UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

REFERENCES

Aggarwal, B. B. 2003. Signalling pathways of the TNF superfamily: A double-edged sword. *Nature Reviews Immunology*, *3*(9), 745.

Ai, T. T., & Huong, N. T. 2018. Research on the Production of Black Garlic Juice. *International Journal of Pharmaceutical Schience Invention*.

Aktan, F., 2004. iNOS-mediated nitric oxide production and its regulation. *Life sciences*, *75*(6), 639-653.

Al-Farsi, M. A., & Lee, C. Y. 2008. Optimization of phenolics and dietary fibre extraction from date seeds. *Food Chemistry*, *108*(3), 977–985.

Altemimi, A., Lakhssassi, N., Baharlouei, A., Watson, D., & Lightfoot, D. 2017. Phytochemicals: Extraction, isolation, and identification of bioactive compounds from plant extracts. *Plants*, *6*(4), 42.

Amagase, H., Petesch, B. L., Matsuura, H., Kasuga, S., & Itakura, Y. (2001). Intake of garlic and its bioactive components. *The Journal of Nutrition*, *131*(3), 955S-962S.

Ammerman, N. C., Beier-Sexton, M., & Azad, A. F. 2008. Growth and maintenance of Vero cell lines. *Current Protocols in Microbiology*, *11*(1), A. 4E. 1-A. 4E. 7.

Apel, K., & Hirt, H. 2004. Reactive oxygen species: Metabolism, oxidative stress, and signal transduction. *Annual Review of Plant Biology.*, *55*, 373–399.

Arreola, R., Quintero-Fabián, S., López-Roa, R. I., Flores-Gutiérrez, E. O., Reyes-Grajeda, J. P., Carrera-Quintanar, L., & Ortuño-Sahagún, D. (2015). Immunomodulation and anti-inflammatory effects of garlic compounds. *Journal of Immunology Research*, *2015*.

Bae, G.-S., Kim, M.-S., Jung, W.-S., Seo, S.-W., Yun, S.-W., Kim, S. G., Park, R.-K., Kim, E.-C., Song, H.-J., & Park, S.-J. 2010. Inhibition of lipopolysaccharide-induced inflammatory responses by piperine. *European Journal of Pharmacology*, *642*(1–3), 154–162.

Bae, S. E., Cho, S. Y., Won, Y. D., Lee, S. H., & Park, H. J. 2012. A comparative study of the different analytical methods for analysis of S-allyl cysteine in black garlic by HPLC. *LWT-Food Science and Technology*, *46*(2), 532–535.

Bae, S. E., Cho, S. Y., Won, Y. D., Lee, S. H., & Park, H. J. 2014. Changes in S-allyl cysteine contents and physicochemical properties of black garlic during heat treatment. *LWT-Food Science and Technology*, *55*(1), 397–402.

Ban, J. O., Oh, J. H., Kim, T. M., Kim, D. J., Jeong, H.-S., Han, S. B., & Hong, J. T. 2009. Anti-inflammatory and arthritic effects of thiacremonone, a novel

UNIVERSITAS
GADJAH MADA
Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

sulfurcompound isolated from garlic via inhibition of NF-κB. *Arthritis Research & Therapy*, *11*(5), R145.

Bartee, E., & McFadden, G. 2013. Cytokine synergy: An underappreciated contributor to innate anti-viral immunity. *Cytokine*, *63*(3), 237–240.

Beckman, J. S. 1996. Oxidative damage and tyrosine nitration from peroxynitrite. *Chemical Research in Toxicology*, *9*(5), 836–844.

Beckman, J. S., & Koppenol, W. H. 1996. Nitric oxide, superoxide, and peroxynitrite: The good, the bad, and ugly. *American Journal of Physiology-Cell Physiology*, *271*(5), C1424–C1437.

Biswas, S. K. 2016. Does the interdependence between oxidative stress and inflammation explain the antioxidant paradox? *Oxidative Medicine and Cellular Longevity*, *2016*.

Bradley, J.R., 2008. TNF-mediated inflammatory disease. *The Journal of Pathology: A Journal of the Pathological Society of Great Britain and Ireland*, *214*(2), 149-160.

Brand-Williams, W., Cuvelier, M.E. and Berset, C.L.W.T., 1995. Use of a free radical method to evaluate antioxidant activity. *LWT-Food science and Technology*, *28*(1), 25-30.

Bozin, B., Mimica-Dukic, N., Samojlik, I., Goran, A. and Igic, R., 2008. Phenolics as antioxidants in garlic (Allium sativum L., Alliaceae). *Food chemistry*, *111*(4), pp.925-929.

Buelna-Chontal, M., & Zazueta, C. 2013. Redox activation of Nrf2 & NF-κB: a double end sword? Cellular Signalling, 25(12), 2548–2557.

Butler, M., 2004. *Animal cell culture and technology*. Taylor & Francis.

