เอกสารอ้างอิง

Achike, F.I., Kwan, C.Y. 2003. Nitric oxide, human diseases and the herbal products that affect the nitric oxide signalling pathway. *Clinical and Experimental Pharmacology and Physiology* 30 (9): 605-615.

Adesanya, S.A., Nia, R., Martin, M.T., Boukamcha, N., Montagnac, A., Païs, M. 1999. Stilbene derivatives from *Cissus quadrangularis*. *Journal of Natural Products* 62 (12): 1694-1695.

Amália, P.M., Possa, M.N., Augusto, M.C., Francisca, L.S. 2007. Quercetin prevents oxidative stress in cirrhotic rats. *Digestive Diseases and Sciences* 52 (10): 2616-2621.

Apipalakul, K. 2003. Effects of the dried-stem powder of *Cissus quadrangularis* on hepatic cytochrome P450 and clinical blood chemistry in rats. M.Sc. thesis, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok.

Arias, M., Penichet, I., Ysambertt, F., Bauza, R., Zougagh, M., Ríos, A. 2009. Fast supercritical fluid extraction of low- and high-density polyethylene additives: comparison with conventional reflux and automatic soxhlet extraction. *Journal of Supercritical Fluids* 50 (1): 22-28.

Attawish, A., Chavalittumrong, P., Chivapat, S., Chuthaputti, A., Rattanajarasroj, S., Punyamong, S. 2002. Subchronic toxicity of *Cissus quadrangularis* Linn. *Songklanakarin Journal of Science and Technology* 24 (1): 39-51.

Badami, S., Channabasavaraj, K.P. 2007. In vitro antioxidant activity of thirteen medicinal plants of India's Western Ghats. *Pharmaceutical Biology* 45 (5): 392-396.

Bao, M., Lou, Y. 2006. Flavonoid from Seabuckthorn protect endothelial cells (EA.hy926) from oxidized low-density lipoprotein induced injuries via regulation of LOX-1 and eNOS expression. *Journal of Cardiovascular Pharmacology* 48: 834-841.

Baur, J.A., Sinclair, D.A. 2006. Therapeutic potential of resveratrol: the in vivo evidence. *Nature Reviews Drug Discovery* 5 (6): 493-506.

Bony, S., Carcelen, M., Oliveir, L., Devaux, A. 2006. Genotoxicity assessment of deoxynivalenol in the Caco-2 cell line model using the Comet assay. *Toxicology Letters* 166: 67-76.

Boots, A.W., Haenen, G.R.M.M., Bast, A. 2008. Health effects of quercetin: From antioxidant to nutraceutical. *European Journal of Pharmacology* 585 (2-3): 325-337.

Bouskela, E., Cyrino, F.Z.G.A., Lerond, L. 1997. Microvascular reactivity after ischemia/reperfusion in the hamster cheek pouch: Beneficial effects of different oral doses of S-5682 (Daflon 500 mg). *Angiology* 48 (1): 33-37.

Bruck, R., Aeed, H., Shirin, H., Matas, Z., Zaidel, L., Avni, Y., Halpern, Z. 1999. The hydroxyl radical scavengers dimethylsulfoxide and dimethylthiourea protect rats against thioacetamide-induced fulminant hepatic failure. *Journal of Hepatology* 31 (1): 27-38.

Buckshee, K., Takkar, D., Aggarwal, N. 1997. Micronized flavonoid therapy in internal hemorrhoids of pregnancy. *International Journal of Gynecology and Obstetrics* 57 (2): 145-151.

Cai, H., Harrison, D.G. 2000. Endothelial dysfunction in cardiovascular diseases: the role of oxidant stress. *Circulation Research* 87 (10): 840-844.

Carmichael, J., Degraff, W.G., Gazdar, A.F., Minna, J.D., Mitchell, J.B. 1987. Evaluation of a tetrazolium-based semiautomated colorimetric assay: assessment of chemosensitivity testing. *Cancer Research* 47: 936-942.

Carver, J.H., Carrano, A.V., MacGregor, J.T. 1983. Genetic effects of the flavonols quercetin, kaempferol, and galangin on Chinese hamster ovary cells in vitro. *Mutation Research* 113: 45-60.

Chang, G.T., Kang, S.K., Kim, J.H., Chung, K.H., Chang, Y.C., Kim, C.H. 2005. Inhibitory effect of the Korean herbal medicine, Dae-Jo-Whan, on platelet-activating factor-induced platelet aggregation. *Journal of Ethnopharmacology* 102 (3): 430-439.

Chang, Y.F., Chi, C.W., Wang, J.J. 2006. Reactive oxygen species production is involved in quercetin-induced apoptosis in human hepatoma cells. *Nutrition and Cancer* 55 (2): 201–209.

Chen, H.W., Chien, C.T., Yu, S.L., Lee, Y.T., Chen, W.J. 2002. Cyclosporine A regulate oxidative stress-induced apoptosis in cardiomyocytes: mechanisms via ROS generation, iNOS and Hsp70. *British Journal of Pharmacology* 137 (6): 771-781.

Chen, J., Gu, Y., Shao, Z., Luo, J., Tan, Z. 2010. Propofol protects against hydrogen peroxide-induced oxidative stress and cell dysfunction in human umbilical vein endothelial cells. *Molecular and Cellular Biochemistry* 339 (1-2): 43-54.

