

REFERENCES

- Abbas M, Moussa M, Akel H. Type I Hypersensitivity Reaction. [Updated 2020 Jul 21]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560561/>
- Ahmed, Q., & Alhassan, A. (2016). *Averrhoa bilimbi* Linn.: A review of its ethnomedicinal uses, phytochemistry, and pharmacology. *Journal of Pharmacy and Bioallied Sciences*, 8(4), 265. doi: 10.4103/0975-7406.199342
- Ambili, S., Subramoniam, A., & Nagarajan, N. (2008). Studies on the Antihyperlipidemic Properties of *Averrhoa bilimbi* Fruit in Rats. *Planta Medica*, 75(01), 55-58. doi: 10.1055/s-0028-1088361
- Asher, M., Montefort, S., Björkstén, B., Lai, C., Strachan, D., Weiland, S., & Williams, H. (2006). Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. *The Lancet*, 368(9537), 733-743. doi: 10.1016/s0140-6736(06)69283-0
- Baumann, L., Romero, K., Robinson, C., Hansel, N., Gilman, R., & Hamilton, R. et al. (2014). Prevalence and risk factors for allergic rhinitis in two resource-limited settings in Peru with disparate degrees of urbanization. *Clinical & Experimental Allergy*, 45(1), 192-199. doi: 10.1111/cea.12379
- Beasley, R. (1998). Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC. *The Lancet*, 351(9111), 1225-1232. doi: 10.1016/s0140-6736(97)07302-9
- Bendtsen, P., Grnbk, M., Kjr, S. K., Munk, C., Linneberg, A., & Tolstrup, J. S. (2008). Alcohol consumption and the risk of self-reported perennial and seasonal allergic rhinitis in young adult women in a population-based cohort study. *Clinical & Experimental Allergy*, 38(7), 1179–1185. doi:10.1111/j.1365-2222.2008.02945.x
- Bhasker, B., & Shantaram, M. (2013). Morphological and Biochemical Characteristics of *Averrhoa* Fruits. *International Journal of Pharmaceutical, Chemical And Biological Sciences*, 3(3), 924-928.
- Bousquet, P. J., Combescure, C., Neukirch, F., Klossek, J. M., Méchin, H., Daures, J.-P., & Bousquet, J. (2007). Original article: Visual analog scales can assess the severity of rhinitis graded according to ARIA guidelines. *Allergy*, 62(4), 367–372. doi:10.1111/j.1398-9995.2006.01276.x
- Bousquet, J., Khaltaev, N., Cruz, A., Denburg, J., Fokkens, W., & Togias, A. et al. (2008). Allergic Rhinitis and its Impact on Asthma (ARIA) 2008*. *Allergy*, 63, 8-160. doi: 10.1111/j.1398-9995.2007.01620.x

