

DAFTAR PUSTAKA

- Abbas, O., G. Compere., Y. Larondelle., D. Pompeu., H. Rogez., V. Beaten. 2017. Phenolic compound explorer: a mid-infrared spectroscopy, 92: 111-118.
- Afrianti, L. H., E. Y., S. Sukandar., Ibrahim dan I. K. Adnyana. 2010. Senyawa asam 2-metilester-1-h-pirol-4-karboksilat dalam ekstrak etil asetat buah salak varietas bongkok sebagai antioksidan dan antihyperuricemia. J. Teknol. dan Industri Pangan, 21(1): 66-72.
- Agustini, N. W. S dan N. Febria. 2019. Hidrolisis biomassa mikroalga *Porphyridium cruentum* menggunakan asam (H_2SO_4) dan (HNO_3) dalam produksi bioetanol. Jurnal Kimia dan Kemasan, 41(1): 1-10.
- Ahmad, A. R., A. Mun'im., B. Elya. 2012. Study of antioxidant activity with reduction of DPPH radical and xanthine oxidase inhibitor of the extract of *Ruella tuberosa* linn leaf. International Research Journal of Pharmacy, 3(11): 66-70.
- Ale, M.T., J. D. Mikkelsen., and A. S. Meyer. 2011. Important determine for fucoidan bioactivity: a critical review of structure-function relations and extraction methods for fucose-containing sulfated polysaccharides from brown seaweeds. Marine Drugs, 9: 2106-2130.
- Algaebase. 2016. <https://www.algaebase.org/>. Diakses tanggal 1 Desember 2019.
- Aliyu, A. B., M. A. Ibrahim., A. M. Musa., A. O. Musa., J. J. Kiplimo. A. O. Oyewale. 2013. Free radical scavenging and total antioxidant capacity of root extracts of anchomanes difformis engl. (araceae). Acta Poloniae Pharmaceutica - Drug Research, 70(1): 115-121.
- Anand, S.P., S. Deborah., and G. Velmurugan. 2018. Evaluation of antioxidant activity of some wild edible fruits collected from boda and kolli hills. The Journal of Phytopharmacology, 7(2): 127-133.
- Aruoma, O. I. 1998. Free radicals, oxidative stress, and antioxidants in human health and disease. Journal of the American Oil Chemists' Society, 75(2), 199–212.
- Ayunani, F. Z. 2020. Aktivitas Antioksidan Fukoidan Dari *Sargassum hystrix* yang Diekstrak Menggunakan $CaCl_2$. Fakultas Pertanian, Universitas Gadjah Mada. Skripsi.
- Babuponnusami, A. dan K. Muthukumar. 2013. A review on Fenton and improvements to the fenton process for wastewater treatment. Journal of Environmental Chemical Engineering, 2: 557–572.
- Batool, R., M. R. Khan., M. Sajid., S. Ali., Z. Zahra. 2019. Estimation of phytochemical constituents and in vitro antioxidant potencies of *Brachychiton populneus* (Schott & Endl.) R.Br. BMC Chemistry, 13(32): 1-15.

- Bilan, M. I., A. A. Gracev., A. S. Shashkov., N. E. Nifantiev., A. I. Usov. 2006. Structure of a fucoidan from the brown seaweed *Fucus serratus* L. Carbohydrate Research, 341: 238-245.
- Bird, G. M., and P. Hass. 1931. On the nature of the cell wall constituents of *Laminaria* sp. mannuronic acid. Biochem. J, 25: 403–411.
- Budhiyanti, S. A., S. Raharjo., D. W. Marseno., I. Y. B. Lelana. 2011. Free radical scavenging, metal chelating and singlet oxygen quenching activity of fractionated brown seaweed *Sargassum hystrix* extract. J. Biol. Sci., 11: 288-298.
- Cacace, J. E., G. Mazza. 2003. Mass transfer process during extraction of phenolic compounds from milled berries. Journal of Food Engineering, 59: 379-389.
- Clarke G. K. N., C. H. Ting, C. H. Wiart., J. Fry. 2013. High correlation of (2,2-diphenyl-1-picrylhydrazyl) (DPPH) radical scavenging, ferric reducing activity potential and total phenolics content indicates redundancy in use of all three assays to screen for Antioxidant activity of extract of plants from the malaysian rainforest. Antioxidant. 2(1): 1-10.