Choi, I., Cha, H., & Lee, Y. (2014). Physicochemical and antioxidant properties of black garlic. Molecules, 19(10), 16811–16823.

Chuah, S. C., Moore, P. K., & Zhu, Y. Z. 2007. S-allylcysteine mediates cardioprotection in an acute myocardial infarction rat model via a hydrogen sulfide-mediated pathway. American Journal of Physiology-Heart and Circulatory Physiology, 293(5), H2693–H2701.

Chun, J., Choi, R. J., Khan, S., Lee, D.-S., Kim, Y.-C., Nam, Y.-J., Lee, D.-U., & Kim, Y. S. 2012. Alantolactone suppresses inducible nitric oxide synthase and cyclooxygenase-2 expression by down-regulating NF-κB, MAPK and AP-1 via the MyD88 signaling pathway in LPS-activated RAW 264.7 cells. *International Immunopharmacology*, *14*(4), 375–383.

Clancy, R. M., Amin, A. R., & Abramson, S. B. 1998. The role of nitric oxide in inflammation and immunity. Arthritis & Rheumatism, 41(7), 1141–1151.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Colín-González, A. L., Santana, R. A., Silva-Islas, C. A., Chánez-Cárdenas, M. E., Santamaría, A., & Maldonado, P. D. 2012. The antioxidant mechanisms underlying the aged garlic extract-and S-allylcysteine-induced protection. Oxidative Medicine and Cellular Longevity, 2012.

Corzo-Martínez, M., Corzo, N., & Villamiel, M. 2007. Biological properties of onions and garlic. Trends in Food Science & Technology, 18(12), 609–625.

Coward, W. R., Okayama, Y., Sagara, H., Wilson, S. J., Holgate, S. T., & Church, M. K. 2002. NF-κB and TNF-α: A positive autocrine loop in human lung mast cells? The Journal of Immunology, 169(9), 5287–5293.

Ćujić, N., Šavikin, K., Janković, T., Pljevljakušić, D., Zdunić, G., & Ibrić, S. (2016). Optimization of polyphenols extraction from dried chokeberry using maceration as traditional technique. Food Chemistry, 194, 135–142.

Cuzzocrea, S., & Salvemini, D. 2007. Molecular mechanisms involved in the reciprocal regulation of cyclooxygenase and nitric oxide synthase enzymes. Kidney International, 71(4), 290–297.

Daliri, E. B.-M., Ofosu, F. K., Chelliah, R., Park, M. H., Kim, J.-H., & Oh, D.-H. 2019. Development of a soy protein hydrolysate with an antihypertensive effect. International Journal of Molecular Sciences, 20(6), 1496.

Del Rio, D., Borges, G., & Crozier, A. 2010. Berry flavonoids and phenolics: Bioavailability and evidence of protective effects. British Journal of Nutrition, 104(S3), S67–S90.

Deore S. L., K.S., Baviskar, B.A., Khangenbam, R.A., Koli, U.S., Daga, N.P., Gadbail, P.A. and Jain, P.A., 2009. In vitro antioxidant activity and phenolic content of Croton caudatum. *vitro*, *1*(2), pp.174-6.

Esmon, C. T. 2004. The impact of the inflammatory response on coagulation. Thrombosis Research, 114(5–6), 321–327.

Farnsworth, N. R., Akerele, O., Bingel, A. S., Soejarto, D. D., & Guo, Z. 1985. Medicinal plants in therapy. Bulletin of the World Health Organization, 63(6), 965.

Ferrero-Miliani, L., Nielsen, O. H., Andersen, P. S., & Girardin, S. E. 2007. Chronic inflammation: Importance of NOD2 and NALP3 in interleukin-1β generation. Clinical & Experimental Immunology, 147(2), 227–235.

Freshney, R. I. 2015. Culture of animal cells: A manual of basic technique and specialized applications. John Wiley & Sons.

Fridovich, I. 1978. The biology of oxygen radicals. Science, 201(4359), 875–880.

Funk, C. D., Funk, L. B., Kennedy, M. E., Pong, A. S., & Fitzgerald, G. A. (1991). Human platelet/erythroleukemia cell prostaglandin G/H synthase: CDNA

UNIVERSITAS
GADJAH MADA
Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

cloning, expression, and gene chromosomal assignment. The FASEB Journal, 5(9), 2304–2312.

Gangwar, M., Gautam, M. K., Sharma, A. K., Tripathi, Y. B., Goel, R. K., & Nath, G. 2014. Antioxidant capacity and radical scavenging effect of polyphenol rich Mallotus philippenensis fruit extract on human erythrocytes: An in vitro study. The Scientific World Journal, 2014.

Grinberg-Bleyer, Y., & Ghosh, S. 2016). A novel link between inflammation and cancer. Cancer Cell, 30(6), 829–830.

