



DAFTAR PUSTAKA

- Adam, W. C., Peter, A.M., James, R.S. 2011. The role of oxidatives stres in the metabolic syndrome, Review in Cardiovascular Medicine, 12(1): 21-29.
<https://doi.org/10.3909/ricm0555>
- Albuquerque, B. R., Prieto, M. A., Barreiro, M. F., Rodrigues, A. E., Curran, T. P., Barros, L., Ferreira, I. C. F. R. 2017. Catechin-based extract optimization obtained from *arbutus unedo* L. fruits using maceration/microwave/ultrasound extraction techniques. Industrial Crops and Products, 95, 404–415. <https://doi.org/10.1016/j.indcrop.2016.10.050>
- Al-Oqail, M. M., Al-Sheddi, E. S., Farshori, N. N., Al-Massarani, S. M., Al-Turki, E. A., Ahmad, J., Al-Khedhairy, A. A., Siddiqui, M. A. 2019. Corn silk (*zea mays* L.) induced apoptosis in human breast cancer (MCF-7) cells via the ros-mediated mitochondrial pathway. Oxidative Medicine and Cellular Longevity, <https://doi.org/10.1155/2019/9789241>
- Apridamayanti, P., Pratiwi, R., Purwestri, Y. A., Sri Tunjung, W. A., Rumiyati, R. 2018. Anthocyanin, nutrient contents, and antioxidant activity of black rice bran of *oryza sativa* L. ‘Cempo Ireng’ from Sleman, Yogyakarta, Indonesia. Indonesian Journal of Biotechnology, 22 (1), 49. <https://doi.org/10.22146/ijbiotech.26401>
- Artun, F. T., Karagoz, A., Ozcan, G., Melikoglu, G., Anil, S., Kultur, S., Sutlupinar, N. 2016. In vitro anticancer and cytotoxic activities of some plant extracts on Hela and Vero cell lines. Journal of Balkan Union of Oncology., 21(3), 720–725. <https://doi.org/10.3390/proceedings1101019>
- Auley, M. T., Guimera, A. M., Hodgson, D., McDonald, N., Mooney, K. M., Morgan, A. E., Proctor C. J. 2017. Modelling the molecular mechanisms of aging. Bioscience Reports (37). <https://doi.org/10.1042/bsr20160177>.
- Azad, N., Rojanasakul, Y., Vallyathan, V. 2008. Inflammation and lung cancer: roles of reactive oxygen/nitrogen species. Journal of Toxicology and Environmental Health, Part B: Critical Reviews, 11 (1), 1-15.



<https://doi.org/10.1080/10937400701436460>

Azmir, J., Zaidul, I. S. M., Rahman, M. M., Sharif, K. M., Mohamed, A., Sahena, F., Jahurul, M. H. A., Ghafoor, K., Norulaini, N. A. N., Omar, A. K. M. 2013. Techniques for extraction of bioactive compounds from plant materials: A Review. *Journal of Food Engineering*, 117(4), 426–436.
<https://doi.org/10.1016/j.jfoodeng.2013.01.014>

Bae, I. Y., An, J. S., Oh, I. K., Lee, H. G. 2017. Optimized preparation of anthocyanin-rich extract from black rice and its effects on in vitro digestibility. *Food Science and Biotechnology*, 26(5), 1415–1422.
<https://doi.org/10.1007/s10068-017-0188-x>

Balasubramanian, J. dan Kumar, A. 2013. Effect of sodium arsenite on liver function related enzymes of cat fish *Heteropneustes fossilis* and its chelation by zeolite. *Ecotoxicology and Environmental Contamination* 8(2):53-58.
<https://doi.org/10.5132/eec.2013.02.008>.

Bao, D., Wang, J., Pang, X., Liu, H. 2017. Protective effect of quercetin against oxidative stress-induced cytotoxicity in rat pheochromocytoma (PC-12) cells. *Molecules*, 22, 1122 <https://doi.org/10.3390/molecules22071122>

Barbusiński, K. 2009. Fenton reaction - controversy concerning the chemistry. *Ecological chemistry and engineering*, 16(3), 347–358.

Baynes, J. W. dan Dominiczak, M. H. 2014. *Medical biochemistry*. Elsevier.

Boonyanuphong, P., dan Tobgay, U. 2022. Protective effect of two thai pigmented rice cultivars against H₂O₂-induced oxidative damage in HT-29 cell culture. *Food Research*, 6 (1): 27-33. [https://doi.org/10.26656/fr.2017.6\(1\).206](https://doi.org/10.26656/fr.2017.6(1).206)

Bretón-Romero, R., dan Lamas, S. 2014. Hydrogen peroxide signaling in vascular endothelial cells. *Redox Biology*, 2(1), 529–534.
<https://doi.org/10.1016/j.redox.2014.02.005>

Buanasari, B., Eden, W. T., Sholichah, A. I. 2017. Extraction of phenolic



compounds from petai leaves (*Parkia speciosa* hassk.) using microwave and ultrasound assisted methods. *Jurnal Bahan Alam Terbarukan*, 6(1), 25–31.

<https://doi.org/10.15294/jbat.v6i1.7793>

Butchan, K., Jirakanjanakit, N., Chulasiri, M., Jirasripongpun, K. 2014. Anti-oxidative stress of red and black rice bran extracts against H₂O₂, *t*-BHP, and UVA radiation. *Thai Society for Biotechnology and International Conference*.

Cavalcanti, R. N., Santos, D. T., Meireles, M. A. A. 2011. Non-thermal stabilization mechanisms of anthocyanins in model and food systems-an overview. *Food Research International*, 44(2), 499–509.

<https://doi.org/10.1016/j.foodres.2010.12.007>

CCRC. 2009. Prosedur tetap preparasi sampel. Fakultas Farmasi UGM, 1–3.

Chang, R. 2006. Kimia dasar konsep-konsep inti edisi 3. Jakarta: Erlangga.

Chapdelaine, J. M. 2011. MTT reduction - a tetrazolium-based colorimetric assay for cell survival and proliferation. *Molecular Devices*, 1–6.

Chen, X. Q., Nagao, N., Itani, T., Irifune, K. 2012. Anti-oxidative analysis, and identification and quantification of anthocyanin pigments in different coloured rice. *Food Chemistry*, 135(4), 2783–2788.