- Day, R. A. dan A. L. Underwood. terj. R Soendoro. 1986. Analisa Kimia Kuantitatif, edisi ke-4. Penerbit Erlangga. Jakarta.
- Devi, G. K., K. I. Manivannan., G. Thirumaran., F. A. A. Rajathi., P. Anantharaman. 2011. In vitro antioxidant activities of selected seaweeds from southeast coast of india. Asian Pacific Journal of Tropical Medicine: 205-211.
- Djapiala, F. Y., L. A. D. Y. Montolalu., F. Mentang. 2013. Kandungan total fenol dalam rumput laut *Caulerpa racemosa* yang berpotensi sebagai antioksidan. Jurnal Media Teknologi Hasil Perikanan. 1(2): 1-5.
- Dodgson, K. S., and R. G. Price. 1962. A note on determination of ester sulphate content of sulphated polysaccharides. Biochemical, 84(1): 106–110.
- Dubois, M., K. A. Gilles., J. K. Hamilton., P. A. Rebers., F. Smith. 1956. Colorimetric method for determination of sugars and related substances. Analytical Chemistry, 28(3): 350–356.
- Fernando, I. P. S., K. K. A. Sanjeewa., K. W. Samarakoon., W. W. Lee., S. H. Kim., E. A. Kim., U. K. D. S. S. Gunasekara., D. T. U. Abeytunga., C. Nanayakkara., E. D. Silva., H. S. Lee., Y. J. Jeon. 2017. FTIR characterization and antioxidant activity of water soluble crude polysaccharides of Sri Lankan marine algae. Algae, 32(1): 75-86.
- Gazali, M., Nurjanah., N. P. Zamani. 2018. Eksplorasi senyawa bioaktif alga coklat *Sargassum* sp. agardh sebagai antioksidan dari pesisir barat aceh. JPHPI, 21(1): 167-178.

- Gohari, A. R., H. Hajimehdipoor., S. Saeidnia., Y. Ajani., A. Hadjiakhoondi. 2011. Antioxidant activity of some medicinal species using FRAP assay. *Journal of Medicinal Plants*, 10(37): 1-8.
- Guedes, C. A. E., M. A. D. S. Araujo., A. K. P. Saoza., L. I. O. D. Saoza., L. D. D. Barros., F. C. D. A. Maranhao., A. E. G. Sant'Ana. 2012. Antifungal Activities of Different Extracts of Marine Macroalgae Against Dermatophytes and *Candida* Species. *Mycopathologia and Candida Species*: 223–232.
- Gupta, S. and N. Abu-Ghannam. 2011. Bioactive Potential and Possible Health Effects of Edible Brown Seaweeds. *Trends Food Sci. Technol*, 22: 315-326.
- Hagiwara, H. 2010. La Jolla, CA, US Patent No. Patentdocs: H. Foundation.
- Handayani, Tri. 2014. Rumput laut sebagai sumber polisakarida bioaktif. *Oseana*, 39(2): 1-11.
- Hardouin, K. A. S., A. Burlot., A. Umami., V. Tanniou., I. Stiger-Pouvreau., G. Widowati., N. Bedoux., Bourgougnon. 2013. Biochemical and antiviral activities of enzymatic hydrolysates from different invasive French seaweeds. *International Seaweed Symposium*, 26(2): 1029-1042.
- Hayashi, S., A. Itoh., K. Isoda., M. Kondoh., M. Kawase., K. Yagi. 2008. Fucoidan partly prevents CCl₄-induced liver fibrosis. *European Journal of Pharmacology*, 580: 380-384.
- Hifney, A. F., M. A. Fawzy., K. M. A. Gawad., M. Gomaa. 2016. Industrial optimization of fucoidan extraction from *Sargassum* sp. and its potential antioxidant and emulsifying activities. *Food Hydrocolloids*, 54: 77-88.
- Holdt, S. L. and S. Kraan. 2011. Bioactive compounds in seaweed: functional food applications and legislation. *J. App. Phycol* 23: 543-597.
- Imbs, N., M. Shevchenko., S. V. Sukhoverkhov., T. L. Semenova., A. V. Skriptsova., T. N. Zvyagintseva. 2009. Seasonal variations of the composition and structural characteristics of polysaccharides from the brown alga *Costaria costata*. *Chemistry of Natural Compounds*, 45(6): 786-791.