- Cory, H., Passarelli, S., Szeto, J., Tamez, M., & Mattei, J. (2018). The Role of Polyphenols in Human Health and Food Systems: A Mini-Review. *Frontiers in Nutrition*, 5. doi: 10.3389/fnut.2018.00087
- Dangat, B. T., Shinde A. A., Jagtap, D. N., Desai, V. R., Shinde, P. B., Gurav, R. V. (2014). Mineral Analysis of *Averrhoa bilimbi* L. – A Potential Fruit. *Asian Journal of Pharmaceutical and Clinical Research*, 7(3).
- Eccleston, E., Leonard, B., Lowe, J., & Welford, H. (1973). Basophilic Leukaemia in the Albino Rat and a Demonstration of the Basopoitin. *Nature New Biology*, 244(133), 73-76. doi: 10.1038/newbio244073b0
- Fauzi, Sudiro, M., & Lestari, B. (2015). Prevalence of Allergic Rhinitis based on World Health Organization (ARIA-WHO) questionnaire among Batch 2010 Students of the Faculty of Medicine Universitas Padjadjaran. *Althea Medical Journal*, 2(4). doi: 10.15850/amj.v2n4.658
- Fu, L., Cherayil, B., Shi, H., Wang, Y., & Zhu, Y. (2019). *Food Allergy: From Molecular Mechanisms to Control Strategies* (1st ed.). Singapore: Springer Singapore, Imprint: Springer.
- Fukuishi, N., Murakami, S., Ohno, A., Yamanaka, N., Matsui, N., & Fukutsuji, K. et al. (2014). Does β -Hexosaminidase Function Only as a Degranulation Indicator in Mast Cells? The Primary Role of β -Hexosaminidase in Mast Cell Granules. *The Journal of Immunology*, 193(4), 1886-1894. doi: 10.4049/jimmunol.1302520
- Galli, S., Tsai, M., & Piliponsky, A. (2008). The development of allergic inflammation. *Nature*, 454(7203), 445-454. doi: 10.1038/nature07204
- Gong, J., & Chen, S. (2003). Polyphenolic antioxidants inhibit peptide presentation by antigen-presenting cells. *International Immunopharmacology*, 3(13-14), 1841-1852. doi: 10.1016/j.intimp.2003.08.010
- Graif, Y., Garty, B.-Z., Livne, I., Green, M. S., & Shohat, T. (2004). Prevalence and risk factors for allergic rhinitis and atopic eczema among schoolchildren in Israel: results from a national study. *Annals of Allergy, Asthma & Immunology*, 92(2), 245–249. doi:10.1016/s1081-1206(10)61555-4
- Hasanuzzaman, M., Ali, M., Hossain, M., Kuri, S., & Islam, M. (2013). Evaluation of total phenolic content, free radical scavenging activity and phytochemical screening of different extracts of *Averrhoa bilimbi* (fruits). *International Current Pharmaceutical Journal*, 2(4), 92-96. doi: 10.3329/icpj.v2i4.14058
- Hasim, N. B. (2014). Study on Bioactive Compound Degradation from Belimbing Buluh (*Averrhoa bilimbi*). *Universiti Malaysia Pahang*.
- Hepbildikler, S., Sandhoff, R., Kölzer, M., Proia, R., & Sandhoff, K. (2001). Physiological Substrates for Human Lysosomal β -Hexosaminidase S. *Journal of Biological Chemistry*, 277(4), 2562-2572. doi: 10.1074/jbc.m105457200