Cheng, T.H., Liu, J.C., Lin, H., Shih, N.L., Chen, Y.L., Huang, M.T., Chan, P., Cheng, C.F., Chen, J.J. 2004. Inhibitory effect of resveratrol on angiotensin II-induced cardiomyocyte hypertrophy. *Naunyn-Schmiedeberg's Archives of Pharmacology* 369 (2): 239-244.

Chidambara, M.K.N., Vanitha, A., Mahadeva, S.M., Ravishankar, G.A. 2003. Antioxidant and antimicrobial activity of *Cissus quadrangularis* L. *Journal of Medicinal Food* 6 (2): 99-105.

Chiou, C.S., Lin, J.W., Kao, P.F., Liu, J.C., Cheng, T.H., Chan, P. 2008. Effects of hesperidin on cyclic strain-induced endothelin-1 release in human umbilical vein endothelial cells. *Clinical and Experimental Pharmacology and Physiology* 35 (8): 938-943.

Choi, E.H., Chang, H.J., Cho, J.Y., Chun, H.S. 2007. Cytoprotective effect of anthocyanins against doxorubicin-induced toxicity in H9c2 cardiomyocytes in relation to their antioxidant activities. *Food and Chemical Toxicology* 45 (10): 1873-1881.

Choi, E.M. 2010. Protective effect of quercitrin against hydrogen peroxide-induced dysfunction in osteoblastic MC3T3-E1 cells. *Experimental and Toxicologic Pathology*. Article in Press.

Chopra, R.N., Nayar, S.L., Chopra, I.C. 1965. I.C. *Glossary of Indian Medicinal foant* 66-67. India: Catholic Press.

Cíz, M., Pavelková, M., Gallová, L., Králová, J., Kubala, L., Lojek, A. 2008. The influence of wine polyphenols on reactive oxygen and nitrogen species production by murine macrophages RAW 264.7. *Physiological Research* 57: 393-402.

Cypriani, B., Limasset, B., Carrie, M.L., Le Doucen, C., Roussie, M., Crastes De Paulet, A., Damon, M. 1993. Antioxidant activity of micronized diosmin on oxygen species from stimulated human neutrophils. *Biochemical Pharmacology* 45 (7): 1531-1535.

Diaz, M.N., Frei, B., Vita, J.A., Keaney Jr., J.F. 1997. Antioxidants and atherosclerotic heart disease. *New England Journal of Medicine* 337 (6): 408-416.

Franks, F. 1998. Freeze-drying of bioproducts: putting principles into practice. *European Journal of Pharmaceutics and Biopharmaceutics* 45 (3): 221-229.

Galisteo, M., García-Saura, M.F., Jiménez, R., Villar, I.C., Wangensteen, R., Zarzuelo, A., Vargas, F., Duarte, J. 2004. Effects of quercetin treatment on vascular function in deoxycorticosterone acetate-salt hypertensive rats. Comparative study with verapamil. *Planta Medica* 70 (4): 334-341.

Gao, Z., Huang, K., Yang, X., Xu, H. 1999. Free radical scavenging and antioxidant activities of flavonoids extracted from the radix of *Scutellaria baicalensis* Georgi. *Biochimica et Biophysica Acta* 1472 (3): 643-650.

Gil'yano, N.Y., Semenova, E.G., Fedortseva, R.F., Konevega, L.V. 2009. Characteristics of spontaneously transformed human endothelial ECV304 cell line: II. Functional responses of ECV304 cells. *Cell and Tissue Biology* 3 (3): 274-282.

Glowinski, J., Glowinski, S. 2002. Generation of reactive oxygen metabolites by the varicose vein wall. *European Journal of Vascular and Endovascular Surgery* 23 (6): 550-555.

Gong, G., Qin, Y., Huang, W., Zhou, S., Yang, X., Li, D. 2010. Rutin inhibits hydrogen peroxide-induced apoptosis through regulating reactive oxygen species mediated mitochondrial dysfunction pathway in human umbilical vein endothelial cells. *European Journal of Pharmacology* 628 (1-3): 27-35.

Gosgnach, W., Messika-Zeitoun, D., Gonzalez, W., Philipe, M., Michel, J.B. 2000. Shear stress induces iNOS expression in cultured smooth muscle cells: role of oxidative stress. *American Journal of Physiology - Cell Physiology* 279 (6): 1880-1888.

Gupta, M.M., Verma, R.K. 1991. Lipid constituents of *Cissus quadrangularis*. *Phytochemistry* 30 (3): 875-878.

Halliwell, B., Hoult, J.R., Blake, D.R. 1988. Oxidants, inflammation, and anti-inflammatory drugs. *FASEB Journal* 2 (13): 2867-2873.

Hastwell, P.W., Chai, L.L., Roberts, K.J., Webster, T.W., Harvey, J.S., Rees, R.W., Walmsley, R.M. 2006. High specificity and high sensitivity genotoxicity assessment in a human cell line: validation of GreenScreen HC GADD45a-GFP genotoxicity assay. *Mutation Research* 607: 160-175.

Hazra, B., Biswas, S., Mandal, N. 2008. Antioxidant and free radical scavenging activity of *Spondias pinnata*. *BMC Complementary and Alternative Medicine* 8: 63.

Hou, Y.Z., Zhao, G.R., Yang, J., Yuan, Y.J., Zhu, G.G., Hiltunen, R. 2004. Protective effect of *Ligusticum chuanxiong* and *Angelica sinensis* on endothelial cell damage induced by hydrogen peroxide. *Life Sciences* 75 (14): 1775-1786.