- Izmi, N. 2020. Aktivitas antioksidan fukoidan Ddri *Sargassum hystrix* yang diekstrak menggunakan HCl. Fakultas Pertanian, Universitas Gadjah Mada. Skripsi.
- January, G. G., R. K. Naidoo., B. Kirby-McCullough., R. Baurer. 2019. Assessing methodologies for fucoidan extraction from South African brown algae. *Algal Research*, 40: 1-8.
- Jeeva, S., J. Marimuthu., C. Domettila., Anantham., M. Mahesh. 2012. Preliminary phytochemical studies on some selected seaweeds from Gulf of Mannar, India. *Asian Pacific Journal of Tropical Biomedicine*: 30-33.
- Kadi, A. 2007. Beberapa Catatan Kehadiran Marga *Sargassum* di Perairan Indonesia. Pusat Penelitian Oseanografi. LIPI. Jakarta.

- Kartini, A. 2020. Aktivitas antioksidan fukoidan dari *Sargassum hystrix* yang diekstrak menggunakan etanol. Fakultas Pertanian, Universitas Gadjah Mada. Skripsi.
- Kurutas, E. B. 2016. The importance of antioxidants which play the role in cellular response against oxidative/nitrosative stress: current state. *Nutritional Journal*, 15(71): 1-22.
- Kylin, H. 1913. Biochemistry of sea algae. *H. Z. Physiol. Chem*, 83: 171–197.
- Laeliocattleya, R. A., Yunianta., A. F. Suloi., P. P. Gayatri., N. A. Putri., Y. C. Anggraeni. 2020. Fucoidan Content from Brown Seaweed (*Sargassum filipendula*) And Its Potential As Radical Scavenger. *Journal of Physic*: 1-6.
- Lanigan R. S., T. A. Yamarik. 2002. Final report on the safety assessment of EDTA, calcium disodium EDTA, diammonium EDTA, dipotassium EDTA, disodium EDTA, TEA-EDTA, tetrasodium EDTA, tripotassium EDTA, trisodium EDTA, HEDTA, and trisodium HEDTA. *International Journal of Toxicology*, 21(2): 95-142.
- Li, X. 2013. Solvent effects and improvements in the deoxyribose degradation assay for hydroxyl radical-scavenging. *Food Chemistry*, 141: 2083-2088.
- Li, B., F. Lu., X. Wei., R. Zhao. 2008. Fucoidan: Structure and bioactivity. *Molecules*, 13: 1671-1695.
- Lien, D. T. P., P. T. B. Tram., H. T. Toan. 2015. Effects of extraction process on phenolic content and antioxidant activity of soybean. *Journal of Food and Nutrition Sciences*, 3(1-2): 33-38.
- Lim, S. J., W. M. W. Aida., M. Y. Maskat., J. Latip., K. H. Badri., O. Hassan., B. M. Yamin. 2016. Characterisation of fucoidan extracted from Malaysian *Sargassum binderi*. *Food Chemistry*, 209: 267–273.
- Lim, S. J., W. M. W. Aida., M. Y. Maskat., S. Mamot., J. Ropien., D. M. Mohd. 2014. Isolation and antioxidant capacity of fucoidan from selected malaysian seaweeds. *Food Hydrocolloids*, 42: 280-288.
- Liu, X., B. Liu., X. L. Wei., Z. L. Sun., C. Y. Wang. 2016. Extraction, fractionation, and chemical characterisation of fucoidans from the brown seaweed *Sargassum pallidum*. *Czech J. Food Sci.*, 34 (5): 406–413.
- Mak, W., S. K. Wang., T. Liu., N. Hamid., Y. Li., J. Lu., W. L. White. 2014. Anti-proliferation potential and content of fucoidan extracted from sporophyll of New Zealand *Undaria pinnatifida*. *Nutrition and Food Science Technology*, 1: 1-10.
- Mak, W., N. Hamid., T. Liu., J. Lu., W. L. White. 2013. Fucoidan from New Zealand *Undaria pinnatifida*: Monthly variations and determination of antioxidant activities. *Carbohydrate Polymers*, 95(1): 606–614.
- Mak, W. W. F. 2012. Extraction, characterization and antioxidant activity of fucoidan from New Zealand *Undaria pinnatifida* (Harvey) Suringar. Faculty of Health and Environmental Sciences, Auckland University of Technology. Thesis.