Guha, M., & Mackman, N. 2001. LPS induction of gene expression in human monocytes. Cellular Signalling, 13(2), 85–94.

Gupta, S. C., Sundaram, C., Reuter, S., & Aggarwal, B. B. 2010. Inhibiting NF-κB activation by small molecules as a therapeutic strategy. Biochimica et Biophysica Acta (BBA)-Gene Regulatory Mechanisms, 1799(10–12), 775–787.

Haddad, John J. 2002. Antioxidant and prooxidant mechanisms in the regulation of redox (y)-sensitive transcription factors. Cellular Signalling, 14(11), 879–897.

Haddad, John JE, Safieh-Garabedian, B., Saadé, N. E., Kanaan, S. A., & Land, S. C. 2001. CHEMIOXYEXCITATION (Δp O2/ROS)-DEPENDENT RELEASE OF IL-1β, IL-6 AND TNF-α: EVIDENCE OF CYTOKINES AS OXYGEN-SENSITIVE MEDIATORS IN THE ALVEOLAR EPITHELIUM. Cytokine, 13(3), 138–147.

Hajjar, D. P., Lander, H. M., Pearce, S. F. A., Upmacis, R., & Pomerantz, K. B. 1995. Nitric oxide enhances prostaglandin-H synthase-1 activity by a heme-independent mechanism: Evidence implicating nitrosothiols. Journal of the American Chemical Society, 117(12), 3340–3346.

Hancock, J. T., Desikan, R., & Neill, S. J. 2001. Role of reactive oxygen species in cell signalling pathways. Portland Press Limited.

Heidland, A., Klassen, A., Rutkowski, P., & Bahner, U. 2006. The contribution of Rudolf Virchow to the concept of inflammation: What is still of importance?

Herodež, Š. S., Hadolin, M., Škerget, M., & Knez, Ž. 2003. Solvent extraction study of antioxidants from Balm (Melissa officinalis L.) leaves. Food Chemistry, 80(2), 275–282.

Herrera-Mundo, M. N., Silva-Adaya, D., Maldonado, P. D., Galván-Arzate, S., Andrés-Martínez, L., Pérez-De La Cruz, V., Pedraza-Chaverrí, J., & Santamaría, A. 2006. S-Allylcysteine prevents the rat from 3-nitropropionic acid-induced hyperactivity, early markers of oxidative stress and mitochondrial dysfunction. Neuroscience Research, 56(1), 39–44.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Hickey, E. J., Raje, R. R., Reid, V. E., Gross, S. M., & Ray, S. D. 2001. Diclofenac induced in vivo nephrotoxicity may involve oxidative stress-mediated massive genomic DNA fragmentation and apoptotic cell death. Free Radical Biology and Medicine, 31(2), 139–152.

Himalayan "lazy garlic" comprising one big single clove now in Lidl. (2013, October 7). Mail Online. https://www.dailymail.co.uk/femail/article-2448515/No-fiddly-peeling-Himalayan-lazy-garlic-comprising-ENORMOUS-single-clove-sold-Lidl.html

Hinz, B., & Brune, K. 2002. Cyclooxygenase-2—10 years later. Journal of Pharmacology and Experimental Therapeutics, 300(2), 367–375.

Hussain, S. P., Hofseth, L. J., & Harris, C. C. 2003. Radical causes of cancer. Nature Reviews Cancer, 3(4), 276.

Hussain, T., Tan, B., Yin, Y., Blachier, F., Tossou, M.C. and Rahu, N., 2016. Oxidative stress and inflammation: what polyphenols can do for us?. *Oxidative medicine and cellular longevity*, *2016*.

Ichikawa, M., Ryu, K., Yoshida, J., Ide, N., Yoshida, S., Sasaoka, T. and Sumi, S.I., 2002. Antioxidant effects of tetrahydro-β-carboline derivatives identified in aged garlic extract. *Biofactors*, *16*(3-4), pp.57-72.

Ide, N. and LAU, B.H., 1997. Garlic compounds protect vascular endothelial cells from oxidized low-density lipoprotein-induced injury. *Journal of pharmacy and pharmacology*, *49*(9), pp.908-911.

Ide, N., Matsuura, H. and Itakura, Y., 1996. Scavenging effect of aged garlic extract and its constituents on active oxygen species. *Phytotherapy Research*, *10*(4), pp.340-341.Ide, N., Lau, B.H., Ryu, K., Matsuura, H. and Itakura, Y., 1999. Antioxidant effects of fructosyl arginine, a Maillard reaction product in aged garlic extract. The Journal of nutritional biochemistry, 10(6), pp.372-376

Ighodaro, O.M. and Akinloye, O.A., 2016. Sapium ellipticum (Hochst.) Pax Leaf Extract: In-vitro Antioxidant Activities and Lethal Dose (LD50) Determination in Wistar Rats. *Journal of Advances in Medicine and Medical Research*, 1-7.