Hsu, B., Coupar, I.M., Ng, K. 2006. Antioxidant activity of hot water extract from the fruit of the Doum palm, *Hyphaene thebaica*. *Food Chemistry* 98 (2): 317-328.

Hubbard, G.P., Stevens, J.M., Cicmil, M., Sage, T., Jordan, P.A., Williams, C.M, Lovegrove, J.A., Gibbins, J.M. 2003. Quercetin inhibits collagen-stimulated platelet activation through inhibition of multiple components of the glycoprotein VI signaling pathway. *Journal of Thrombosis and Haemostasis* 1 (5): 1079-1088.

Hwang, S.L., Yen, G.C. 2008. Neuroprotective effects of the citrus flavanones against H_2O_2-induced cytotoxicity in PC12 cells. *Journal of Agricultural and Food Chemistry* 56 (3): 859-864.

Jackson, J.R., Ryan, M.J., Hao, Y., Always, S.E. 2010. Mediation of endogenous antioxidant enzymes and apoptotic signaling by resveratrol following muscle disuse in the gastrocnemius muscles of young and old rats. *American Journal of Physiology* 299: 1572-1581.

Jackson, S.J.T., Venema, R.C. 2006. Quercetin inhibits eNOS, microtubule polymerization, and mitotic progression in bovine aortic endothelial cells. *Journal of Nutrition* 135 (5): 1178-1184.

Jagetia, G.C., Rao, S.K., Baliga, S.M., Babu, K.S. 2004. The evaluation of nitric oxide scavenging activity of certain herbal formulations in vitro: a preliminary study. *Phytotherapy Research* 18 (7): 561-565.

Jainu, M., Devi, C.S.S. 2005. In vitro and in vivo evaluation of free radical scavenging potential of *Cissus quadrangularis*. *African Journal of Biomedical Research* 8: 95–99.

Jainu, M., Devi, C.S.S. 2005. Attenuation of neutrophil infiltration and proinflammatory cytokines by *Cissus quadrangularis*: a possible prevention against gastric ulcerogenesis. *Journal of Herbal Pharmacotherapy* 5 (3): 33-42.

Jainu, M., Devi, C.S.S. 2006. Gastroprotective action of *Cissus quadrangularis* extract against NSAID induced gastric ulcer: Role of proinflammatory cytokines and oxidative damage. *Chemico-Biological Interactions* 161 (3): 262-270.

Jainu, M., Mohan, K.V. 2008. Protective role of ascorbic acid isolated from *Cissus quadrangularis* on NSAID induced toxicity through immunomodulating response and growth factors expression. *International Immunopharmacology* 8 (13-14): 1721-1727.

Jakikasem, S., Limsiriwong, P., Kajsongkarm, T., Soontorntanasart, T. 2000. Phytochemical study of *Cissus quadrangularis* Linn. *Thai Journal of Pharmaceutical Sciences* 24: 25.

Jaya, C., Anuradha, C.V. 2010. *Cissus quadrangularis* stem alleviates insulin resistance, oxidative injury and fatty liver disease in rats fed high fat plus fructose diet. *Food and Chemical Toxicology* 48: 2021-2029.

Kaindl, U., Eyberg, I., Rohr-Udilova, N., Heinzle, C., Marian, B. 2008. The dietary antioxidants resveratrol and quercetin protect cells from exogenous pro-oxidative damage. *Food and Chemical Toxicology* 46 (4): 1320-1326.

Kalpana, K.B., Srinivasan, M., Menon, V.P. 2009. Evaluation of antioxidant activity of hesperidin and its protective effect on H_2O_2 induced oxidative damage on pBR322 DNA and RBC cellular membrane. *Molecular and Cellular Biochemistry* 323 (1-2): 21-29.

Kaneider, N.C., Mosheimer, B., Reinisch, N., Patsch, J.R., Wiedermann, C.J. 2004. Inhibition of thrombin-induced signaling by resveratrol and quercetin: effects on adenosine nucleotide metabolism in endothelial cells and platelet-neutrophil interactions. *Thrombosis Research* 114 (3): 185-194.

Kann, B.R., Whitlow, C.B. 2004. Hemorrhoids: diagnosis and management. *Techniques in Gastrointestinal Endoscopy* 6 (1): 6-11.

Kaur, G., Tirkey, N., Chopra, K. 2006. Beneficial effect of hesperidin on lipopolysaccharide-induced hepatotoxicity. *Toxicology* 226 (2-3): 152-160.

Khoo, N.K., White, C.R., Pozzo-Miller, L., Zhou, F., Constance, C., Inoue, T., Patel, R.P., Parks, D.A. 2010. Dietary flavonoid quercetin stimulates vasorelaxation in aortic vessels. *Free Radical Biology and Medicine* 49 (3): 339-347.

Kirk, R.I., Deitch, J.A., Wu, J.M., Lerea, K.M. 2000. Resveratrol decreases early signaling events in washed platelets but has little effect on platelet aggregation in whole blood. *Blood Cells, Molecules, and Diseases* 26 (2): 144-150.

Kosem, N., Han, Y.H., Moongkarndi, P. 2007. Antioxidant and cytoprotective activities of methanolic extract from *Garcinia mangostana* hulls. *ScienceAsia* 33 (3): 283-292.

Kumar, R., Sharma, A.K., Saraf, S.A., Gupta, R. 2010. CNS activity of aqueous extract of root of *Cissus quadrangularis* Linn. (Vitaceae). *Journal of Dietary Supplements* 7 (1): 1-8.