- Hernandez, P., Rodriguez, P., Delgado, R., & Walczak, H. (2007). Protective effect of *Mangifera indica* L. polyphenols on human T lymphocytes against activation-induced cell death. *Pharmacological Research*, 55(2), 167-173. doi: 10.1016/j.phrs.2006.11.004
- Hou, W., Xu, G., & Wang, H. (2011). Basic immunology and immune system disorders. *Treating Autoimmune Disease with Chinese Medicine*, 1-12. doi: 10.1016/b978-0-443-06974-1.00001-4
- Hsu, S. P., Lin, K. N., Tan, C. T., Lee, F. P., Huang, H. M. (2009). Prenatal risk factors and occurrence of allergic rhinitis among elementary school children in an urban city. *International Journal of Pediatric Otorhinolaryngology*, 73(6). 807-810. <https://doi.org/10.1016/j.ijporl.2009.02.023>
- Ishida, M., Nishi, K., Watanabe, H., & Sugahara, T. (2013). Inhibitory effect of aqueous spinach extract on degranulation of RBL-2H3 cells. *Food Chemistry*, 136(2), 322-327. doi: 10.1016/j.foodchem.2012.08.079
- Janeway, C., Travers, P., Walport, M., & Shlomchik, M. (2001). *Immunobiology 5: the immune system in health and disease* (1st ed.). New York: Garland Science.
- Johansson, S., Bieber, T., Dahl, R., Friedmann, P., Lanier, B., & Lockey, R. et al. (2004). Revised nomenclature for allergy for global use: Report of the Nomenclature Review Committee of the World Allergy Organization, October 2003. *Journal of Allergy and Clinical Immunology*, 113(5), 832-836. doi: 10.1016/j.jaci.2003.12.591
- John, P., & Pta, U. (2019). Effect of *Averrhoa bilimbi* fruit powder on Histopathology and the Functional Indices of the Liver and Kidney of Rats fed with high fat diet. *The Pharma Innovation Journal*, 8(1), 48–51. Retrieved from www.thepharmajournal.com
- Kanda, T., Akiyama, H., Yanagida, A., Tanabe, M., Goda, Y., Toyoda, M., Teshida, R., et al. (1998). Inhibitory Effects of Apple Polyphenol on Induced Histamine Release from RBL-2H3 Cells and Rat Mast Cells. *Bioscience, Biotechnology, and Biochemistry*, 62(7), 1284-1289. doi: 10.1271/bbb.62.1284
- Kania, E., Roest, G., Vervliet, T., Parys, J., & Bultynck, G. (2017). IP3 Receptor-Mediated Calcium Signaling and Its Role in Autophagy in Cancer. *Frontiers in Oncology*, 7. doi: 10.3389/fonc.2017.00140
- Kempuraj, D., Madhappan, B., Christodoulou, S., Boucher, W., Cao, J., & Papadopoulou, N. et al. (2005). Flavonols inhibit proinflammatory mediator release, intracellular calcium ion levels and protein kinase C theta phosphorylation in human mast cells. *British Journal of Pharmacology*, 145(7), 934-944. doi: 10.1038/sj.bjp.0706246
- King, T. (2007). Inflammation, Inflammatory Mediators, and Immune-Mediated Disease. *Elsevier's Integrated Pathology*, 21-57. doi: 10.1016/b978-0-323-04328-1.50008-5

- Kurup, S., & Mini, S. (2014). Attenuation of Hyperglycemia and Oxidative Stress in Streptozotocin-induced Diabetic rats by Aqueous Extract of *Averrhoa bilimbi* Linn. Fruits. *International Journal of Pharmaceutical Sciences and Research*, 5(11), 4981-4988.
- Kurup, S., & Mini, S. (2017). *Averrhoa bilimbi* fruits attenuate hyperglycemia-mediated oxidative stress in streptozotocin-induced diabetic rats. *Journal of Food and Drug Analysis*, 25(2), 360-368. doi: 10.1016/j.jfda.2016.06.007
- Lestari, I., Melania, A., & Prasetyo, B. (2018). Potency water Stew of *Averrhoa bilimbi* L for Antihypertensive. *International Journal of Nursing and Midwifery Science (IJNMS)*, 2(01), 55-61. doi: 10.29082/ijnms/2018/vol2.iss01.98
- Li, C., Chen, D., Zhong, J., Lin, Z., Peng, H., & Lu, H. et al. (2014). Epidemiological Characterization and Risk Factors of Allergic Rhinitis in the General Population in Guangzhou City in China. *Plos One*, 9(12), e114950. doi: 10.1371/journal.pone.0114950
- Li, Y., Jiang, Y., Li, S., Shen, X., Liu, J., & Jiang, F. (2015). Pre- and Postnatal Risk Factors in Relation to Allergic Rhinitis in School-Aged Children in China. *Plos One*, 10(2), e0114022. doi: 10.1371/journal.pone.0114022
- Lian, Q., Cheng, Y., Zhong, C., & Wang, F. (2015). Inhibition of the IgE-Mediated Activation of RBL-2H3 Cells by TIPP, a Novel Thymic Immunosuppressive Pentapeptide. *International Journal of Molecular Sciences*, 16(1), 2252-2268. doi: 10.3390/ijms16012252
- Lima, V. L. A. G. de, Melo, E. de A., & Lima, L. dos S. (2001). Physicochemical Characteristics of bilimbi (*Averrhoa bilimbi* L.). *Revista Brasileira de Fruticultura*, 23(2), 421–423. doi: 10.1590/s0100-29452001000200045
- Maeda-Yamamoto, M., Inagaki, N., Kitaura, J., Chikumoto, T., Kawahara, H., Kawakami, Y., Sano, M., et al. (2004). O-methylated Catechins from Tea Leaves Inhibit Multiple Protein Kinases in Mast Cells. *The Journal of Immunology*, 172(7). doi: 10.4049/jimmunol.172.7.4486
- Maeda-Yamamoto, M., Ema, K., & Shibuichi, I. (2007). In vitro and in vivo anti-allergic effects of 'benifuuki' green tea containing O-methylated catechin and ginger extract enhancement. *Cytotechnology*, 55(2-3), 135-142. doi: 10.1007/s10616-007-9112-1
- Martínez, M., Martínez, N., & Silva, W. (2017). Measurement of the Intracellular Calcium Concentration with Fura-2 AM Using a Fluorescence Plate Reader. *Bio-Protocol*, 7(14). doi: 10.21769/bioprotoc.2411
- McConnell, T. (2012). *Nature of disease* (2nd ed.). Baltimore, Mar.: Lippincott Williams & Wilkins.
- Metcalfe, D., Peavy, R., & Gilfillan, A. (2009). Mechanisms of mast cell signaling in anaphylaxis. *Journal of Allergy and Clinical Immunology*, 124(4), 639-646. doi: 10.1016/j.jaci.2009.08.035