Imai, M., Naito, H., Okuda, M. and Sugimura, A., 1994. Method for determination of rotational viscosity in nematic liquid crystals. *Japanese journal of applied physics*, *33*(1B), p.L119.

Invitrogen. 2010. Cell Culture Basics Handbook. ThermoFisher Scientific Inc., 1–61. https://doi.org/10.1093/chemse/bjt099

Ishiyama, M., Tominaga, H., Shiga, M., Sasamoto, K., Ohkura, Y. and Ueno, K., 1996. A combined assay of cell vability and in vitro cytotoxicity with a highly

UNIVERSITAS
GADJAH MADA
Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

water-soluble tetrazolium salt, neutral red and crystal violet. *Biological and Pharmaceutical Bulletin*, *19*(11), 1518-1520.

Jabs, Thorsten. "Reactive oxygen intermediates as mediators of programmed cell death in plants and animals." *Biochemical pharmacology* 57, no. 3 (1999): 231-245.

Jang, E.K., Seo, J.H. and Lee, S.P., 2008. Physiological activity and antioxidative effects of aged black garlic (Allium sativum L.) extract. *Korean Journal of Food Science and Technology*, *40*(4), 443-448.

Jeong, Y.Y., Ryu, J.H., Shin, J.H., Kang, M.J., Kang, J.R., Han, J. and Kang, D., 2016. Comparison of anti-oxidant and anti-inflammatory effects between fresh and aged black garlic extracts. *Molecules*, *21*(4), 430.

Karadag, A., Ozcelik, B. and Saner, S., 2009. Review of methods to determine antioxidant capacities. *Food analytical methods*, *2*(1), 41-60.

Katsiki, N. and Manes, C., 2009. Is there a role for supplemented antioxidants in the prevention of atherosclerosis?. *Clinical nutrition*, *28*(1), 3-9.

Kedare, S.B. and Singh, R.P., 2011. Genesis and development of DPPH method of antioxidant assay. *Journal of food science and technology*, *48*(4), 412-422.

Khoddami, A., Wilkes, M.A. and Roberts, T.H., 2013. Techniques for analysis of plant phenolic compounds. *Molecules*, *18*(2), 2328-2375.

Kim, J.M., Chang, N., Kim, W.K. and Chun, H.S., 2006. Dietary S-allyl-L-cysteine reduces mortality with decreased incidence of stroke and behavioral changes in stroke-prone spontaneously hypertensive rats. *Bioscience, biotechnology, and biochemistry*, *70*(8), 1969-1971.

Kim, K.M., Chun, S.B., Koo, M.S., Choi, W.J., Kim, T.W., Kwon, Y.G., Chung, H.T., Billiar, T.R. and Kim, Y.M., 2001. Differential regulation of NO availability from macrophages and endothelial cells by the garlic component S-allyl cysteine. *Free Radical Biology and Medicine*, *30*(7), 747-756.

Kim, M.J., Yoo, Y.C., Kim, H.J., Shin, S.K., Sohn, E.J., Min, A.Y., Sung, N.Y. and Kim, M.R., 2014. Aged black garlic exerts anti-inflammatory effects by decreasing no and proinflammatory cytokine production with less cytoxicity in LPS-stimulated raw 264.7 macrophages and LPS-induced septicemia mice. *Journal of medicinal food*, *17*(10), 1057-1063.

Kleinert, H., Wallerath, T., Euchenhofer, C., Ihrig-Biedert, I., Li, H. and Förstermann, U., 1998. Estrogens increase transcription of the human endothelial NO synthase gene: analysis of the transcription factors involved. *Hypertension*, *31*(2), 582-588.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Knowles, R.G. and Moncada, S., 1994. Nitric oxide synthases in mammals. *Biochemical Journal*, *298*(Pt 2), 249.

Kodera, Y., Suzuki, A., Imada, O., Kasuga, S., Sumioka, I., Kanezawa, A., Taru, N., Fujikawa, M., Nagae, S., Masamoto, K. and Maeshige, K., 2002. Physical, chemical, and biological properties of S-allylcysteine, an amino acid derived from garlic. *Journal of Agricultural and Food Chemistry*, *50*(3), 622-632.

Korhonen, R., Lahti, A., Kankaanranta, H. and Moilanen, E., 2005. Nitric oxide production and signaling in inflammation. *Current Drug Targets-Inflammation & Allergy*, *4*(4), 471-479.

Kumar, R., Chhatwal, S., Arora, S., Sharma, S., Singh, J., Singh, N., Bhandari, V. and Khurana, A., 2013. Antihyperglycemic, antihyperlipidemic, anti-inflammatory and adenosine deaminase–lowering effects of garlic in patients with type 2 diabetes mellitus with obesity. *Diabetes, metabolic syndrome and obesity: targets and therapy*, *6*, 49.

Kurutas, E.B., 2015. The importance of antioxidants which play the role in cellular response against oxidative/nitrosative stress: current state. *Nutrition journal*, *15*(1), 71.