Kuo, W.W., Huang, C.Y., Chung, J.G., Yang, S.F., Tsai, K.L., Chiu, T.H., Lee, S.D., Ou, H.C. 2009. Crude extracts of *Solanum lyratum* protect endothelial cells against oxidized low-

density lipoprotein-induced injury by direct antioxidant action. *Journal of Vascular Surgery* 50 (4): 849-860.

Lee, H.J., Seo, J.W., Lee, B.H., Chung, K.H., Chi, D.Y. 2004. Syntheses and radical scavenging activities of resveratrol derivatives. *Bioorganic and Medicinal Chemistry Letters* 14 (2): 463-466.

Lee, M.H., Lin, R.D., Shen, L.Y., Yang, L.L., Yen, K.Y., Hou, W.C. 2001. Monoamine oxidase B and free radical scavenging activities of natural flavonoids in *Melastoma candidum* D. Don. *Journal of Agricultural and Food Chemistry* 49 (11): 5551-5555.

Lee, S.E., Hwang, H.J., Ha, J.S., Jeong, H.S., Kim, J.H. 2003. Screening of medicinal plant extracts for antioxidant activity. *Life Sciences* 73 (2): 167-179.

Leonard, S.S., Xia, C., Jiang, B.H., Stinefelt, B., Klandorf, H., Harris, G.K., Shi, X. 2003. Resveratrol scavenges reactive oxygen species and effects radical-induced cellular responses. *Biochemical and Biophysical Research Communications* 309 (4): 1017-1026.

Liang, Z.Q., Zhu, Y., Gu, Z.L., Lu, Q., Fan, P.S. 2003. Effects of quercetin on platelet-endothelial cell adhesion and their expression of adhesion molecules. *Yao Xue Xue Bao* 38 (8): 574-547.

Lin, R., Liu, J., Gan, W., Ding, C. 2007. Protective effect of quercetin on the homocysteine-injured human umbilical vein vascular endothelial cell line (ECV304). *Basic and Clinical Pharmacology and Toxicology* 101 (3): 197-202.

Liu, H.T., Li, W.M., Xu, G., Li, X.Y., Bai, X.F., Wei, P., Yu, C., Du, Y.G. 2009. Chitosan oligosaccharides attenuate hydrogen peroxide-induced stress injury in human umbilical vein endothelial cells. *Pharmacological Research* 59 (3): 167-175.

Liu, J.C., Chen, J.J., Chan, P., Cheng, C.F., Cheng, T.H. 2003. Inhibition of cylic strain-induced endothelin-1 gene expression by resveratrol. *Hypertension* 42: 1198-1205.

Liu, Q.M., Yang, X.M., Zhang, L., Majetich, G. 2010. Optimization of ultrasonic-assisted extraction of chlorogenic acid from *Folium eucommiae* and evaluation of its antioxidant activity. *Journal of Medicinal Plant Research* 4 (23): 2503-2511.

Lodi, F., Jiménez, R., Menendez, C., Needs, P.W., Duarte, J., Perez-Vizcaino, F. 2008. Glucuronidated metabolites of the flavonoid quercetin do not auto-oxidise, do not generate free radicals and do not decrease nitric oxide bioavailability. *Planta Medica* 74 (7): 741-746.

Loscalzo, J. 2001. Nitric oxide insufficiency, platelet activation, and arterial thrombosis. *Circulation Research* 88 (8): 756-762.

Lu, Y., Yeap Foo, L. 2000. Antioxidant and radical scavenging activities of polyphenols from apple pomace. *Food Chemistry* 68 (1): 81-85.

Luo, P., Tan, Z.H., Zhang, Z.F., Zhang, H., Liu, X.F., Mo, Z.J. 2008. Scutellarin isolated from *Erigeron multiradiatus* inhibits high glucose-mediated vascular inflammation. *Yakugaku Zasshi* 128 (9): 1293-1299.

Manach, C., Morand, C., Demigné, C., Texier, O., Régérat, F., Rémésy, C. 1997. Bioavailability of rutin and quercetin in rats. *FEBS Letters* 409 (1): 12-16.

Manach, C., Morand, C., Texier, O., Favier, M.L., Agullo, G., Demigné, C., Régérat, F., Rémésy, C. 1995. Quercetin metabolites in plasma of rats fed diets containing rutin or quercetin. *Journal of Nutrition* 125 (7): 1911-1922.

Mehta, M., Kaur, N., Bhutani, K.K. 2001. Determination of marker constituents from *Cissus quadrangularis* Linn. and their quantitation by HPTLC and HPLC. *Phytochemical Analysis* 12 (2): 91-95.

Melin, A.M., Perromat, A., Clerc, M. 1996. In vivo effect of diosmin on carrageenan and CCl_4-induced lipid peroxidation in rat liver microsomes. *Journal of Biochemical Toxicology* 11 (1): 27-32.

Mendes, A.F., Caramona, M.M., Carvalho, A.P., Lopes, M.C. 2003. Hydrogen peroxide mediates interleukin-1β-induced AP-1 activation in articular chondrocytes: Implications for the regulation of iNOS expression. *Cell Biology and Technology* 19: 203-214.

Meyer, A.S., Heinonen, M., Frankel, E.N. 1998. Antioxidant interactions of catechin, cyanidin, caffeic acid, quercetin, and ellagic acid on human LDL oxidation. *Food Chemistry* 61 (1-2): 71-75.