<https://doi.org/10.1016/j.foodchem.2012.06.098>

Chen, Z., Yuan, Q., Xu, G., Chen, H., Lei, H., Su, J. 2018. Effects of quercetin on proliferation and H₂O₂-induced apoptosis of intestinal porcine enterocyte cells. *Molecules*, 23, <https://doi.org/10.3390/molecules23082012>

Choi, M.J., Kim, H.Y., Cho, E.J. 2012. Anti-aging effect of black rice against H₂O₂-induced premature senescence. *Journal of Medicinal Plants Research* Vol. 6(20): 3672-3680. <https://doi.org/10.5897/JMPR12.324>

Chowdhury, S. R., Sengupta, S., Biswas, S., Sinha, T. K., Sen, R., Basak, R. K., Adhikari, B., Bhattacharyya, A. 2014. Bacterial fucose-rich polysaccharide stabilizes mapk-mediated Nrf2/Keap1 signaling by directly scavenging reactive oxygen species during hydrogen peroxide-induced apoptosis of



human lung fibroblast cells. PLOS one vol 9(11), e113663.

Christanto, D. R., Mose, J. C., Yuniarti, T., Bestari, M. B., Fauziah, N., Purwestri, Y. A., Munthe, J. N. 2021. Anti-angiogenic effect of black rice bran (*Oryza sativa* L. 'Sembada Hitam') on soluble fms-like tyrosine kinase and placental growth factor in preeclampsia. Systematic Reviews in Pharmacy, 12(1), 1594–1597.

Christanto, D.R., Mose, J.C., Yuniarti, T., Bestari, M.B., Purwestri, Y.A., Fauziah, P.N. 2020. The role of black rice bran (*Oryza sativa* L. "Sembada Hitam") on levels of malondialdehyde in induction human umbilical vein endothelial cell serum preeclampsia. Open Journal of Obstetrics and Gynecology, 10, 1686-1692. <https://doi.org/10.4236/ojog.2020.10120152>

Collado, M., Blasco, M. A., Serrano, M. 2007. Cellular senescence in cancer and aging. Cell, 130(2), 223–233. <https://doi.org/10.1016/j.cell.2007.07.003>

Cui, H., Kong, Y., Zhang, H. 2012. Oxidative stress, mitochondrial dysfunction, and aging. Journal of Signal Transduction. <https://doi.org/10.1155/2012/646354>

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. <https://doi.org/10.1016/j.foodchem.2015.08.008>

Deng, G. F., Xu, X. R., Zhang, Y., Li, D., Gan, R. Y., Li, H. Bin. 2013. Phenolic compounds and bioactivities of pigmented rice. Critical Reviews in Food Science and Nutrition, 53(3), 296–306. <https://doi.org/10.1080/10408398.2010.529624>

Dey, S., Roy, S., Deb, N., Sen, K. K., Besra, S.E. 2013. Anti-carcinogenic activity of *Ruellia tuberosa* L. (acanthaceae) leaf extract on hepatoma cell line and increased superoxide dismutase activity on macrophage cell lysate. International Journal Pharmacy Science 5(3):854-861.

Djajanegara, I. dan Wahyudi, P. 2009. Pemakaian sel Hela dalam uji sitotoksitas



fraksi kloroform dan etanol ekstrak daun *Annona squamosa*. Jurnal Ilmu Kefarmasian Indonesia, vol 7(1): 7-11.

Eghbaliferiz, S., dan Iranshahi, M. 2016. Pro-oxidant activity of polyphenols, flavonoids, anthocyanins, and carotenoids: update review of mechanisms and catalysing metals. Phytotherapy Research, 30 (9), 1379-1391.
<https://doi.org/10.1002/ptr5643>

Finocchiaro, F., Ferrari, B., Gianinetti, A. 2010. A study of biodiversity of flavonoid content in the rice caryopsis evidencing simultaneous accumulation of anthocyanins and proanthocyanidins in a black-grained genotype. Journal of Cereal Science, 51, 28-34.
<https://doi.org/10.1016/j.jcs.2009.09.003>

Forster, P. M. Andrew, T., Good, P., Gregory, J. M., Jackson, L. S., Zelinka, M. 2013. Evaluating adjusted forcing and model spread for historical and future scenarios in the CMIP5 generation of climate models. Journal of Geophysical Research: Atmospheres, 118(3). 1139-1150.

Freshney, R. I. 2010. Culture of animal cells: a manual of basic technique and specialized applications, sixth edition, John Wiley & Sons Ltd., Hoboken.
<https://doi.org/10.1002/9780470649367>.

Ghasemzadeh, A., Karbalaii, M. T., Jaafar, H. Z. E., Rahmat, A. 2018. Phytochemical constituents, antioxidant activity, and antiproliferative properties of black, red, and brown rice bran. Chemistry Central Journal, 12(1), 1-13. <https://doi.org/10.1186/s13065-018-0382-9>

Giordano, M. E., Caricato, R., Lionetto, M. G. 2020. Concentration dependence of the antioxidant and prooxidant activity of Trolox in Hela cells: involvement in the induction of apoptotic volume decrease. Antioxidants, 9(11): 1058.
<https://doi.org/10.3390/antiox9111058>

Girsang, E., Ginting, C. N., Lister, I. N. E., Gunawan, K. yashfa, Widowati, W. 2021. Anti-inflammatory and antiaging properties of chlorogenic acid on UV-induced fibroblast cell. Peer Reviewed Journal, 7, 1-15.



<https://doi.org/10.7717/peerj.11419>

Gonçalves, E. M., Ventura, C. Â., Yano, T., Rodrigues Macedo, M. L., Genari, S. C. 2006. Morphological and growth alterations in Vero cells transformed by cisplatin. *Cell Biology International*, 30(6), 485–494.
<https://doi.org/10.1016/j.cellbi.2005.12.007>

Gülden, M., Jess, A., Kammann, J., Maser, E., Seibert, H. 2010. Cytotoxic potency of H₂O₂ in cell cultures: impact of cell concentration and exposure time, *Free Radical Biology and Medicine*. Vol 49: 1298-1305.
<https://doi.org/10.1016/.freeradbiomed.2010.07.015>

Han, D., Chen, W., Gu, X., Shan, R., Zou, J., Liu, G., Shahid, M., Gao, J., Han, B. 2017. Cytoprotective effect of chlorogenic acid against hydrogen peroxide-induced oxidative stress in MC3T3-E1 cells through PI3K/Akt-mediated Nrf2/HO-1 signaling pathway. *Oncotarget*, 8(9), 14680–14692.
<https://doi.org/10.18632/oncotarget.14747>

Han, M., Bae, J., Ban, J., Shin, H., Lee, D., Chung, J. 2018. black rice (*Oryza sativa* L.) extract modulates ultraviolet-induced expression of matrix metalloproteinases and procollagen in a skin cell model. *International Journal Molecular Medicine*. Published online February 22,18.
<https://doi.org/10.3892/ijmm.2018.3508>

Handoko, E., dan Sumilat, W.A. 2011. Metabolisme hidrogen peroksida dan peranannya pada infeksi telinga. *Laboratorium Ilmu Penyakit Telinga Hidung Tenggorokan FK UB*, 1,1-14.