Lechner, M., Lirk, P. and Rieder, J., 2005, August. Inducible nitric oxide synthase (iNOS) in tumor biology: the two sides of the same coin. In *Seminars in cancer biology*,15(4), 277-289).

Lee, E.N., Choi, Y.W., Kim, H.K., Park, J.K., Kim, H.J., Kim, M.J., Lee, H.W., Kim, K.H., Bae, S.S., Kim, B.S. and Yoon, S., 2011. Chloroform extract of aged black garlic attenuates TNF-α-induced ROS generation, VCAM-1 expression, NF-κB activation and adhesiveness for monocytes in human umbilical vein endothelial cells. *Phytotherapy Research*, *25*(1), 92-100.

Lee, K.M., Kang, B.S., Lee, H.L., Son, S.J., Hwang, S.H., Kim, D.S., Park, J.S. and Cho, H.J., 2004. Spinal NF-kB activation induces COX-2 upregulation and contributes to inflammatory pain hypersensitivity. *European Journal of Neuroscience*, *19*(12), 3375-3381.

Lee, Y.M., Gweon, O.C., Seo, Y.J., Im, J., Kang, M.J., Kim, M.J. and Kim, J.I., 2009. Antioxidant effect of garlic and aged black garlic in animal model of type 2 diabetes mellitus. *Nutrition research and practice*, *3*(2), 156-161.

Locksley, R.M., Killeen, N. and Lenardo, M.J., 2001. The TNF and TNF receptor superfamilies: integrating mammalian biology. *Cell*, *104*(4), 487-501.

Lu, X., Li, N., Qiao, X., Qiu, Z. and Liu, P., 2017. Composition analysis and antioxidant properties of black garlic extract. *Journal of food and drug analysis*, *25*(2), 340-349.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

MacMicking, J., Xie, Q.W. and Nathan, C., 1997. Nitric oxide and macrophage function. *Annual review of immunology*, *15*(1), 323-350..

Mahmood, T. and Yang, P.C., 2012. Western blot: technique, theory, and trouble shooting. *North American journal of medical sciences*, *4*(9), 429. Mahmood, T. and Yang, P.C., 2012. Western blot: technique, theory, and trouble shooting. *North American journal of medical sciences*, *4*(9), 429.

Mahmoodzadeh, Y., Mazani, M. and Rezagholizadeh, L., 2017. Hepatoprotective effect of methanolic Tanacetum parthenium extract on CCl4-induced liver damage in rats. *Toxicology reports*, *4*, 455-462.

Mardini, I.A. and FitzGerald, G.A., 2001. Selective inhibitors of cyclooxygenase-2. *Molecular interventions*, *1*(1), 30.

Medina-Campos, O.N., Barrera, D., Segoviano-Murillo, S., Rocha, D., Maldonado, P.D., Mendoza-Patiño, N. and Pedraza-Chaverri, J., 2007. S-allylcysteine scavenges singlet oxygen and hypochlorous acid and protects LLC-PK1 cells of potassium dichromate-induced toxicity. *Food and chemical toxicology*, *45*(10), 2030-2039.

Medzhitov, R., 2001. Toll-like receptors and innate immunity. *Nature Reviews Immunology*, *1*(2), 135-145.

Moncada, S. and Higgs, E.A., 2006. The discovery of nitric oxide and its role in vascular biology. *British journal of pharmacology*, *147*(S1), S193-S201..

Montagnon, B.J. and Vincent-Falquet, J.C., 1998. Experience with the Vero cell line. *Developments in biological standardization*, *93*, 119-123.

Mukaida, N., 2000. The roles of cytokine receptors in diseases. *Rinsho byori. The Japanese journal of clinical pathology*, *48*(5), 409-415.

Nencini, C., Menchiari, A., Franchi, G.G. and Micheli, L., 2011. In vitro antioxidant activity of aged extracts of some Italian Allium species. *Plant foods for human nutrition*, *66*(1), 11-16.

Jewkes, R., Sikweyiya, Y., Morrell, R. and Dunkle, K., 2011. Gender inequitable masculinity and sexual entitlement in rape perpetration South Africa: findings of a cross-sectional study. *PloS one*, *6*(12).

Nicholas, C., Batra, S., Vargo, M.A., Voss, O.H., Gavrilin, M.A., Wewers, M.D., Guttridge, D.C., Grotewold, E. and Doseff, A.I., 2007. Apigenin blocks lipopolysaccharide-induced lethality in vivo and proinflammatory cytokines expression by inactivating NF-κB through the suppression of p65 phosphorylation. *The Journal of Immunology*, *179*(10), 7121-7127.