- Matuszewska, A., M. Jaszek., D. Stefaniuk., T. Ciszewski., L. Matuszewski. 2018. Anticancer, antioxidant, and antibacterial activities of low molecular weight bioactive subfractions isolated from cultures of wood degrading fungus *Cerren unicolor*. PLoS ONE 13(6): e0197044.
- Molyneux, P. 2004. The use of the stable free radical diphenylpicrylhydrazyl (DPPH) for estimating antioxidant activity. Songklanakarin J. Sci. Technology, 26 (2): 211-219.
- Na, Y. S., J. W. Kim., S. Kim., J. Park., S. Lee., S. Kim., A. Synytsya., Y. Park. 2010. Purification, characterization and immunostimulating activity of water soluble polysaccharides isolated from *Capsosiphon fulvescen*. 2010. International immunopharmacology, 10: 364-370.
- Nagappan, H., P. P. Pee., S. H. Y. Kee., J. T. Ow., S. W. Yan., L. Y. Chew., K. W. Kong. 2017. Malaysian brown seaweeds *Sargassum siliculosum* and *Sargassum polycystum*: low density lipoprotein (LDL) oxidation, angiotensin converting enzyme (ACE), α -amylase and α -glucosidase inhibition activities. Food Research International, 99: 950-958.
- Naggar, A., dan S. Hussein. 2010. Protective and therapeutic effects of fucoidan, brown algae extract, against diclofenac sodium hepatonephrotoxicity in rat. Journal Comp. Path & Clinic.Path, 23(1): 1-20.
- Nelson, W. L. and L. H. Cretcher. 1931. The carbohydrate acid sulfate of *Macrocystis pyrifera*. J. Biol. Chem, 94: 147–154.
- Nontji, A. 1993. Laut Nusantara. Penerbit Djambatan. Jakarta.
- Nursid, M., T. Wikanta., R. Susilowati. 2013. Aktivitas antioksidan, sitotoksitas dan kandungan fukosantin ekstrak rumput laut coklat dari pantai Binuangeun, Banten. Jurnal Pascapanen dan Bioteknologi Kelautan dan Perikanan. 8(1): 73-84.
- Olabarria, C., I. F. Rodil., M. Incera., J. S. Troncoso. 2005. Limited impact of *Sargassum muticum* on native algal assemblages from rocky intertidal shores. Marine Environmental Research, 67: 153-158.
- Ozgen, M., R. N. Reese., A. Z. Tulio Jr., J. C. Scheerens., R. Miller. 2006. Modified 2,2-azino-bis-3-ethylbenzoathiazoline-6-sulfonic acid (ABTS) method to measure antioxidant capacity of selected small fruits and comparison to ferric reducing antioxidant power (FRAP) and 2,2-diphenil-1-picrylhydrazyl (DPPH) methods. J. Agric. Food Chem, 54: 1151-1157.
- Padua, D., E. Rocha., D. Gargiulo., A. A. Ramos. 2105. Bioactive compounds from brown seaweeds: phloroglucinol, fucoxanthin and fucoidan as promising therapeutic agents against breast cancer. Phytochemistry Letters, 14: 91-98.
- Parikh, B dan V. H. Patel. 2018. Total phenolic content and total antioxidant capacity of common Indian pulses and split pulses. J. Food Sci Technol, 55(4): 1499-1507.

- Pasanda, O. S. R., and A. Azis. 2018. The extraction of brown algae (*Sargassum* sp.) through calcium path to produce sodium alginate. *Jurnal Bahan Alam Terbarukan*, 7(1): 64-69.
- Patel, P., R. Sunkara., L. T. Walker., M. Verghese. 2016. Effect of Drying Techniques on Antioxidant Capacity of Guava Fruit. *Food and Nutrition Sciences* 7:544-554.
- Peasura, N., N. Laohakunjit., O. Kerdchoechuen., S. Wanlapa. 2015. Characteristics and antioxidant of *Ulva intestinalis* sulphated polysaccharides extracted with different solvents. *International Journal of Biological Macromolecules*, 81: 912–919.
- Pereira, L., S. F. Gheda., J. A. R. C. Paulo. 2013. Analysis by vibrational spectroscopy of seaweed polysaccharides with potential use in food, pharmaceutical and cosmetic industries. *International Journal of Carbohydrate Chemistry*, 2013: 1-8.