Haryani, R., Harahap, U., Masfria., Satria, D. 2018. Cytoprotective activity of ethanol fraction of *Coleus amboinicus* Lour. leaves against Vero cells induced by H₂O₂. *Asian Journal of Pharmaceutical and Clinical Research*, 11(1). <https://doi.org/10.22159/ajpcr.2018.v11s1.26559>

Haryoto, Muhtadi, Indrayudha, P., Azizah, T., Suhendi, A., Haryoto, Muhtadi, Peni Indrayudha, Tanti Azizah, A. S. 2013. Aktivitas sitotoksik ekstrak etanol tumbuhan sala (*Cynometra ramiflora* Linn) terhadap sel Hela, T47D dan



WiDr. Jurnal Penelitian Saintek, 18:21–28.

Hou, Z., Qin, P., Zhang, Y., Cui, S., Ren, G. 2013. Identification of anthocyanins isolated from black rice (*Oryza sativa L.*) and their degradation kinetics. *Food Research International*, 50(2), 691–697.
<https://doi.org/10.1016/j.foodres.2011.07.037>

Hu, C., Zawistowski, J., Ling, W., Kitts, D. D. 2003. Black rice (*Oryza sativa L. indica*) pigmented fraction suppresses both reactive oxygen species and nitric oxide in chemical and biological model systems. *Journal of Agricultural and Food Chemistry*, 51(18), 5271–5277. <https://doi.org/10.1021/jf034466n>

Hubrecht, R. dan Kirkwood, J. 2011. The UFAW hanbook in the care and management of laboratory animals, edisi 8. USA: Willey Blackwell.

Hwang, G. H., Jeon, Y. J., Han, H. J., Park, S. H., Baek, K. M., Chang, W., Kim, J. S., Kim, L. K., Lee, Y. M., Lee, S., Bae, J. S., Jee, J. G., Lee, M. Y. 2015. Protective effect of butylated hydroxyanisole against hydrogen peroxide-induced apoptosis in primary cultured mouse hepatocytes. *Journal of Veterinary science*, 16(1), 17-23.
<http://dx.doi.org/10.4142/jvs.2015.16.1.17>

Ichikawa, H., Ichiyanagi, T., Xu, B., Yoshii, Y., Nakajima, M., Konishi, T. 2001. Antioxidant activity of anthocyanin extract from purple black rice. *Journal of Medicinal Food*, 4(4), 211–218. <https://doi.org/10.1089/10966200152744481>

Ikawati, Z., Sudjadi, Sismindari., Sari, R. P., Maulani, N. 2002. Efek fraksi protein sejenis RIP (ribosome-inactivating protein) yang diisolasi dari akar *Mirabilis jalapa L.* terhadap proses kematian kultur sel dan raji. *Biologi* 2(13): 769-783.

ISO. 2009. "Biological evaluation of medical devices-part 5: tests for in vitro cytotoxicity", ISO 10993-5, International Organization for Standardization, Geneva, Switzerland.

Jan, R., dan Chaundry, G. S. 2019. Understanding apoptosis and apoptotic pathway targeted cancer therapeutics. *Advances pharmaceutical bulletin*, 9(2), 205.



Je, J. Y., dan Lee, D. B. 2015. *Nelumbo nucifera* leaves protect hydrogen peroxide-induced hepatic damage via antioxidant enzyme and HO-1/Nrf2 activation.

Journal of Food and Function. 6, 1911-1918.
<https://doi.org/10.1039/c5fo00201j>

Jia, N., Kong, B., Liu, Q., Diao, X., Xia, X. 2012. Antioxidant activity of black currant (*Ribes nigrum* L.) extract and its inhibitory effect on lipid and protein oxidation of pork patties during chilled storage. Meat Science, 91: 533-539.
<https://doi.org/10.1016/j.meatsci.2012.03.010>

Jittorntrum, B., Chunhabundit, R., Kongkachuichai, R., Srisala, S., Visetpanit, Y. 2009. Cytoprotective and cytotoxic effects of rice bran extracts on H₂O₂-induced oxidative damage in human intestinal Caco-2 Cells. Thailand Journal Toxicology, 24 (2): 92-100.

Joshi, Y., dan Goyal, B. 2011. Anthocyanins : a lead for anticancer drugs. International Journal of Research in Pharmacy and Chemistry, 1(4), 1119–1126.

Junmarkho, K., dan Hansakul, P. 2019. Thai pigmented rice bran extracts inhibit production of superoxide, nitric oxide radicals and inducible nitric oxide synthase in cellular models. Asian Pasific Journal of Tropical Biomedicine, 9(7): 291-298. <https://doi.org/10.4103/2221-1691.261809>

K Sinha, B. 2013. Roles of free radicals in the toxicity of environmental pollutants and toxicants. Journal of Clinical Toxicology, s12(01).
<https://doi.org/10.4172/2161-0495.s13-e001>

Kaneda, I., Kubo, F., Sakurai, H. 2006. Antioxidative compounds in the extracts of black rice brans. Journal of Health Science, 52(5), 495–511.
<https://doi.org/10.1248/jhs.52.495>

Kang, M. Y., Kim, J. H., Rico, C. W., Nam, S. H. 2011. A comparative study on the physicochemical characteristics of black rice varieties. International Journal of Food Properties, 14(6), 1241–1254.
<https://doi.org/10.1080/10942911003637350>