Nimse, S.B. and Pal, D., 2015. Free radicals, natural antioxidants, and their reaction mechanisms. *Rsc Advances*, *5*(35), 27986-28006.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Ohnishi, S., Ma, N., Thanan, R., Pinlaor, S., Hammam, O., Murata, M. and Kawanishi, S., 2013. DNA damage in inflammation-related carcinogenesis and cancer stem cells. *Oxidative medicine and cellular longevity*, *2013*.

Ohshima, H. and Bartsch, H., 1994. Chronic infections and inflammatory processes as cancer risk factors: possible role of nitric oxide in carcinogenesis. *Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*, *305*(2), 253-264.

Handa, S.S., Khanuja, S.P.S., Longo, G. and Rakesh, D.D., 2008. Extraction technologies for medicinal and aromatic plants: Earth. *Environmental and Marine Sciences and Technologies*.

Oh, H.L., Ahn, M.H., Kim, N.Y., Song, J.E., Lee, S.Y., Song, M.R., Park, J.Y. and Kim, M.R., 2012. Quality characteristics and antioxidant activities of yanggeng with added Rehmanniae radix Preparata concentrate. *Korean journal of food and cookery science*, *28*(1), 1-8.

Osada, N., Kohara, A., Yamaji, T., Hirayama, N., Kasai, F., Sekizuka, T., Kuroda, M., & Hanada, K. 2014. The genome landscape of the african green monkey kidney-derived vero cell line. *DNA Research*, 21(6), 673–683.

O'Shea, J.J. and Murray, P.J., 2008. Cytokine signaling modules in inflammatory responses. *Immunity*, *28*(4), 477-487.

Park, E.J., Bae, E., Yi, J., Kim, Y., Choi, K., Lee, S.H., Yoon, J., Lee, B.C. and Park, K., 2010. Repeated-dose toxicity and inflammatory responses in mice by oral administration of silver nanoparticles. *Environmental toxicology and pharmacology*, *30*(2), 162-168.

Park, J.M., Han, Y.M., Kangwan, N., Lee, S.Y., Jung, M.K., Kim, E.H. and Hahm, K.B., 2014. S-allyl cysteine alleviates nonsteroidal anti-inflammatory drug-induced gastric mucosal damages by increasing cyclooxygenase-2 inhibition, heme oxygenase-1 induction, and histone deacetylation inhibition. *Journal of gastroenterology and hepatology*, *29*, 80-92.

Phelan, K. and May, K.M., 2015. Basic techniques in mammalian cell tissue culture. *Current protocols in cell biology*, *66*(1), 1-1.

Poyton, R.O., Ball, K.A. and Castello, P.R., 2009. Mitochondrial generation of free radicals and hypoxic signaling. *Trends in Endocrinology & Metabolism*, *20*(7), 332-340.

Prior, R.L., Wu, X. and Schaich, K., 2005. Standardized methods for the determination of antioxidant capacity and phenolics in foods and dietary supplements. *Journal of agricultural and food chemistry*, *53*(10), 4290-4302.

PUTRI, L.S.E., DASUMIATI, D., KRISTIYANTO, K., MARDIANSYAH, M., MALIK, C., LEUVINADRIE, L.P. and MULYONO, E.A., 2016.

UNIVERSITAS
GADJAH MADA
Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Ethnobotanical study of herbal medicine in Ranggawulung urban forest, Subang District, West Java, Indonesia. *Biodiversitas Journal of Biological Diversity*, *17*(1).

RAMNATH1a, S. and VENKATARAMEGOWDA, S., 2016. Antioxidant activity of indian propolis-an in vitro evaluation. *International Journal of Pharmacology, Phytochemistry and Ethnomedicine*, 79.

Reeh, P.W. and Steen, K.H., 1996. Tissue acidosis in nociception and pain. In *Progress in brain research* ,13, 143-151.

Rhim, J.S., Schell, K., Creasy, B. and Case, W., 1969. Biological characteristics and viral susceptibility of an African green monkey kidney cell line (Vero). *Proceedings of the Society for Experimental Biology and Medicine*, *132*(2), 670-678.

Ruch, R.J., Cheng, S.J. and Klaunig, J.E., 1989. Prevention of cytotoxicity and inhibition of intercellular communication by antioxidant catechins isolated from Chinese green tea. *Carcinogenesis*, *10*(6), 1003-1008.

Ryu, J.H. and Kang, D., 2017. Physicochemical properties, biological activity, health benefits, and general limitations of aged black garlic: A review. *Molecules*, *22*(6), 919.

Salman, H., Bergman, M., Bessler, H., Punsky, I. and Djaldetti, M., 1999. Effect of a garlic derivative (alliin) on peripheral blood cell immune responses. *International journal of immunopharmacology*, *21*(9), 589-597.

Salvemini, D., Misko, T.P., Masferrer, J.L., Seibert, K., Currie, M.G. and Needleman, P., 1993. Nitric oxide activates cyclooxygenase enzymes. *Proceedings of the National Academy of Sciences*, *90*(15),7240-7244.