Mokhtar, S. I., & Aziz, N. A. A. (2016). Antimicrobial Properties of *Averrhoa bilimbi* Extracts at Different Maturity Stages. *Journal of Medical Microbiology & Diagnosis*, 5(233). doi: 10.4172/2161-0703.1000233

Morton, J. F. (2004). *Fruits of Warm Climates*. Retrieved from <http://www.hort.purdue.edu/newcrop/morton/index.html>

Muhamad, N., Yusoff, M. M., & Gimbun, J. (2015). Thermal degradation kinetics of nicotinic acid, pantothenic acid and catechin derived from *Averrhoa bilimbi* fruits. *RSC Advances*, 5(90), 74132–74137. doi:10.1039/c5ra11950b

Nair, M. S., Soren, K., Singh, V., & Boro, B. (2016). Anticancer Activity of Fruit and Leaf Extracts of *Averrhoa Bilimbi* on MCF-7 Human Breast Cancer Cell Lines: A Preliminary Study. *Austin Journal of Pharmacology and Therapeutics*, 4(2). Retrieved from www.austinpublishinggroup.com

Nishida, K., Yamasaki, S., Ito, Y., Kabu, K., Hattori, K., & Tezuka, T. et al. (2005). Fc ϵ RI-mediated mast cell degranulation requires calcium-independent microtubule-dependent translocation of granules to the plasma membrane. *Journal of Cell Biology*, 170(1), 115-126. doi: 10.1083/jcb.200501111

Norhana, M. N. W., A, M. N. A., Poole, S. E., Deeth, H. C., & Dykes, G. A. (2009). Effects of bilimbi (*Averrhoa bilimbi* L.) and tamarind (*Tamarindus indica* L.) juice on *Listeria monocytogenes* Scott A and *Salmonella Typhimurium* ATCC 14028 and the sensory properties of raw shrimps. *International Journal of Food Microbiology*, 136(1), 88–94. doi: 10.1016/j.ijfoodmicro.2009.09.011

Ong, H. C., & Nordiana, M. (1999). Malay ethno-medico botany in Machang, Kelantan, Malaysia. *Fitoterapia*, 70(5), 502–513. doi: 10.1016/S0367-326X(99)00077-5

Pandey, K., & Rizvi, S. (2009). Plant Polyphenols as Dietary Antioxidants in Human Health and Disease. *Oxidative Medicine and Cellular Longevity*, 2(5), 270-278. doi: 10.4161/oxim.2.5.9498

Pawankar, R., Canonica, G., Holgate, S., & Lockey, R. (2011). *WAO White Book of Allergy* (pp. 27-30). Milwaukee: World Allergy Organization.