- Karch, J. dan Molkentin, J. D. 2015. Regulated necrotic cell death. *Circulation Research*. 116: 1800-1809.
- Khaliq, M., Riaz, M., Kanwal, N., Mahmood, I., Khan, A., Bokhari, T. H., Afzal, M. 2017. Evolution of cytotoxicity, antioxidant, and antimicrobial studies of sugarcane (*Saccharum officinarum*) roots extracts. *Journal of the Chemical Society of Pakistan*, 39(1), 152–160.
- Khammanit, R., Lomarat, P., Anantachoke, N., Sato, V. H., Ungsurungsie, M., Mangmool, S. 2017. Inhibition of oxidative stress through the induction of antioxidant enzymes of pigmented rice bran in HEK-293 Cells. *Natural Product Communications*, vol 12 (7): 1107-1110.
- Kicinska, A., dan Szewczyk, A. 2003. Protective effects of the potassium channel opener-diazoxide against injury in neonatal rat ventricular myocytes. *General Physiology and Biophysics* 22: 383-395.
- Kim, S., Kim, M., Kang, M. C., Lee, H. H. L., Cho, C. H., Choi, I., Park, Y., Lee, S. H. 2021. Antioxidant effects of turmeric leaf extract against hydrogen peroxide-induced oxidative stress in vitro in vero cells and in vivo in zebrafish. *Antioxidants*, 10(1), 1–14. <https://doi.org/10.3390/antiox10010112>
- Kiruthika, B. dan P. R. Padma. 2013. Screening of antioxidant properties of *Zea mays* leaves at different time periods of growth. *Journal of Pharmacy Research*, 5(8), 4034-4037.
- Kocyigit, A., dan Selek, S. 2016. Exogenous antioxidants are double-edged Swords. *Bezmialem Science*, 4(2): 70-75. <https://doi.org/10.14235/bs.2016.704>
- Kong, S., Kim, D. J., Oh, S. K., Choi, I. S., Jeong, H. S., Lee, J. 2012. Black rice bran as an ingredient in noodles: chemical and functional evaluation. *Journal of Food Science*, 77(3). <https://doi.org/10.1111/j.1750-3841.2011.02590.x>
- Krga, I., dan Milenkovic, D. 2019. Anthocyanins: from sources and bioavailability to cardiovascular-health benefits and molecular mechanisms of action [review-article]. *Journal of Agricultural and Food Chemistry*, 67(7), 1771–



1783. <https://doi.org/10.1021/acs.jafc.8b06737>

Kristamtini, K., Wiranti, E. W., Sutarno, S. 2018. Variation of pigment and anthocyanin content of local black rice from Yogyakarta on two altitude. *Buletin Plasma Nutfah*, 24(2), 97. <https://doi.org/10.21082/blpn.v24n2.2018.p97-102>

Kristamtini,. Taryono., Basunanda, P., Murti, R. H. 2014. Keragaman genetik kultivar padi beras hitam lokal berdasarkan penanda mikrosatelit. *Jurnal AgroBiogen*, 10(2):69-76.

Kuilman, T., Michaloglou, C., Mooi, W. J., Peeper, D. S. 2010. The essence of senescence. *Genes and Development*, 24(22), 2463–2479. <https://doi.org/10.1101/gad.1971610>

Kumar, R., Kamra, D. N., Agarwal, N., Chaudhary, L. C. 2007. *In vitro* methanogenesis and fermentation of feeds containing oil seed cokes with rumen liquor of buffalo. *Asian-Australasian Journal of Animal Sciences.*, 20 (8): 1196-1200.

Kumar, S., dan Sitasawad, S. L. 2009. N-acetylcysteine prevents glucose/glucose oxide-induced oxidative stress, mitochondrial damage and apoptosis in H9c2 cells. *Life Sciences* 84: 328-336.

Kupcsik, L. 2011. Estimation of cell number based on metabolic activity: the MTT reduction assay. *Methods in Molecular Biology* (Clifton, N.J.), 740, 13–19. https://doi.org/10.1007/978-1-61779-108-6_3

Kurniati, Y., Budijanto, S., Nuraida, L., Nur, F., Dewi, A. 2017. Peningkatan senyawa fenolik bekatul dengan SSF (solid state fermentation) sebagai pencegah kanker enhancement of phenolic compounds of rice bran with SSF (solid state fermentation) for preventing cancer. *Iptek Tanaman Pangan*, 12(2),97–104.

<http://ejurnal.litbang.pertanian.go.id/index.php/ippn/article/view/8175>

Kushwaha, U. K. S. 2016. Black rice: Research, history and development. Springer



International Publishing Switzerland, 1–192. <https://doi.org/10.1007/978-3-319-30153-2>

Lam, L. H. T., Le, N. H., Tuan, L. V., Ban, H. T., Hung, T. N. K., Nguyen, N. T. K., Dang, L. H., Le, N. Q. K. 2020. Machine learning model for identifying antioxidant proteins using features calculated from primary sequences. *Biologi*, 9, 325. <https://doi.org/10.3390/biology9100325>

Laokuldilok, T., Shoemaker, C. F., Jongkaewwattana, S., Tulyathan, V. 2011. Antioxidants and antioxidant activity of several pigmented rice brans. *Journal of Agricultural and Food Chemistry*, 59(1), 193–199. <https://doi.org/10.1021/jf103649q>

Lee, K. S., Kim, S. R., Park, S. J., Park, H. S., Min, K. H., Lee, M. H., Jin, S. M., Jin, G. Y., Yoo, W. H., Lee, Y. C. 2006. Hydrogen peroxide induces vascular permeability via regulation of vascular endothelial growth factor. *American Journal of Respiratory Cell and Molecular Biology*, 35(2), 190–197. <https://doi.org/10.1165/rccb.2005-0482OC>

Lee, S. M., Choi, Y., Sung, J., Kim, Y., Jeong, H. S., Lee, J. 2014. Protective effect of black rice extracts on oxidative stress induced by *tert*-butyl hydroperoxide in HepG2 cells, *Preventive Nutrition and Food Sciences*, 19(4): 348-352. <https://doi.org/10.3746/pnf.2014.19.4.348>

Lee, W., Kang, N., Kim, E., Yang, H. W., Oh, J. Y., Fernando, I. P. S., Kim, K. N., Ahn, G., Jeon, Y. J. 2017. Radioprotective effects of a polysaccharide purified from *Lactobacillus plantarum*-fermented *Ishige okamurae* against oxidative stress caused by gamma ray-irradiation in zebrafish *in vivo* model. *Journal of Functional Foods*, 28: 83-89. <https://doi.org/10.1016/j.jff.2016.11.004>

Lephart, E. D. 2018. Equol's anti-aging effects protect against environmental assaults by increasing skin antioxidant defense and ECM proteins while decreasing oxidative stress and inflammation. *Cosmetics*, 5(1), 1–17. <https://doi.org/10.3390/cosmetics5010016>



Liochev, S. I. 2013. Reactive oxygen species and the free radical theory of aging.