Santhosha, S.G., Jamuna, P. and Prabhavathi, S.N., 2013. Bioactive components of garlic and their physiological role in health maintenance: A review. *Food Bioscience*, *3*, 59-74.

Saryono, P., 2019, April. The potency of black garlic as anti-atherosclerotic: Mechanisms of action and the prospectively. In *American Institute of Physics Conference Series* , 2094(2).

Sato, E., Kohno, M. and Niwano, Y., 2006. Increased level of tetrahydro-β-carboline derivatives in short-term fermented garlic. *Plant Foods for Human Nutrition*, *61*(4), 175-178.

Satti, N.M.E., A-Elbasit, I.E.M., Ahmed, I.E.M. and Eltahir, F.A.M., 2018. Comparative analysis on the levels of some bioactive constituents of Asian and African garlic types. *Bioscience Biotechnology Research Communications*, *11*(4), 556-562.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Schraufstätter, I., Hyslop, P.A., Jackson, J.H. and Cochrane, C.G., 1988. Oxidant-induced DNA damage of target cells. *The Journal of clinical investigation*, *82*(3), 1040-1050.

Schwab, J.M., Schluesener, H.J., Meyermann, R. and Serhan, C.N., 2003. COX-3 the enzyme and the concept: steps towards highly specialized pathways and precision therapeutics?. *Prostaglandins, leukotrienes and Essential fatty acids*, *69*(5), 339-343.

Seki, M., Narusaka, M., Ishida, J., Nanjo, T., Fujita, M., Oono, Y., Kamiya, A., Nakajima, M., Enju, A., Sakurai, T. and Satou, M., 2002. Monitoring the expression profiles of 7000 Arabidopsis genes under drought, cold and high-salinity stresses using a full-length cDNA microarray. *The Plant Journal*, *31*(3), 279-292.

Shi, H., Jing, X., Wei, X., Perez, R.G., Ren, M., Zhang, X. and Lou, H., 2015. S-allyl cysteine activates the Nrf2-dependent antioxidant response and protects neurons against ischemic injury in vitro and in vivo. *Journal of neurochemistry*, *133*(2), 298-308.

Shimoda, L.M., Park, C., Stokes, A.J., Gomes, H.H. and Turner, H., 2012. Pacific island'Awa (Kava) extracts, but not isolated kavalactones, promote proinflammatory responses in model mast cells. *Phytotherapy research*, *26*(12), 1934-1941.

Smith, W.L. and Dewitt, D.L., 1996. Prostaglandin endoperoxide H synthases-1 and-2. In *Advances in immunology* , 62, 167-215.

Soto-Hernández, M., Tenango, M.P. and García-Mateos, R. eds., 2017. *Phenolic Compounds: Biological Activity*. BoD–Books on Demand.

Spigno, G., Tramelli, L. and De Faveri, D.M., 2007. Effects of extraction time, temperature and solvent on concentration and antioxidant activity of grape marc phenolics. *Journal of food engineering*, *81*(1), 200-208.

Sreelatha, S. and Padma, P.R., 2009. Antioxidant activity and total phenolic content of Moringa oleifera leaves in two stages of maturity. *Plant foods for human nutrition*, *64*(4), 303.

Subbaramaiah, K. and Dannenberg, A.J., 2003. Cyclooxygenase 2: a molecular target for cancer prevention and treatment. *Trends in pharmacological sciences*, *24*(2), 96-102.

SUHARNO, S. (2016). Wati (Piper methysticum) medicinal plant: The ethnobiological and ethnomedicinal values of the Marind tribe in Merauke, Papua, Indonesia. *Biodiversitas Journal of Biological Diversity*, 17(2), 814–822.

UNIVERSITAS
GADJAH MADA
Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Sultana, B., Anwar, F. and Ashraf, M., 2009. Effect of extraction solvent/technique on the antioxidant activity of selected medicinal plant extracts. *Molecules*, *14*(6), 2167-2180.

Suschek, C.V., Schnorr, O. and Kolb-Bachofen, V., 2004. The role of iNOS in chronic inflammatory processes in vivo: is it damage-promoting, protective, or active at all?. *Current molecular medicine*, *4*(7), 763-775.

Szabó, C. and Ohshima, H., 1997. DNA damage induced by peroxynitrite: subsequent biological effects. *Nitric oxide*, *1*(5), 373-385.

Szliszka, E., Czuba, Z.P., Jernas, K. and Król, W., 2008. Dietary flavonoids sensitize HeLa cells to tumor necrosis factor-related apoptosis-inducing ligand (TRAIL). *International Journal of Molecular Sciences*, *9*(1), 56-64.

Teferedegne, B., Macauley, J., Foseh, G., Dragunsky, E., Chumakov, K., Murata, H., Peden, K. and Lewis Jr, A.M., 2014. MicroRNAs as potential biomarkers for VERO cell tumorigenicity. *Vaccine*, *32*(37), 4799-4805.