- Pereira, L., A. M. Amado., A. T. Critchley., F. Velde., P. J. A. Ribero-Claro. 2009. Identification of selected seaweed polysaccharides (phycocolloids) by vibrational spectroscopy (FTIR-ATR and FT-Raman). *Food Hydrocolloids*. 23: 1903-1909.
- Pereira, L., A. Sousa., H. Coelho., A. M. Amado., J. A. R. C. Paulo. 2003. Use of FTIR, FT-Raman and ¹³C-NMR spectroscopy for identification of some seaweed phycocolloids. *Biomolecular Engineering*, 20: 223-228.
- Perez, M. O. G dan G. S. Patience. 2019. Experimental methods in chemical engineering: Fourier transform infrared spectroscopy—FTIR. *Can J Chem Eng*, 98:25-33.
- Pokorny, J. 2003. Chapter 1. Antioxidants in food: practical applications, Reprint. ed, Woodhead publishing in food science and technology. Woodhead, Cambridge: 42- 50.
- Pomin, V. H., A. P. Valente., M. S. Pereira., P. A. S. Mourão. 2005. Mild acid hydrolysis of sulfated fucans: A selective 2-desulfation reaction and an alternative approach for preparing tailored sulfated oligosaccharides. *Glycobiology*, 15: 1376–1385.
- Ponce, N. M. A., C. A. Pujol., E. B. Damonte., M. L. Flores., C. A. Stortz. 2003. Fucoidans from the brown seaweed *Adenocystis utricularis*: extraction methods, antiviral activity and structural studies. *Carbohydrates Research*, 338: 153-165.
- Pozharitskaya, O. N., E. D. Obluchinskaya., A. N. Shikov. 2020. Mechanisms of bioactivities of fucoidan from the brown seaweed *Fucus vesiculosus* L. of the Barents Sea. *Marine drugs*, 18(275): 1-17.
- Prieto, P., M. Pineda., and M. Aguilar. 1999. Spectrophotometric quantitation of antioxidant capacity through the formation of a phosphomolybdenum complex: specific application to the determination of vitamin E. *Analytical Biochemistry*, 269: 337-341.

- Putra, S. E., 2006. Alga laut sebagai Biotarget Industri, dalam <http://www.energi.lipi.go.id/utama.cgi?artikel&118681917&11>. Diakses tanggal 15 November 2019 pukul 14.00 WIB.
- Saravana, P. S., J. H. Choi., Y. B. Park., H. C. Woo., B. S. Chun. 2016. Evaluation of the chemical composition of brown seaweed (*Saccharina japonica*) hydrolysate by pressurized hot water extraction. *Algal Research*, 13: 246-254.
- Schrieber, R., H. Gareis. 2007. *Gelatine Handbook: Theory and Industrial Practice*. John Wiley & Sons.
- Sim, S.Y., Y. E. Shin., H. K. Kim. 2019. Fucoidan from *Undaria pinnatifida* has anti-diabetic effects by stimulation of glucose uptake and reduction of basal lipolysis in 3T3-L1 adipocytes. *Nutrition Research*, 65: 54-62.
- Qi, H., T. Zhao., Q. Zhang., Z. Li., Z. Zhao., R. Xing. 2005. Antioxidant activity of different molecular weight sulfated polysaccharides from *Ulva pertusakjellm* (Chlorophyta). *Journal of Applied Phycology*, 17, 527-534.
- Rakhee., J. Mishra., R. K. Sharma., K. Misra. 2018. Characterization Techniques for Herbal Products. *Management of High Altitude Pathophysiology*. 171-202.
- Ruperez, P., O. Ahrazem., J. A. Leal. 2002. Potential antioxidant capacity of sulfated polysaccharides from the edible marine brown seaweed *Fucus vesiculosus*. *J. Agric. Food Chem.*, 50: 840–845.
- Satyarsa, A.B.S. 2019. Potential of fucoidan from brown seaweeds (*Sargassum* sp.) as innovative therapy on breast cancer. *Journal of Medicine and Health*, 2(3): 909-919.
- Septian, B. A., dan T. D. Widyaningsih. 2014. Peranan senyawa bioaktif minuman cincau hitam (*Mesona palustris* BI) terhadap penurunan tekanan darah tinggi: kajian pustaka. *Jurnal Pangan Agroindustri*. 2(3): 198-202.