Free Radical Biology and Medicine.

<https://doi.org/10.1016/j.freeradbiomed.2013.02.011>

Lobo, V., Patil, A., Phatak, A., Chandra, N. 2010. Free radicals, antioxidants and functional foods: impact on human health. *Pharmacognosy Reviews*, 4(8), 118–126. <https://doi.org/10.4103/0973-7847.70902>

Looi, C. Y., Arya, A., Cheah, F. K., Muhamram, B., Leong, K. H., Mohamad, K., Wong, W. F., Rai, N., Mustafa, M. R. 2013. Induction of apoptosis in human breast cancer cells via caspase pathway by vernodalin isolated from *Centratherum anthelminticum* (L.) seeds. *PLoS ONE*, 8(2). <https://doi.org/10.1371/journal.pone.0056643>

López-Otín, C., Blasco, M. A., Partridge, L., Serrano, M., Kroemer, G. 2013. The hallmarks of aging. *Cell*, 153(6): 1194. <https://doi.org/10.1016/j.cell.2013.05.039>

Lu, J. M., Lin, P. H., Yao, Q., Chen, C. 201). Chemical and molecular mechanisms of antioxidant: experimental approaches and model system. *Journal Cell Molecular Medicine*, 14:840-860. <https://doi.org/10.1111/j.1582-4934.2009.00897.x>

Luna-Vargas, M. P., dan Chipuk, J. E. 2016. The deadly landscape of pro-apoptotic Bcl-2 proteins in the outer mitochondrial membrane. *The Federation European Biochemical Societies journal*, 283(14), 2676-2689.

Lv, R., Du, L., Lu, C., Wu, J., Ding, M., Wang, C., Mao, N., Shi, Z. 2017. Allicin protects against H₂O₂-induced apoptosis of PC12 cells via the mitochondrial pathway. *Experimental and therapeutic medicine*, 14: 2053-2059. <https://doi.org/10.3892/etm.2017.4725>

Machana, S., Weerapreeyakul, N., Barusrux, S., Nonpunya, A., Sripanidkulchai, B., Thitimetharoch, T. 2011. Cytotoxic and apoptotic effects of six herbal plants against the human hepatocarcinoma (HepG2) cell line. *Chinese Medicine*, 6(1), 39. <https://doi.org/10.1186/1749-8546-6-39>



- Masruroh, L., Juswono, U. P., Wardoyo, A. 2014. Pengaruh emisi partikel ultrafine asap pembakaran biomassa terhadap organ paru-paru mencit (*Mus musculus*) berdasarkan Gambaran Mikroskopinya. Brawijaya Physics Student Journal. 1-4.
- Matsuura, K., Canfield, K., Feng, W., Kurokawa, M. 2016. Metabolic regulation of apoptosis in cancer. International Review of Cell and Molecular Biology Vol. 327. Elsevier. <https://doi.org/10.1016/bsircmb.2016.06.006>
- McCool, K. W., dan Miyamoto, S. 2012. DNA damage-dependent NF-kappaB activation: NEMO turns nuclear signaling inside out. Immunological Reviews. 246, 311-326.
- McHugh, D., dan Gil, J. 2017. Senescence and aging: causes, consequences, and therapeutic avenues. Journal Cell Biology. <https://doi.org/10.1083/jcb.201708092>
- Moglad, E. H. O., Abdalla, O. M., Koko, W. S., Saadabi, A. M. 2014. In vitro anticancer activity and cytotoxicity of *Solarium nigrum* on cancers and normal cell lines. International Journal of Cancer Research, 10(2), 74–80. <https://doi.org/10.3923/ijcr.2014.74.80>
- Muktisari, R. D., & Hartati, F. K. 2018. Analisis aktivitas antioksidan pada beras hitam dan tepung beras hitam (*Oryza sativa L. indica*). Food science technology, 1(1), 20–27. <https://doi.org/10.25139/fst.v1i1.1002>
- Muñoz-Espín, D., dan Serrano, M. 2014. Cellular senescence: from physiology to pathology. Nature Reviews Molecular Cell Biology, 15(7), 482–496. <https://doi.org/10.1038/nrm3823>
- Nikoletopoulou, V., Markaki, M., Palikaras, K., Tavernarakis, N. 2013. Crosstalk between apoptosis, necrosis, and autophagy. Biochimica et Biophysica Acta vol, 1833: 3448-3459.
- Nor Kaspia, R., Yuni Nur Hidayati, D., Widayati, A. 2016. The infection effect of strain H37rv mycobacterium tuberculosis on apoptosis of mice's neuron cell



brain (*Mus Musculus*). Malang Neurology Journal, 2(2).
<https://doi.org/10.21776/ub.mnj.2016.002.02.2>

Nurani, L. H. 2012. Uji sitotoksitas dan antiproliferatif sel kanker payudara t47d dan sel Vero biji *Nigella sativa*, L. Pharmaciana, 2(1).
<https://doi.org/10.12928/pharmaciana.v2i1.637>

Nurdyansyah, F. 2017. Stres oksidatif dan status antioksidan. Jendela Olahraga, 2(1), 105–109.

Nuriliani, A., Nakahata, Y., Ahmed, R., Khaidizar, F. D., Matsui, T., Bessho, Y. 2020. Over-expression of nicotinamide phosphoribosyltransferase in mouse cells confers protective effect against oxidative and ER stress-induced premature senescence. Molecular Biology Society of Japan and John Wiley & Sons Australia, Ltd. Genes Cells, 25:593-602.
<https://doi.org/10.1111/gtc.12794>

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 pp, 1-11.
<https://doi.org/10.1093/dnares/dsu029>.

Palungwachira, P., Tancharoen, S., Dararat, P., Nararatwanchai, T. 2020. Anthocyanins isolated from *Oryza sativa* L. protect dermal fibroblast from hydrogen peroxide-induced cell death. Journal of Natural Science Biology and Medicine. https://doi.org/10.4103/jnsbm.JNSBM_171_19

Pang, Y., Ahmed, S., Xu, Y., Beta, T., Zhu, Z., Shao, Y., Bao, J. 2018. Bound phenolic compounds and antioxidant properties of whole grain and bran of white, red and black rice. Food Chemistry, 240, 212–221.
<https://doi.org/10.1016/j.foodchem.2017.07.095>

Pangkahila, W. 2007. Anti-aging medicine: memperlambat penuaan meningkatkan kualitas hidup. Jakarta: Kompas Media Nusantara.