Toledano-Medina, M.A., Pérez-Aparicio, J., Moreno-Rojas, R. and Merinas-Amo, T., 2016. Evolution of some physicochemical and antioxidant properties of black garlic whole bulbs and peeled cloves. *Food chemistry*, *199*, 135-139.

Tran, G.B., Dam, S.M. and Le, N.T.T., 2018. Amelioration of Single Clove Black Garlic Aqueous Extract on Dyslipidemia and Hepatitis in Chronic Carbon Tetrachloride Intoxicated Swiss Albino Mice. *International journal of hepatology*, *2018*.

Tran, G.B., Pham, T.V. and Trinh, N.N., 2019. Black Garlic and Its Therapeutic Benefits. In *Studies on Garlic*. IntechOpen.

van den Bosch, M.W., Palsson-Mcdermott, E., Johnson, D.S. and O'Neill, L.A., 2014. LPS induces the degradation of programmed cell death protein 4 (PDCD4) to release Twist2, activating c-Maf transcription to promote interleukin-10 production. *Journal of Biological Chemistry*, *289*(33), 22980-22990.

Vane, J., 1994. Towards a better aspirin. *Nature*, *367*(6460), 215-216.

Vincent, H.K. and Taylor, A.G., 2006. Biomarkers and potential mechanisms of obesity-induced oxidant stress in humans. *International journal of obesity*, *30*(3), 400-418.

Von Knethen, A. and Brüne, B., 1997. Cyclooxygenase-2: an essential regulator of NO-mediated apoptosis. *The FASEB Journal*, *11*(11), 887-895.

Wang, D., Feng, Y., Liu, J., Yan, J., Wang, M., Sasaki, J.I. and Lu, C., 2010. Black garlic (Allium sativum) extracts enhance the immune system. *Medicinal and Aromatic Plant Science and Biotechnology*, *4*(1), 37-40.

UNIVERSITAS
GADJAH MADA

Antioxidant and Anti-inflammatory Effect of Black Garlic Aqueous Extract on LPS induced Vero cell
Amna Mohamed Abdulhafith Marie, Dr.biol.hom. Nastiti Wijayanti, M.Si
Universitas Gadjah Mada, 2020 | Diunduh dari http://etd.repository.ugm.ac.id/

Siddiquee, S., Rovina, K., Azad, S.A., Naher, L., Suryani, S. and Chaikaew, P., 2015. Heavy metal contaminants removal from wastewater using the potential filamentous fungi biomass: a review. *J Microb Biochem Technol*, *7*(6), 384-395.

Willmer, E.N. ed., 2015. *Cells and tissues in culture: methods, biology and physiology*. Elsevier.

Williams, C.S., Luongo, C., Radhika, A., Zhang, T., Lamps, L.W., Nanney, L.B., Beauchamp, R.D. and DuBois, R.N., 1996. Elevated cyclooxygenase-2 levels in Min mouse adenomas. *Gastroenterology*, *111*(4), 1134-1140.

Winer, J., Jung, C.K.S., Shackel, I. and Williams, P.M., 1999. Development and validation of real-time quantitative reverse transcriptase–polymerase chain reaction for monitoring gene expression in cardiac myocytesin vitro. *Analytical biochemistry*, *270*(1), 41-49.

Yadav, U. and Ramana, K.V., 2013. Regulation of NF-B-induced inflammatory signaling by lipid peroxidation-derived aldehydes. *Oxidative medicine and cellular longevity*, *2013*.

Yasumura, Y., 1963. The research for the SV40 by means of tissu culture technique. *Nippon Rinsho*, *21*(6), 1201-1219.

Yoon, W.J., Kim, S.S., Oh, T.H., Lee, N.H. and Hyun, C.G., 2009. Abies koreana essential oil inhibits drug-resistant skin pathogen growth and LPS-induced inflammatory effects of murine macrophage. *Lipids*, *44*(5), 471-476.

Yoshimura, R., Matsuyama, M., Tsuchida, K., Takemoto, Y. and Nakatani, T., 2005. Relationship between cyclooxygenase (COX)-2 and malignant tumors. *Nihon rinsho. Japanese journal of clinical medicine*, *63*(10), 1839-1848.

Yuan, H., Sun, L., Chen, M. and Wang, J., 2016. The comparison of the contents of sugar, Amadori, and Heyns compounds in fresh and black garlic. *Journal of food science*, *81*(7), C1662-C1668.

Yun, H.Y., Dawson, V.L. and Dawson, T.M., 1996. Neurobiology of nitric oxide. *Critical Reviews™ in Neurobiology*, *10*(3-4), 291–316.

Zhang, X., Li, N., Lu, X., Liu, P. and Qiao, X., 2016. Effects of temperature on the quality of black garlic. *Journal of the Science of Food and Agriculture*, *96*(7), 2366-2372.