Michot, J.L., Virion, A., Deme, D. 1985. NADPH oxidation catalyzed by the peroxidase/H_2O_2 system. Guaiacol-mediated and scopoletin-mediated oxidation of NADPH to $NADP^+$. *European Journal of Biochemistry* 148 (3): 441-445.

Mokni, M., Elkahoui, S., Limam, F., Amri, M., Aouani, E. 2007. Effect of resveratrol on antioxidant enzyme activities in the brain of healthy rat. *Neurochemical Research* 32 (6): 981-987.

Moore, R.A. 2000. Hemorrhoid review. *Current Surgery* 57 (2): 103-106.

Murota, K., Terao, J. 2003. Antioxidative flavonoid quercetin: implication of its intestinal absorption and metabolism. *Archives of Biochemistry and Biophysics* 417 (1): 12-17.

Muthusami, S., Senthilkumar, K., Vignesh, C., Ilangovan, R., Stanley, J., Selvamurugan, N., Srinivasan, N. 2011. Effects of *Cissus quadrangularis* on the proliferation, differentiation and matrix mineralization of human osteoblast like SaOS-2 cells. *Journal of Cellular Biochemistry* 112 (4): 1035-1045.

Nordberg, J., Arner, E.S.J. 2001. Reactive oxygen species, antioxidants, and the mammalian thioredoxin system. *Free Radical Biology and Medicine* 31 (11): 1287-1312.

Oben, J.E., Ngondi, J.L., Momo, C.N., Agbor, G.A., Sobgui, C.S.M. 2008. The use of a *Cissus quadrangularis/Irvingia gabonensis* combination in the management of weight loss: a double-blind placebo-controlled study. *Lipids in Health and Disease* 7: 12.

Odukoya, O.A., Sofidiya, M.O., Ilori, O.O., Gbededo, M.O., Ajadotuigwe, J.O., Olaleye, O.O. 2009. Hemorrhoid therapy with medicinal plants: astringency and inhibition of lipid peroxidation as key factors. *International Journal of Biological Chemistry* 3: 111-118.

Østerud, B., Bjørklid, E. 2003. Role of monocytes in atherogenesis. *Physiological Reviews* 83 (4): 1069-1112.

Pace-Asciak, C.R., Hahn, S., Diamandis, E.P., Soleas, G., Goldberg, D.M. 1995. The red wine phenolics *trans*-resveratrol and quercetin block human platelet aggregation and eicosanoid synthesis: Implications for protection against coronary heart disease. *Clinica Chimica Acta* 235 (2): 207-219.

Panthong, A., Supraditaporn, W., Kanjanapothi, D., Taesotikul, T., Reutrakul, V. 2007. Analgesic, anti-inflammatory and venotonic effects of *Cissus quadrangularis* Linn. *Journal of Ethnopharmacology* 110 (2): 267-270.

Parisuthiman, D., Singhatanadgit, W., Dechatiwongse, T., Koontongkaew, S. 2009. *Cissus quadrangularis* extract enhances biomineralization through up-regulation of MAPK-dependent alkaline phosphatase activity in osteoblasts. *In Vitro Cellular and Developmental Biology* 45 (3-4): 194-200.

Patarapanich, C., Thiangtham, J., Saifah, E., Laungchonlatan, S., Janthasoot, W. 2004. Determination of antioxidant constituents in the herb *Cissus quadrangularis* Linn. *Iranian Journal of Pharmaceutical Research* 2: 77-77.

Peng, Z.F., Strack, D., Baumert, A., Subramaniam, R., Goh, N.K., Chia, T.F., Tan, S.N., Chia, L.S. 2003. Antioxidant flavonoids from leaves of *Polygonum hydropiper* L. *Phytochemistry* 62 (2): 219-228.

Potu, B.K., Bhat, K.M.R., Rao, M.S., Nampurath, G.K., Chamallamudi, M.R., Nayak, S.R., Muttigi, M.S. 2009. Petroleum ether extract of *Cissus quadrangularis* (linn.) enhances bone marrow mesenchymal stem cell proliferation and facilitates osteoblastogenesis. *Clinics* 64 (10): 993-998.

Qian, J., Jiang, F., Wang, B., Yu, Y., Zhang, X., Yin, Z., Liu, C. 2010. Ophiopogonin D prevents H_2O_2-induced injury in primary human umbilical vein endothelial cells. *Journal of Ethnopharmacology* 128 (2): 438-445.

Reddy, M.B., Reddy, K.B., Reddy, M.N. 1989. A survey of plant crude drugs of Anantapur district, Andhra Pradesh, India. *International Journal of Crude Drug Research* 27 (3): 145-155.

Repine, J.E., Eaton, J.W., Anders, M.W. 1979. Generation of hydroxyl radical by enzymes, chemicals, and human phagocytes in vitro. Detection with the anti-inflammatory agent, dimethyl sulfoxide. *Journal of Clinical Investigation* 64 (6): 1642-1651.

Robak, J., Gryglewski, R.J. 1988. Flavonoids are scavengers of superoxide anions. *Biochemical Pharmacology* 37 (5): 837-841.

Roland, A., Patterson, R.A., Leake, D.S. 2001. Measurement of copper-binding sites on low density lipoprotein. *Arteriosclerosis, Thrombosis, and Vascular Biology* 21 (4): 594-602.

Sarabia, M., León, S., Vivas, J., Lizarzabal, M., Rangel, R., Fernández, J., Romero, G., Añez, M., D'Albenzio, M., Latuff, Z., Serrano, A., González, M. 2001. Calcium dobesilate versus purified flavonoid fraction of diosmin in the treatment of hemorrhoidal crises: A randomized, controlled study with an initial double-blind, double-dummy period. *Current Therapeutic Research - Clinical and Experimental* 62 (7): 524-529.