- Park, W. H. 2014. Anti-apoptotic effect of caspase inhibitors on H₂O₂-treated HeLa cells through early suppression of its oxidative stress. *Oncology reports* 31: 2413-2421.
- Pereira-Caro, G., Watanabe, S., Crozier, A., Fujimura, T., Yokota, T., Ashihara, H. 2013. Phytochemical profile of a Japanese black-purple rice. *Food Chemistry*, 141(3), 2821–2827. <https://doi.org/10.1016/j.foodchem.2013.05.100>
- Pham-Huy, L. A., He, H., Pham-Huy, C. 2008. Free radicals, antioxidants in disease and health. *International Journal of Biomedical Science*, 4(2), 89–96.
- Phaniendra, A., Jestadi, D. B., Periyasamy, L. 2015. Free radicals: properties, sources, targets, and their implication in various diseases. *Indian Journal of Clinical Biochemistry*, 30(1), 11–26. <https://doi.org/10.1007/s12291-014-0446-0>
- Phetpornpaisan, Pornpimpa, Sutthanut, K., Jay, M., Tippayawat, P. 2014. Local Thai cultivar glutinous black rice bran: a source of functional compounds in immunomodulation, cell viability and collagen synthesis, and matrix metalloproteinase-2 and -9 inhibition. Elsevier Ltd, vol 7, 650-661.
- Pisoschi, A. M., dan Pop, A. 2015. The role of antioxidants in the chemistry of oxidative stress: A review. *European Journal of Medicinal Chemistry* (Vol. 97, pp. 55–74). Elsevier Masson SAS. <https://doi.org/10.1016/j.ejmech.2015.04.040>
- Pistrutto, G., Trisciuglio, D., Ceci, C., Alessia Garufi, D’Orazi, G. 2016. Apoptosis as anticancer mechanism: function and dysfunction of its modulators and targeted therapeutic strategies. *Aging*, 8(4), 603–619. <https://doi.org/10.18632/aging.100934>
- Pole, A., Dimri, M., P. Dimri, G. 2016. Oxidative stress, cellular senescence and ageing. *AIMS Molecular Science*, 3(3), 300–324. <https://doi.org/10.3934/molsci.2016.3.300>
- Procházková, D., Boušová, I., Wilhelmová, N. 2011. Antioxidant and prooxidant



properties of flavonoids. Fitoterapia, 82(4), 513-523.
<https://doi.org/10.1016/j.fitote.2011.01.018>

Ransy, C., Vaz, C., Lombès, A., Bouillaud, F. 2020. Use of H₂O₂ to cause oxidative stress, the catalase issue. International Journal of Molecular Sciences, 21(23), 1–14. <https://doi.org/10.3390/ijms21239149>

Ratnaningsih, N., dan Ekawatiningsih, D. P. 2010. Potensi beras hitam sebagai sumber antosianin dan aplikasinya pada makanan tradisional Yogyakarta. Hasil Penelitian Dosen Universitas Negeri Yogyakarta Tahun, 5, 173–174.

Rejeki, Sri. 2016. Kesehatan dan keselamatan Kerja. Kementerian Kesehatan Republik Indonesia.

Rodríguez-Pérez, C., Quirantes-Piné, R., Fernández-Gutiérrez, A., Segura-Carretero, A. 2015. Optimization of extraction method to obtain a phenolic compounds-rich extract from *Moringa oleifera* Lam leaves. Industrial Crops and Products, 66, 246–254. <https://doi.org/10.1016/j.indcrop.2015.01.002>

Rosdiana, A., dan Hadisaputri, E. 2013. Review artikel: studi pustaka tentang prosedur kultur sel. Farmaka, 14(1), 236–249.

Rukmana, R. M., Soesilo, N. P., Pratiwi, R. 2016. The effect of ethanolic extract of black and white rice bran (*Oryza sativa L.*) on Cancer Cells. International Journal of Biotechnology, 21(1), 63–69.

Ruzic, I., Skerget, M., Knez, Z. 2010. Potential of phenolic antioxidant. Acta Chimica Slovenica, 57, 263-271.

Safrida, Budijanto, S., Nuraida, L., Priosoeryanto, B. P., Saepuloh, U., Marya, S. S., Ardiansyah, Shirakawa, H. 2022. Fermented black rice bran extract inhibit colon cancer proliferation in WiDr cell lines. Food Science and Technology, 42. <https://doi.org/10.1590/fst.14422>

Sak, K. 2014. Dependence of DPPH radical scavenging activity of dietary flavonoid quercetin on reaction environment. Mini Review Medicine Chemistry. 14, 494-504.

Salama, R., Sadaie, M., Hoare, M., Narita, M. 2014. Cellular senescence and its



effector programs. Genes and Development, 28(2), 99–114.
<https://doi.org/10.1101/gad.235184.113>

Salmon, A. B., Richardson, A., Pérez, V. I. 2010. Update on the oxidative stress theory of aging: does oxidative stress play a role in aging or healthy aging? Free Radical Biology and Medicine, 48(5), 642–655.
<https://doi.org/10.1016/j.freeradbiomed.2009.12.015>

Sangkitikomol, W., Tencomnao, T., Rocejanasaroj, A. 2010. Antioxidant effects of anthocyanins-rich extract from black sticky rice on human erythrocytes and mononuclear leukocytes. African Journal of Biotechnology, Vol 9, 8222-8229. <https://doi.org/10.5897/AJB10.827>

Sari, L. M. 2018. Apoptosis: mekanisme molekuler kematian sel. Cakradonya Dental Journal, 10(2), 65–70. <https://doi.org/10.24815/cdj.v10i2.11701>

Savitri, I., Suhendra, L., Wartini, N. M. 2017. Pengaruh jenis pelarut pada metode maserasi terhadap karakteristik ekstrak *Sorgassum polycystum*. Jurnal Rekayasa dan Manajemen Agroindustri, 5(3), 93–101.