Paredes, R., Etzler, J., Watts, L., Zheng, W., & Lechleiter, J. (2008). Chemical calcium indicators. *Methods*, 46(3), 143-151. doi: 10.1016/j.ymeth.2008.09.025

Putney, J., & Tomita, T. (2012). Phospholipase C signaling and calcium influx. *Advances in Biological Regulation*, 52(1), 152-164. doi: 10.1016/j.advenzreg.2011.09.005

Putri, F., Utama, G. L., Indah, H. (2015). Preliminary Identification of Potential Halophilic Bacteria Isolated from ‘Asam Sunti’ – Indonesian Traditional Herbs in Inhibiting the Growth of *E. coli* and *Salmonella* spp. *International Journal on Advanced Science Engineering and Information Technology*, 5(3), 152-154. doi: 10.18517/ijaseit.5.3.509.152-154

- Samuel, A., Kalusalingam, A., Chellappan, D., Gopinath, R., Radhamani, S., & Husain, H. et al. (2010). Ethnomedical survey of plants used by the Orang Asli in Kampung Bawong, Perak, West Malaysia. *Journal of Ethnobiology and Ethnomedicine*, 6(1). doi: 10.1186/1746-4269-6-5
- Sánchez-Borges, M., Martin, B., Muraro, A., Wood, R., Agache, I., & Ansotegui, I. et al. (2018). The importance of allergic disease in public health: an iCAALL statement. *World Allergy Organization Journal*, 11, 8. doi: 10.1186/s40413-018-0187-2
- Scheller, S., Dworniczak, S., Pogorzelska, T., Rajca, M., & Shani, J. (2011). Effect of Quercetin, Caffeic Acid and Caffeic Acid Phenylethyl Ester, Solubilized in Non-ionic Surfactants, on Histamine Release in vivo and in vitro. *Arzneimittelforschung*, 50(01), 72-76. doi: 10.1055/s-0031-1300166
- Shorte, S., & Bolsover, S. (1999). Imaging Reality: Understanding Maps of Physiological Cell Signals Measured by Fluorescence Microscopy and Digital Imaging. In W. Matson, *Fluorescent and Luminescent Probes for Biological Activity* (2nd ed., pp. 94-107). Cambridge: ACADEMIC PRESS.
- Silva, R., & Pogačnik, L. (2020). Polyphenols from Food and Natural Products: Neuroprotection and Safety. *Antioxidants*, 9(1), 61. doi: 10.3390/antiox9010061
- Singh, A., Holvoet, S., & Mercenier, A. (2011). Dietary polyphenols in the prevention and treatment of allergic diseases. *Clinical & Experimental Allergy*, 41(10), 1346–1359. doi:10.1111/j.1365-2222.2011.03773.x
- Soegiarto, G., Abdullah, M. S., Damayanti, L. A., Suseno, A., & Effendi, C. (2019). The prevalence of allergic diseases in school children of metropolitan city in Indonesia shows a similar pattern to that of developed countries. *Asia Pacific Allergy*, 9(2). doi: 10.5415/apallergy.2019.9.e17
- Sun, N., Zhou, C., Zhou, X., Sun, L., & Che, H. (2014). Use of a rat basophil leukemia (RBL) cell-based immunological assay for allergen identification, clinical diagnosis of allergy, and identification of anti-allergy agents for use in immunotherapy. *Journal of Immunotoxicology*, 12(2), 199-205. doi: 10.3109/1547691x.2014.920063
- Suluvoy, J. K., & Grace, V. M. B. (2017). Phytochemical profile and free radical nitric oxide (NO) scavenging activity of *Averrhoa bilimbi* L. fruit extract. *3 Biotech*, 7(1). doi: 10.1007/s13205-017-0678-9
- Suluvoy, J. K., K.M., S., Guruvayoorappan, G. C., & Berlin, B. G. (2017). Protective effect of *Averrhoa bilimbi* L. fruit extract on ulcerative colitis in wistar rats via regulation of inflammatory mediators and cytokines. *Biomedicine and Pharmacotherapy*, 91, 1113–1121. doi: 10.1016/j.biopha.2017.05.057
- Resep Asem-asm Daging Sapi, Pakai Asam Jawa dan Belimbing Wuluh. (2020). Retrieved 27 October 2020, from <https://www.kompas.com/food/read/2020/10/25/193055675/resep-asm-asm-daging-sapi-pakai-asam-jawa-dan-belimbing-wuluh>