Scherer, R., Godoy, H.T. 2009. Antioxidant activity index (AAI) by the 2,2-diphenyl-1-picrylhydrazyl method. *Food Chemistry* 112: 654-658.

Shirai, M., Yamanishi, R., Moon, J.H., Murota, K., Terao, J. 2002. Effect of quercetin and its conjugated metabolite on the hydrogen peroxide-induced intracellular production of reactive oxygen species in mouse fibroblasts. *Bioscience, Biotechnology and Biochemistry* 66 (5): 1015-1021.

Shirwaikar, A., Khan, S., Malini, S. 2003. Antiosteoporotic effect of ethanol extract of *Cissus quadrangularis* Linn. on ovariectomized rat. *Journal of Ethnopharmacology* 89 (2-3): 245-250.

Singh, G., Rawat, P., Maurya, R. 2007. Constituents of *Cissus quadrangularis*. *Natural Product Research* 21 (6): 522-528.

Spanier, G., Xu, H., Xia, N., Tobias, S., Deng, S., Wojnowski, L., Forstermann, U., Li, H. 2009. Resveratrol reduces endothelial oxidative stress by modulating the gene expression of superoxide dismutase 1 (SOD1), glutathione peroxidase 1 (GPX1) and NADPH oxidase subunit (NOX4). *Journal of Physiology and Pharmacology* 60 (4): 111-116.

Srisook, K., Palachot, M., Mongkol, N., Srisook, E., Sarapusit, S. 2011. Anti-inflammatory effect of ethyl acetate extract from *Cissus quadrangularis* Linn may be involved with induction of heme oxygenase-1 and suppression of NF-KB activation. *Journal of Ethnopharmacology* 133 (3): 1008-1014.

Taguchi, H., Ogura, Y., Takanashi, T., Hashizoe, M., Honda, Y. 1996. In vivo quantitation of peroxides in the vitreous humor by flurophotometry. *Investigative Ophthalmology and Visual Science* 37 (7): 1444-1450.

Thakur, A.K., Jain, V., Hingorani, L., Laddha, K.S. 2009. Improved high-performance liquid chromatography-DAD method for the simultaneous analysis of quercetin and kaempferol in the stems of *Cissus quadrangularis* Linn. *Acta Chromatographica* 21 (1): 95-103.

Thanapongsathorn, W., Vajrabukka, T. 1992. Clinical trial of oral disomin (Daflon®) in the treatment of hemorrhoids. *Diseases of the Colon and Rectum* 35: 1085-1088.

Trapp, V., Parmakhtiar, B., Papazian, V., Willmott, L., Fruehauf, J.P. 2010. Anti-angiogenic effects of resveratrol mediated by decreased VEGF and increased TSP1 expression in melanoma-endothelial cell co-culture. *Angiogenesis* 13 (4): 305-315.

Valentão, P.,Fernandas, E., Carvalho, F., Andrade, P.B., Seabra, R.M., Bastos, M.L. 2001. Antioxidant activity of *Centaurium erythraea* infusion evidenced by its superoxide radical

scavenging and xanthine oxidase inhibitory activity. *Journal of Agricultural and Food Chemistry* 49 (7): 3476-3479.

Valko, M., Leibfritz, D., Moncol, J., Cronin, M.T., Mazur, M., Telser, J. 2007. Free radicals and antioxidants in normal physiological functions and human disease. *International Journal of Biochemistry and Cell Biology* 39 (1): 44-84.

Wagner, C., Fachinetto, R., Dalla Corte, C.L., Brito, V.B., Severo, D., de Oliveira Costa Dias, G., Morel, A.F. Nogueira, C.W., Rocha, J.B.T. 2006. Quercitrin, a glycoside form of quercetin, prevents lipid peroxidation in vitro. *Brain Research* 1107 (1): 192-198.

Wali, M.A., Suleiman, S.A., Kadoumi, O.F., Nasr, M.A. 2002. Superoxide radical concentration and superoxide dismutase (SOD) enzyme activity in varicose veins. *Annals of Thoracic and Cardiovascular Surgery* 8 (5): 286-290.

Wallerath, T., Deckert, G., Ternes, T., Anderson, H., Li, H., Witte, K., Förstermann, U. 2002. Resveratrol, a polyphenolic phytoalexin present in red wine, enhances expression and activity of endothelial nitric oxide synthase. *Circulation* 106 (13): 1652-1658.

Wang, B., Peng, L., Zhu, L., Ren, P. 2007. Protective effect of total flavonoids from *Spirodela polyrrhiza* (L.) Schleid on human umbilical vein endothelial cell damage induced by hydrogen peroxide. *Colloids and Surfaces B: Biointerfaces* 60 (1): 36-40.

Wang, H., Joseph, J.A. 1999. Quantifying cellular oxidative stress by dichlorofluorescein assay using microplate reader. *Free Radical Biology and Medicine* 27 (5-6): 612-616.

Wang, Y.K., Huang, Z.Q. 2005. Protective effects of icariin on human umbilical vein endothelial cell injury induced by H_2O_2 in vitro. *Pharmacological Research* 52 (2): 174-182.

Wassmann, S., Wassmann, K., Nickenig, G. 2004. Modulation of oxidant and antioxidant enzyme expression and function in vascular cells. *Hypertension* 44 (4): 381-386.