Sayekti, F. D. J., dan Taufiq Qurrohman, M. 2019. Aktivitas antiangiogenesis ekstrak beras hitam (*Oryza sativa L. indica*) pada chorioalantoic membrane (Cam) sebagai kandidat antikanker. Indonesian Journal Of Applied Sciences, 8(1). <https://doi.org/10.24198/ijas.v8i1.18654>

Sayekti, P. R. 2019. Apoptosis induction on human breast cancer T47D cell line by extracts of Ancorina sp . [version 2 ; peer review : 2 approved with reservations] Woro Anindito Sri Tunjung Referee Status : 1–15.

Seawan, N., Vichit, W., Thakam, A., Chaiwut, P., Pintathong, P. 2014. Antioxidant capacities , phenolic , anthocyanin and proanthocyanidin contents of pigmented rice extracts obtained by microwave-assisted method. Journal of Science and Technology, 21(4), 301–306.
<https://doi.org/10.14456/sjst.2014.32>

Sen, S., Chakraborty, R., Sridhar, C., Reddy, Y. S. R., De, B. 2010. Free radicals,



antioxidants, disease and phytomedicines: current status and future prospect.

International Journal of Pharmaceutical Science Review and Research vol 3(1).

Seto, S. W., Chang, D., Ko, W. M., Zhou, X., Kiat, H., Bensoussan, A., Lee, S. M. Y., Hou, M. P. M., Steiner, G. Z., Liu, J. 2017. Sailuotong prevent hydrogen peroxide (H₂O₂)-induced injury in HY926 Cells. International Journal Molecular Sciences. 18, 95. <https://doi.org/10.3390/ijms18010095>

Shao, S. X., Zhang, L., Chen H. X., Liu, Y., Zhang, J. P., Chen, W., Xue, G. Y. 2012. Diazoxide pretreatment enhances L6 skeletal myoblast survival and inhibits apoptosis induced by hydrogen peroxide. Wiley Periodicals. 295: 632-640.

Shatrova, A. N., Lyublinskaya, O. G., Borodkina, A. V., Burova, E. B. 2016. Oxidative stress response of human fibroblasts and endometrial mesenchymal stem cells. Pleiades Publishing, Ltd. 10(1): 18-28. <https://doi.org/10.1134/S1990519X16010090>.

Shen, Y., Jin, L., Xiao, P., Lu, Y., Bao, J. 2009. Total phenolics, flavonoids, antioxidant capacity in rice grain and their relations to grain color, size and weight. Journal of Cereal Science, 49(1): 106–111. <https://doi.org/10.1016/j.jcs.2008.07.010>

Sisinni, L., Pietrafesa, M., Lepore, S., Maddalena, F., Condelli, V., Esposito, F., Landriscina, M. 2019. Endoplasmic reticulum stress and unfolded protein response in breast cancer: The balance between apoptosis and autophagy and its role in drug resistance. International Journal of Molecular Sciences, 20(4). <https://doi.org/10.3390/ijms20040857>

Song, S., Lee, Y. M., Lee, Y. Y., Yeum, K. J. 2021. Oat (*Avena sativa*) extract against oxidative stress-induced apoptosis in human keratinocytes. Molecules, 26(18). <https://doi.org/10.3390/molecules26185564>



- Stone, J. R., dan Yang, S. 2006. Hydrogen peroxide: a signaling messenger. *Antioxidant and Redox Signaling*, 8, no. 3-4, pp 243-270.
<https://doi.org/10.1089/ars.2006.8.243>
- Sun, N., Youle, R. J., Finkel, T. 2016. The mitochondrial basis of aging. *Molecular Cell*, 61(5), 654–666. <https://doi.org/10.1016/j.molcel.2016.01.028>
- Symonowicz, M., dan Kolanek, M. 2012. Flavonoids and their properties to form chelate complexes. *Biotechnology Food Sciences*, 76(1): 35-41.
- Tan, X. W., Bhave, M., Fong, A. Y. Y., Matsuura, E., Kobayashi, K., Shen, L. H., Hwang, S. S. 2016. Cytoprotective and cytotoxic effects of rice bran extracts in rat H9c2 (2-1) cardiomyocytes. *Oxidative Medicine and Cellular Longevity*, <https://doi.org/10.1155/2016/6943053>
- Tiwari, B. K. 2015. Ultrasound: a clean, green extraction technology. *Trends in Analytical Chemistry*, 71, 100–109. <https://doi.org/10.1016/j.trac.2015.04.013>
- Tjitrosoepomo, G. 2005. Morfologi tumbuhan. Yogayakarta: Universitas Gadjah Mada.
- Tunjung, W. A. S., Sayekti, P. R. 2019. Apoptosis induction on human breast cancer T47D cell line by extracts of *Ancorina* sp. F1000 Research, 8:168.
<https://doi.org/10.12688/f1000research.17584.2>
- Vajrabhaya, L. ongthong, Korsuwannawong, S. 2018. Cytotoxicity evaluation of a Thai herb using tetrazolium (MTT) and sulforhodamine B (SRB) assays. *Journal of Analytical Science and Technology*, 9(1).
<https://doi.org/10.1186/s40543-018-0146-0>
- Wang, L., Oh, J. Y., Kim, H. S., Lee, W. W., Cui, Y., Lee, H. G., Kim, Y. T., Ko, J. Y., Jeon, Y. J. 2018. Protective effect of polysaccharides from celluclast-assisted extract of *Hizikia fusiforme* against hydrogen peroxide-induced oxidative stress in vitro in Vero cells and in vivo in zebrafish. *International Journal of Biological Macromolecules*, 112, 483–489.
<https://doi.org/10.1016/j.ijbiomac.2018.01.212>