- Shah, P., dan H. A. Modi. 2015. Comparative study of DPPH, ABTS and FRAP assays for determination of antioxidant activity. *IJRASET*, 3(6): 636-641.
- Shahidi, F. 2015. *Handbook of Antioxidants for Food Preservation*. Woodhead Publishing. Cambridge, England.
- Shahidi, F., dan Y. Zhong. 2015. Measurement of antioxidant activity. *Journal of Functional Foods*, 18: 757-781.
- Sharmila, G., A. Sheba., A. Ilakkia. 2018. Determination of in vitro antioxidant activity of crude fucoidan extracted from *Sargassum wightii* by different methods. *International Journal of Research in Pharmaceutical Sciences* 9(3): 984-989.
- Shi, J., J. Yu., J. Pohorly., C. Young., M. Bryant, Y. Wu. 2003. Optimization of the extraction of polyphenols from grape seed meal by aqueous ethanol solution. *Food Agriculture & Environment*, 1: 42-47.
- Singhal, R. S., and S. S. Jayakar. 2012. Development of an efficient cell disruption method for release of lipoic acid from *Saccharomyces cerevisiae*. *Global Journal of Biotechnology and Biochemistry*, 7(4): 90–99.

- Sinurat, E. 2011. Isolasi dan Karakterisasi serta Uji Aktivitas Fukoidan sebagai Antikoagulan dari Rumput Laut Cokelat (*Sargassum crassifolium*). Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Indonesia. Jakarta. Tesis.
- Sinurat, E., dan R. Kusumawati. 2017. Optimasi metode ekstraksi fukoidan kasar dari rumput laut coklat *Sargassum binderi sonder*. JPB Kelautan dan Perikanan, 12(2): 125-134.
- Sinurat, E., dan R. Marliani. 2017. Karakteristik Na-Alginat dari rumput laut coklat *Sargassum crassifolium* dengan perbedaan alat penyaring. Jurnal Pengolahan Hasil Perikanan Indonesia, 20(2): 351-361.
- Sirivibulkovit, K., S. Nouanthavong., Y. Sameenoi. 2018. Paper based DPPH assay for antioxidant activity analysis. Analytical Science, 34: 795-800.
- Sjahfirdi, L., N. Aldi., H. Maheswari., P. Astuti. 2015. Aplikasi fourier transform infrared (FTIR) dan pengamatan pembengkakan genital pada spesies primata, lutung jawa (*Trachypitcheus auratus*) untuk mendeteksi masa subur. Jurnal Kedokteran Hewan, 9(2): 156-160.
- Skriptsova, A. V., N. M. Shevchenko., T. N. Zvyagintseva., T. I. Imbs. 2009. Monthly changes in the content and monosaccharide composition of fucoidan from *Undaria pinnatifida* (Laminariales, Phaeophyta). Journal of Applied Phycology, 22: 79-86.
- Socrates, G. 2001. Infrared and Raman Characteristic Group Frequencies. Third Edition. Wiley: New Jersey.
- Solange, I. M., M. R. Rosa., P. Lorenzo., A. T. Jose. 2013. Extraction of sulfated by polysaccharides by autohydrolysis of Brown Seaweed *Fucus vesiculosus*. Journal of Applied Phycology, 25(1): 31-39.
- Solarin, B. B., D. A. Bolaji., O. S. Fakayode., R. O. Akininbagbe. 2014. Impacts of an invasive seaweed *Sargassum hystrix* var. fluitans (Borgensen 1914) on the fisheries and other economic implications for the nigerian coastal waters. Journal of Agriculture and Veterinary Science, 7(7): 1-6.
- Somasundaram, S. N., S. Shanmugam., B. Subramanian., R. Jaganathan. 2016. Cytotoxic effect of fucoidan extracted from *Sargassum cinereum* on colon cancer cell line HCT-15. International Journal of Biological Macromolecules, 91: 1215-1223.
- Suhaila, K., A. Husni, E. Sinurat. 2019. Characteristics and antioxidant activity of fucoidan from the brown seaweed *Sargassum hystrix*. AACL Bioflux, 12 (6): 2319- 2329.
- Suresh, V., N. Senthilkumar., R. Thangam., M. Rajkumar., C. Anbazhagan., R. Rengasamy. 2013. Separation, purification and preliminary characterization of sulfated polysaccharides from *Sargassum plagiophyllum* and its in vitro anticancer and antioxidant activity. Process Biochemistry, 48(2): 364–373.