- Resep Sambal: Sambal Udang Petai Belimbing. (2019). Retrieved 27 October 2020, from <https://food.detik.com/bumbu-dasar-dan-sambal/d-4748932/resep-sambal--sambal-udang-petai-belimbing>
- Tanaka, T., & Takahashi, R. (2013). Flavonoids and Asthma. *Nutrients*, 5(6), 2128-2143. doi: 10.3390/nu5062128
- Tanno, L.K., Calderon, M.A., Smith, H.E., Sanchez-Borgez, M., Sheikh, A., Demoly, P. (2016). Dissemination of definitions and concepts of allergic and hypersensitivity conditions. *World Allergy Organ J*, 9(24). doi: 10.1186/s40413-016-0115-2
- Thomas, D., Tovey, S., Collins, T., Bootman, M., Berridge, M., & Lipp, P. (2000). A comparison of fluorescent Ca²⁺ indicator properties and their use in measuring elementary and global Ca²⁺signals. *Cell Calcium*, 28(4), 213-223. doi: 10.1054/ceca.2000.0152
- Uzzaman, A., & Cho, S. (2012). Chapter 28: Classification of hypersensitivity reactions. *Allergy and Asthma Proceedings*, 33(3), 96-99. doi: 10.2500/aap.2012.33.3561
- Vaillant, A. A. J., & Zito, P. M. (2018). Hypersensitivity Reactions, Immediate. In *StatPearls*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/30020687>
- Warrington, R., Watson, W., Kim, H. L., & Antonetti, F. R. (2011). An introduction to immunology and immunopathology. *Allergy, Asthma & Clinical Immunology*, 7(S1). doi: 10.1186/1710-1492-7-s1-s1
- Yan, S., Ramasamy, R., Alitheen, N., & Rahmat, A. (2013). A Comparative Assessment of Nutritional Composition, Total Phenolic, Total Flavonoid, Antioxidant Capacity, and Antioxidant Vitamins of Two Types of Malaysian Underutilized Fruits (*Averrhoa Bilimbi* and *Averrhoa Carambola*). *International Journal of Food Properties*, 16(6), 1231-1244. doi: 10.1080/10942912.2011.582975
- Yano, S., Umeda, D., Yamashita, T., Ninomiya, Y., Sumida, M., & Fujimura, Y. et al. (2007). Dietary flavones suppresses IgE and Th2 cytokines in OVA-immunized BALB/c mice. *European Journal of Nutrition*, 46(5), 257-263. doi: 10.1007/s00394-007-0658-7
- Yoo, J., Sok, D., & Kim, M. (2014). Anti-Allergic Action of Aged Black Garlic Extract in RBL-2H3 Cells and Passive Cutaneous Anaphylaxis Reaction in Mice. *Journal of Medicinal Food*, 17(1), 92-102. doi: 10.1089/jmf.2013.2927
- Zhang, R., Yip, V., & Withers, S. (2010). Mechanisms of Enzymatic Glycosyl Transfer. *Comprehensive Natural Products II*, 385-422. doi: 10.1016/b978-008045382-8.00167-2
- Zuraimi, M., Tham, K., Chew, F., Ooi, P., & David, K. (2007). Home Exposures to Environmental Tobacco Smoke and Allergic Symptoms among Young Children in Singapore. *International Archives of Allergy And Immunology*, 146(1), 57-65. doi: 10.1159/000112503