- Wang, L., Ryu, B., Kim, W. S., Kim, G. H., Jeon, Y. J. 2017. Protective effect of gallic acid derivatives from the freshwater green alga *Spirogyra* sp. against ultraviolet B-induced apoptosis through reactive oxygen species clearance in human keratinocytes and zebrafish. *Algae*, 32(4): 379-388.
<https://doi.org/10.4490/algae.2017.32.11.29>
- Wati, E. M., Puspaningtyas, A. R., Pangaribowo, D. A. 2016. Uji sitotoksitas dan proliferasi senyawa 1- (4-nitrobenzoiloksi- metil) -5-fluorourasil) terhadap sel kanker payudara MCF-7. *E-Journal Pustaka Kesehatan*, 4(3), 484–488.
- Widjaya, M. 2012. Ekstraksi annonaceous acetogenin dari daun sirsak (*Annona muricata*) sebagai senyawa bioaktif antikanker [skripsi]. Depok: UI.
- Widlansky, M. E., dan Guterman, D. D. 2011. Regulation of endothelial function by mitochondrial reactive oxygen species. *Antioxidant Redox Signal*, 15: 1517-1530. <https://doi.org/10.1089/ars.2010.3642>
- Wu, L., Xi, Z., Guo, R., Liu, S., Yang, S., Liu, D., Dong, S., Guo, D. 2013. Exogenous ARC down-regulates caspase-3 expression and inhibits apoptosis of broiler chicken cardiomyocytes exposed to hydrogen peroxide. *Avian Pathology*, 42(1), 32–37. <https://doi.org/10.1080/03079457.2012.757289>
- Wurstle, M. L., laussmann, M. A., Rehm, M. 2012. The central role of initiator caspase-9 in apoptosis signal transduction and the regulation of its activation and activity on the apoptosome. *Experimental Cell Research. Special Issue-Cell Death* 318: 1213-1220.
- Xiang, J., Wan, C., Guo, R., Guo, D. 2016. Is hydrogen peroxide a suitable apoptosis inducer for all cell types?. *BioMed Research International*, <https://doi.org/10.1155/2016/7343965>
- Xiao, Y., Li, X., Cui, Y., Zhang, J., Liu, L., Xie, X., Hao, H., He, G., Kander, M. C., Chen, M., Liu, Z., Verfaillie, C. M., Zhu, H., Lei, M., Liu, Z. 2014. Hydrogen peroxide inhibits proliferation and endothelial differentiation of bone marrow stem cells partially via reactive oxygen species generation. *Life Sciences*, 112(1–2), 33–40. <https://doi.org/10.1016/j.lfs.2014.07.016>



- Xie, J., Xu, Y., Huang, X., Chen, Y., Fu, J., Xi, M. dan Wang, L. 2015. Berberine-induced apoptosis in human breast cancer cells is mediated by reactive oxygen species generation and mitochondrial-related apoptotic pathway. *Tumor Biology*, 36(2), 1279-1288.
- Xu, C. H., Wang, H. X., Tang, F. T., Lu, M. L., Han, R. H., Mei, M., Hu, J. 2016. Protective effect of Astragaloside IV on dysfunction of human umbilical vein endothelial cells induced by hydrogen peroxide induced oxidative stress and cell dysfunction via inhibiting eNOS uncoupling and NADPH oxidase – ROS – NF-κB pathway. *Chinese Journal Experimental Traditional Medical Formulae*, 21, 101-104. <https://doi.org/10.1139/cjpp-2015-0572>
- Xu, X., Xu, Y., Zhang, Q., Yang, F., Yin, Z., Wang, L., Li, Q. 2019. Porcine epidemic diarrhea virus infections induce apoptosis in Vero cells via a reactive oxygen species (ROS)/p53, but not p38 MAPK and SAPK/JNK signalling pathway. *Venetary Microbiology* 232: 1-12. <https://doi.org/10.1016/j.vetmic.2019.03.028>
- Yoon, J., Ham, H., Sung, J., Kim, Y., Choi, Y., Lee, J. S., Jeong, H. S., Lee, J., Kim, D. 2014 Black rice extract protected HepG2 cells from oxidative stress-induced cell death via ERK1/2 and Akt activation. *Nutrition Research and Practice* Vol 8(2): 125-131. <https://doi.org/10.4162/nrp.2014.8.2.125>
- Yuan, J., Lu, Y., Wang, H., Feng, Y., Jiang, S., Gao, X. H., Qi, R., Wu, Y., Chen, H. D. 2020. Paeoniflorin resists H₂O₂-induced oxidative stress in melanocytes by JNK/Nrf2/HO-1 pathway. *Frontiers Pharmacology*. 11:536. <https://doi.org/10.3389/fphar.2020.00536>
- Yulianingtyas, A., dan Kusmartono, B. 2016. Optimasi volume pelarut dan waktu maserasi pengambilan flavonoid daun belimbing wuluh (*Averrhoa bilimbi* L.) *Jurnal Teknik Kimia*, 10(2):58-64.
- Zakkar, M., Guida, G., Suleiman, M. S., Angelini, G. D. 2015. Cardiopulmonary bypass and oxidative stress. *Oxidative Medicine and Cellular Longevity*, 10–12. <https://doi.org/10.1155/2015/189863>



- Zhai, H., Chen, Q. J., Gao, X. M., Ma, Y. T., Chen, B. D., Yu, Z. X., Li, X. M., Liu, F., Xiang, Y., Xie, J., Yang Y. N. 2015. Inhibition of the NF-κB pathway by R65 ribozyme gene via adeno-associatedvirus serotype 9 ameliorated oxidized LDL induced human umbilical vein endothelial cell injury. International Journal of Clinical and Experimental Pathology 8: 9912-9921.
- Zhang, Q. W., Lin, L. G., Ye, W. C. 2018. Techniques for extraction and isolation of natural products: A comprehensive review. Chinese Medicine (United Kingdom), 13(1), 1–26. <https://doi.org/10.1186/s13020-018-0177-x>
- Zhao, X., Fang, J., Li, S., Gaur, U., Xing, X., Wang, H., Zheng, W. 2019. Artemisinin attenuated hydrogen peroxide (H₂O₂-induced oxidative injury in SH-SY5Y and hippocampal naurons via the activation of AMPK Pathway. International Journal of Molecular Sciences, 20(11):2680. doi: 10.3390/ijms20112680.
- Zitka, O., Skalickova, S., Gumulec, J., Masarik, M., Adam, V., Hubalek, J., Trnkova, L., Kruseova, J., Eckschlager, T., Kizek, R. 2012. Redox status expressed as GSH:GSSG ratio as a marker for oxidative stress in paediatric tumour patients. Oncology Letters, 4(6), 1247–1253. <https://doi.org/10.3892/ol.2012.931>
- Zulfafamy, K. E., Ardiansyah, Budijanto, S. 2018. Antioxidative properties and cytotoxic activity against colon cancer cell WiDr or *Rhizopus oryzae* and *Rhizopus Oligosporus*-fermented black rice bran extract. Current Research in Nutrition and Food Science, 6(1): 23-34. <https://doi.org/10.12944/CRNFSJ.6.1.03>