Weissmann, G., Smolen, J.E., Korchak, H.M. 1980. Release of inflammatory mediators from stimulated neutrophils. *New England Journal of Medicine* 303 (1): 27-34.

Willcox, J.K., Ash, S.L., Catignani, G.L. 2004. Antioxidants and prevention of chronic disease. *Critical Reviews in Food Science and Nutrition* 44 (4): 275-295.

Williams, W.B., Cuvelier, M.E., Berset, C. 1994. Use of a free radical method to evaluate antioxidant activity. *LWT- Food Science and Technology*. 28: 25-30.

Wink, D.A., Mitchell, J.B. 1998. Chemical biology of nitric oxide: insights into regulatory, cytotoxic, and cytoprotective mechanisms of nitric oxide. *Free Radical Biology and Medicine* 25 (4-5): 434-456.

Xia, Z., Liu, M., Wu, Y., Sharma, V., Luo, T., Ouyang, J., McNeill, J.H. 2006. *N*-acetylcysteine attenuates TNF-α-induced human vascular endothelial cell apoptosis and restores eNOS expression. *European Journal of Pharmacology* 550 (1-3): 134-142.

Yan, X., Murphy, B.T., Hammond, G.B., Vinson, J.A., Neto, C.C. 2002. Antioxidant activities and antitumor screening of extracts from Cranberry fruit (*Vaccinium macrocarpon*). *Journal of Agricultural and Food Chemistry* 50 (21): 5844-5849.

Yokomizo, A., Moriwaki, M. 2006. Effects of uptake of flavonoids on oxidative stress induced by hydrogen peroxide in human intestinal Caco-2 cells. *Bioscience, Biotechnology and Biochemistry* 70 (6): 1317-1324.

Zhang, R., Kang, K.A., Piao, M.J., Kim, K.C., Kim, A.D., Chae, S., Park, J.S., Youn, U.J., Hyun, J.W. 2010. Cytoprotective effect of the fruits of *Lycium chinense* Miller against oxidative stress-induced hepatotoxicity. *Journal of Ethnopharmacology* 130 (2): 299-306.

ส่วนผนวก

วิธีการเตรียมสารเคมี

Acrylamide gel

สารละลาย 50% acrylamide ปริมาตร 100 มิลลิลิตร เตรียมโดยชั่ง acrylamide 49.2 กรัม และ N,N′–methylenebisacrylamide 0.8 กรัม ละลายในน้ำกลั่น คนจนละลายสมบูรณ์ ปรับปริมาตรด้วยน้ำกลั่นจนครบ 100 มิลลิลิตร เก็บในภาชนะป้องกันแสงที่อุณหภูมิห้อง

4x separating buffer (100 มิลลิลิตร)

1.5 M	Tris base 2M	75	มิลลิลิตร
0.4%	SDS 10%	4	มิลลิลิตร
	Ultrapure water	1	มิลลิลิตร
	HCl ปรับจนได้ pH 8.8		
	Ultrapure water เติมจนครบ	100	มิลลิลิตร

4x stacking buffer (100 มิลลิลิตร)

0.5 M	Tris base 2M	25	มิลลิลิตร
0.4%	SDS 10%	4	มิลลิลิตร
	Ultrapure water	70	มิลลิลิตร
	HCl ปรับจนได้ pH 6.8		
	Ultrapure water เติมจนครบ	100	มิลลิลิตร

4x sample buffer (20 มิลลิลิตร)

8%	SDS	1.6	กรัม
	2-mercaptoethanol 20%	4	มิลลิลิตร
125 mM	Tris 500 mM, pH 6.8	5	มิลลิลิตร
0.02%	bromophenol blue	4	มิลลิกรัม
40%	glycerol	8	มิลลิลิตร
	Ultrapure water เติมจนครบ	20	มิลลิลิตร

Ammonium persulfate (APS)

ชั่ง APS กรัมละลายในน้ำกลั่น คนจนละลาย เติมน้ำจนครบ 100 มิลลิลิตร

Separating gel

เตรียม acrylamide gel จำนวน 2 แผ่น ส่วนผสมแต่ละแผ่น มีดังนี้

	8%	12%	
Ultrapure water	5.9	5.1	มิลลิลิตร
4x separating buffer	2.5	2.5	มิลลิลิตร
50% acrylamide	1.6	2.4	มิลลิลิตร
10% APS	50	50	ไมโครลิตร
TEMED	10	10	ไมโครลิตร

ผสมส่วนผสมทั้งหมดให้เข้ากันอย่างสมบูรณ์ เทในช่องระหว่างแผ่นกระจกทันที หลังจากนั้นเทน้ำกลั่นให้มีความสูงประมาณ 4-5 มิลลิเมตร เพื่อปรับหน้าเจลให้เรียบ ตั้งทิ้งไว้ 20-30 นาที เพื่อให้เจลแข็งตัว

Stacking gel

หลังจาก separating gel แข็งตัวอย่างสมบูรณ์แล้ว เทน้ำกลั่นที่ใช้ปรับหน้าเจลออก และทำการผสมส่วนผสม ดังนี้

Ultrapure water	2.6	มิลลิลิตร
4x stacking buffer	1.0	มิลลิลิตร
50% acrylamide	0.4	มิลลิลิตร
10% APS	30	ไมโครลิตร
TEMED	5	ไมโครลิตร

