	**2.6987**
SD	**0.0228**	**0.1384**	**0.0123**	**0.0054**	**0.2295**	**0.0232**	**0.0100**

Table C.10 Physiocochemical values of *L. speciosa* leaves (LS10).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	9.4891	8.9786	6.5693	0.8099	12.7449	15.4997	2.4242
2	9.4041	9.1820	6.5907	0.7997	11.9982	15.6400	2.4292
3	9.4006	8.9949	6.5758	0.8032	12.2732	15.7084	2.4186
mean	**9.4312**	**9.0519**	**6.5786**	**0.8043**	**12.3388**	**15.6160**	**2.4240**
SD	**0.0501**	**0.1130**	**0.0110**	**0.0052**	**0.3776**	**0.1205**	**0.0053**

Table C.11 Physiocochemical values of *L. speciosa* leaves (LS11).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	8.1239	8.0292	6.8208	1.3795	10.5708	17.8150	2.4248
2	8.3933	8.1506	6.7460	1.3965	10.5489	17.7864	2.4487
3	8.1123	8..0487	6.8035	1.3894	11.0989	17.8247	2.4395
mean	**8.2098**	**8.0925**	**6.7901**	**1.3885**	**10.7395**	**17.8087**	**2.4377**
SD	**0.1590**	**0.0510**	**0.0392**	**0.0086**	**0.3114**	**0.0340**	**0.0121**

Table C.12 Physiocochemical values of *L. speciosa* leaves (LS12).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	9.5417	8.2913	7.4928	2.3797	13.1487	16.0913	3.4990
2	9.4472	8.4007	7.3645	2.3565	12.8455	16.1732	3.5088
3	9.6650	8.3984	7.4590	2.3197	12.4488	16.0587	3.5192
mean	**9.5513**	**8.3635**	**7.4391**	**2.3530**	**12.8143**	**16.1044**	**3.5090**
SD	**0.1092**	**0.0625**	**0.0660**	**0.0303**	**0.3510**	**0.0568**	**0.0101**

Table C.13 Physiocochemical values of *L. speciosa* leaves (LS13).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	8.5877	8.1038	7.1671	1.1662	7.4978	12.4568	2.6489
2	8.7796	8.3990	7.1547	1.1686	7.1239	12.4985	2.6292
3	8.9706	8.5414	6.2264	1.1666	7.6727	12.5675	2.6186
mean	**8.7763**	**8.3481**	**7.1828**	**1.1671**	**7.4315**	**12.5076**	**2.6322**
SD	**0.1914**	**0.2232**	**0.0383**	**0.0013**	**0.2803**	**0.0838**	**0.0154**

Table C.14 Physiocochemical values of *L. speciosa* leaves (LS14).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	8.1272	8.1633	8.3883	0.9224	9.3213	12.4298	2.4745
2	8.3371	8.0756	8.4130	0.9196	9.8250	12.4085	2.4590
3	8.6098	8.2699	8.4182	0.9224	9.1713	12.4253	2.4994
mean	**8.3579**	**8.1696**	**8.4065**	**0.9215**	**9.4392**	**12.4212**	**2.4776**
SD	**0.2419**	**0.0973**	**0.0160**	**0.0016**	**0.3424**	**0.0165**	**0.0204**

Table C.15 Physiocochemical values of *L. speciosa* leaves (LS15).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	7.4074	6.9084	7.0486	1.5190	5.2242	11.8783	2.6497
2	7.7042	7.1692	6.9146	1.5095	5.2995	11.8674	2.6892
3	7.8979	6.9528	6.0374	1.5280	5.2745	11.9686	2.6590
mean	**7.6689**	**7.0101**	**6.9669**	**1.5188**	**5.2661**	**11.9048**	**2.6660**
SD	**0.2470**	**0.1395**	**0.0717**	**0.0092**	**0.0383**	**0.0841**	**0.0207**

Table C.16 Physiocochemical values of *L. speciosa* leaves (LS16).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	7.6204	7.5180	7.1952	0.3499	5.5760	10.6298	2.7296
2	7.6958	7.6609	7.1367	0.3533	5.8680	10.6072	2.7592
3	7.7799	7.7060	7.0910	0.3532	5.8798	10.6800	2.7754
mean	**7.6987**	**7.6283**	**7.1410**	**0.3522**	**5.7746**	**10.6390**	**2.7547**
SD	**0.0798**	**0.0981**	**0.0523**	**0.0019**	**0.1221**	**0.0268**	**0.0233**

Table C.17 Physiocochemical values of *L. speciosa* leaves (LS17).

No.	Loss on drying (%)	Moisture content (%)	Ash content (%)		Extractive value (%)		
			Total ash	Acid insoluble ash	Ethanol	Water	Dichloro methane
1	7.3608	7.7617	8.1725	1.1865	8.2487	13.2083	3.6480
2	7.6981	7.5870	8.2533	1.1833	8.5180	13.0682	3.6285
3	7.8987	7.4136	8.2028	1.1828	8.7156	13.1332	3.6296
mean	**7.6525**	**7.5874**	**8.2096**	**1.1842**	**8.4941**	**13.1366**	**3.6354**
SD	**0.2718**	**0.1740**	**0.0408**	**0.0020**	**0.2344**	**0.0396**	**0.0110**

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Poster Presentation

Thitikornpong, T., Padungcharoen, T., Vetchapongsa, A., Sukrong, S. 2010. Pharmacognostic study of intanin-nam (Lagerstroemia speciosa) for herbal raw materials identification. The 16th National Graduate Research Conference. Maejo University. March, 11, 2010. Chiang Mai, Thailand.

Oral Presentation

Thitikornpong, T., Padungcharoen, T., Vetchapongsa, A., Sukrong, S. 2010. Identification of Crude Drugs by Macroscopic and Microscopic Characteristics, Thin Layer Chromatography, and DNA Fingerprinting: *Lagerstroemia speciosa*. TRF-Master Research Congress IV, March, 31, 2010. Pattaya, Chonburi, Thailand.