- Tanniou, A., L. Vandanjon., M. Incera., Serrano., E. Leon., V. Husa., A. Engelen., Le Grand., R. Walsh., N. I. Poupart., N. Bourgougnon., V. Stiger-Pouvreau., J. L. Nicolas. 2013. Assessment of the spatial variability of phenolic contents and associated bioactivities in the invasive alga *Sargassum muticum* sampled along its European range from Norway to Portugal. *Journal of Applied Phycology*, 26(2): 1-16.
- Then, M., K. Szentmihalyi, A. Sarkozi, I. S. Varga. 2003. Examination on antioxidant activity in greater celadine (*Celidonium majus* L) extracts by FRAP method. *Acta Bio szegediensis*, 47: 115-117.
- Vishchuk, S. O., P. S. Ermakova., and T. N. Zvyagintseva. 2011. Sulfated polisaccharides from seaweeds *Saccharina japonica* and *Undaria pinnatifida*: isolation structural characteristics, and antitumor activity. *Carbohydrate Research*, 346, 2769-2776.
- Wang, C. Y., T. C. Wu., S. L. Hsieh., Y. H. Tsai., C. W. Yeh., C. Y. Huang. 2015. Antioxidant activity and growth inhibition of human colon cancer cells by crude and purified fucoidan preparations extracted from *Sargassum cristaefolium*. *Journal of Food and Drug Analysis*, 23: 766-777.
- Xie, J., and K. M. Schaich. 2014. Re-evaluation of the 2,2-diphenil-1-picrylhydrazyl free radical (DPPH) assay for antioxidant activity. *Journal of Agricultural and Food Chemistry*, 62: 4251-4261.
- Xing, R., S. Liu., H. Yu., X. Chen., Y. Qin., K. Li., P. Li. 2013. Extraction and separation of fucoidan from *Laminaria japonica* with chitosan as extractant. *BioMed Research International*, 2013(2): 1-4.
- Xu, N., X. Fan., X. Yan., C. K. Tseng. 2003. Screening marine algae from China for their antitumor activities. *Journal of Applied Phycology*.
- Yang, W. N., P. W. Chen., C. Y. Huang. 2017. Compositional characteristics and in vitro evaluations of antioxidant and neuroprotective properties of crude extracts of fucoidan prepared from compressional puffing-pretreated *Sargassum crassifolium*. *Marine drugs*, 15(183): 1-19.
- Yang, C., D. Chung., S. Yout. 2008. Determination of physicochemical properties of sulphated fucans from sporophyll of *Undaria pinnatifida* using light scattering technique, 111(2): 503-507.
- Yefrida., N. Ashikin., Refilda. 2015. Validasi metoda FRAP modifikasi pada penentuan kandungan antioksidan total dalam sampel mangga dan rambutan. *J. Ris Kim*, 8(2): 170-175.
- Yuan, Y., and D. Macquarrie. 2015. Microwave assisted extraction of sulfated polysaccharides (fucoidan) from *Ascophyllum nodosum* and its antioxidant activity. *Carbohydrate Polymers*, 129: 101-107.

- Zaranappa, H. M., M. R. Vagdevi., B. C. Lokesh., Gowdarshivannanavar. 2012. Synthesis and antioxidant activity of 3-substituted schiff bases of quinazoline 2,4-diones. *International Journal of Chen Tech Research*, 4 (4): 1527-1533.
- Zhao, D., J. Xu., and X. Xu. 2017. Bioactivity of fucoidan extracted from *Laminaria japonica* using a novel procedure with high yield. *Food Chemistry*, 245: 1-8.
- Zhou, J., N. Hu., Y. Wu., Y. Pan., C. Sun. 2008. Preliminary studies on the chemical characterization and antioxidant properties of acidic polysaccharides from *Sargassum fusiforme*. *Journal of Zhejiang University SCIENCE B*, 9(9): 721–727.
- Zvyagintseva, T. N., N. M. Shevchenko., A. O. Chizhov., T. N. Krupnova., E. V. Sundukova., V. V. Isakov. 2003. Water-soluble polysaccharides of some far-eastern brown seaweeds. Distribution, structure, and their dependence on the developmental conditions. *Journal of Experimental Marine Biology and Ecology*, 294(2003): 1-13.