ผสมส่วนผสมทั้งหมดให้เข้ากันอย่างสมบูรณ์ เทในช่องระหว่างแผ่นกระจกด้านบนทันที หลังจากนั้นเสียบ comb ลงไปในเจล ตั้งทิ้งไว้ 20-30 นาที เพื่อให้เจลแข็งตัว

การหยอดตัวอย่าง

หลังจากที่ stacking gel แข็งตัวอย่างสมบูรณ์ ทำการดึง comb ออกอย่างระมัดระวัง ใช้ electrophoresis buffer ทำความสะอาดหลุม หยอดตัวอย่างลงในหลุม

Bradford reagent

เตรียม Bradford reagent ปริมาตร 1 ลิตร โดยมีส่วนประกอบดังนี้ Coomasie Brilliant Blue G-250 50 มิลลิกรัม เมทานอล 25 มิลลิลิตร และ 85% phosphoric acid 50 มิลลิลิตร ผสมให้เข้ากันและปรับปริมาตรด้วยน้ำกลั่นจนครบ 500 มิลลิลิตร นำไปกรองผ่านกระดาษกรอง Whatman เบอร์ 93 เก็บในภาชนะปิดสนิทและป้องกันแสงที่อุณหภูมิ 4 องศา

Lysis buffer สำหรับการทดลอง Western blot

เตรียม 2x lysis buffer ปริมาตร 30 มิลลิลิตร ประกอบด้วย Tris-HCl (pH 7.4) 40 มิลลิโมลาร์ NaCl 300 มิลลิโมลาร์ Triton-X 2% sodium deoxycholate 2% NaF 20 มิลลิโมลาร์ของ Pefabloc 2 มิลลิโมลาร์ และ sodium orthovanadate 2 มิลลิโมลาร์ โดยละลายส่วนผสมทั้งหมดในน้ำกลั่น และปรับปริมาตรจนครบ 30 มิลลิลิตร ก่อนนำไปใช้ เติม protease inhibitor ปริมาตร 10 ไมโครลิตรต่อ lysis buffer 990 ไมโครลิตร

M199 medium

อาหารเพาะเลี้ยง M199 แบบผง (1 ซอง) ละลายในน้ำกลั่น เติม sodium hydrogen carbonate 2.2 กรัม ผสมให้เข้ากัน ปรับ pH ให้ได้ 7.2 ด้วยกรด HCl ปรับปริมาตรด้วยน้ำกล่นจนครบ 1 ลิตร ทำให้ปราศจากเชื้อโดยกรองผ่านเมมเบรนขนาด 0.22 ไมโครเมตร เติม FBS และ penicillin-streptomycin จนได้ความเข้มข้นสุดท้ายเป็น 10% FBS และ 1% penicillin-streptomycin

Phosphate buffer saline (PBS)

เตรียม PBS ปริมาตร 1 ลิตร ประกอบด้วย NaCl 8 กรัม KCl 0.2 กรัม KH_2PO_4 0.2 กรัม และ Na_2HPO_4 1.15 กรัม โดยละลายในน้ำกลั่น ปรับ pH จนได้ 7.4 ด้วย NaOH หลังจากนั้นปรับปริมาตรด้วยน้ำกลั่นจนครบ 1 ลิตร

Running and transfer solution สำหรับการทดลอง Western blot

10x running and transfer solution

เตรียม 10x running and transfer solution ปริมาตร 1 ลิตร ประกอบด้วย Tris (pH 8.3) 250 มิลลิโมลาร์ และ glycine 1.92 โมลาร์ โดยละลายส่วนผสมในน้ำกลั่น และปรับปริมาตรจนครบ 1 ลิตร

1x running buffer

เตรียม 1x running buffer ปริมาตร 1 ลิตร ทำโดยผสม 10x running and transfer solution 100 มิลลิลิตร ผสมกับ 10% SDS 10 มิลลิลิตร ปรับปริมาตรด้วยน้ำกลั่นจนครบ 1 ลิตร

1x transfer buffer

เตรียม 1x transfer buffer ปริมาตร 1 ลิตร ทำโดยผสม 10x running and transfer solution 80 มิลลิลิตร ผสมกับ methanol 220 มิลลิลิตร ปรับปริมาตรด้วยน้ำกลั่นจนครบ 1 ลิตร

5x sample buffer สำหรับการทดลอง Western blot

เตรียม 5x sample buffer ปริมาตร 50 มิลลิลิตร ประกอบด้วย Tris-HCl (pH 6.8) 60 มิลลิโมลาร์ SDS 2% glycerol 25% β-mercaptoethanol 14.4 มิลลิโมลาร์ และ bromophenol blue 0.1% โดยละลายในน้ำกลั่นและปรับปริมาตรด้วยจนครบ 50 มิลลิลิตร เก็บไว้ที่อุณหภูมิ -20 องศา

10x Tris-buffered saline (TBS) สำหรับการทดลอง Western blot

เตรียม 10x TBS ปริมาตร 1 ลิตร ประกอบด้วย Tris (2M, pH 7.5) 50 มิลลิลิตร และ NaCl 87.6 กรัม ละลายน้ำกลั่นและปรับปริมาตรจนครบ 1 ลิตร

1x Tris-buffered saline, 0.05% Tween 20 (TBST)

เตรียม 1x TBST ปริมาตร 1 ลิตร เตรียมโดยผสม 10x TBS 100 มิลลิลิตร กับ Tween 20 ปริมาตร 0.5 มิลลิลิตร ปรับปริมาตรด้วยน้ำกลั่นจนครบ 1 ลิตร