

DAFTAR PUSTAKA

1. Kumar H, Kawai T, Akira S. Pathogen recognition by the innate immune system. *Int Rev Immunol*. 2011;30:16–34.
2. Nurrahman N, Mariyam M. Status Hematologi , Kadar IgG dan IgA Tikus yang Mengonsumsi berbagai Variasi Jumlah Tempe Kedelai Hitam. *Agritech*. 2019;39:215–21.
3. Rosales C, Demarex N, Lowell CA, Uribe-Querol E. Neutrophils: Their Role in Innate and Adaptive Immunity. *J Immunol Res*. 2016;2016:2–4.
4. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan , China. *The Lancet*. 2020;395:497–506.
5. WHO. WHO COVID-19 global table data July 22nd 2021 [Internet]. WHO Coronavirus Disease (COVID-19) Dashboard. 2021. Available from: <https://covid19.who.int/>
6. COVID19 S. Data Sebaran COVID19 [Internet]. covid19. 2021. Available from: <https://covid19.go.id/peta-sebaran>
7. Perhimpunan Dokter Paru Indonesia. Peumonia COVID-19. Jakarta: PDPI; 2020. 5 p.
8. Pariang NFE, Wijaya E, Sarnianto P, Ikawati Z, Andrajati R, Puspitasari I, et al. Panduan Praktis Untuk Apoteker Menghadapi Pandemi COVID-19. 1st ed. Sarnianto P, editor. Jakarta; 2020. 38–39 p.
9. Elisma E, Rahman H, Lestari U. PPM Pemberdayaan Masyarakat Dalam Pengolahan Tanaman Obat Sebagai Obat Tradisional Di Desa Mendalo Indah Jambi Luar Kota. SELAPARANG. *J Pengabdian Masyarakat Berkemajuan*. 2020;4:274.
10. Masadi. Keanekaragaman Family Malvaceae Di Hutan Taman Eden 100 Sebagai Bahan Perangkat Pembelajaran Biologi. *Best J*. 2019;2:32–41.
11. Pitra H, Haerullah A, Papuangan N. Studi pengetahuan lokal masyarakat moya tentang pemanfaatan tumbuhan sebagai obat tradisional. *J Saintifika*. 2017;1:45–9.
12. Sabitha V, Ramachandran S, Naveen KR, Panneerselvam K. Antidiabetic and antihyperlipidemic potential of *Abelmoschus esculentus* (L.) Moench. in streptozotocin-induced diabetic rats. *J Pharm Bioallied Sci*. 2011;3:397–

402.

13. Yan T, Nian T, Liao Z, Xiao F, Wu B, Bi K, et al. Antidepressant effects of a polysaccharide from okra (*Abelmoschus esculentus* (L) Moench) by anti-inflammation and rebalancing the gut microbiota. *Int J Biol Macromol.* 2020;144:427–40.
14. Sheu SC, Lai MH. Composition analysis and immuno-modulatory effect of okra (*Abelmoschus esculentus* L.) extract. *Food Chem.* 2012;134:1906–11.
15. Wang J, Moore MJ, Wang H, Zhu Z, Wang H. Plastome evolution and phylogenetic relationships among Malvaceae subfamilies. *Gene.* 2021;765:145103.
16. Calixto-júnior JT, Morais SM De, Colares AV, Douglas H, Coutinho M. The Genus *Luehea* (Malvaceae-Tiliaceae): Review about Chemical and Pharmacological Aspects. *J Pharm.* 2016;2016:1–10.
17. Bawa SH, Badrie N. Nutrient profile, bioactive components, and functional properties of okra (*Abelmoschus esculentus* (L.) Moench). *Fruits, Vegetables, and Herbs: Bioactive Foods in Health Promotion. Elsevier Inc.;* 2016. 365–409 p.
18. Mohsen AAM, Abdel-Fattah MK. Effect of different levels of nitrogen and phosphorus fertilizer in combination with botanical compost on growth and yield of okra (*Abelmoschus esculentus* L.) under sandy soil conditions in Egypt. *Asian J Agric Res.* 2015;9:249–58.
19. Prakoso LBA, Mambo C, Wowor MP. Uji efek ekstrak buah okra (*Abelmoschus esculentus*) terhadap kadar glukosa darah pada tikus wistar (*Rattus norvegicus*) yang diinduksi aloksan. *J e-Biomedik.* 2016;4.
20. Rahmat Rukmana HY. *Budidaya Sayuran Lokal.* Bandung: Penerbit Nuansa Cendikia; 2016.
21. Lunga N. Karakteristik Morfologis Beberapa Varietas *Abelmoschus manihot* L . Di Jayapura. *SAINS.* 2016;16:49–53.
22. Dahlia AA, Amin A, Lestari R. Identifikasi Morfologi dan Parameter Spesifik Simplisia dan Ekstrak Daun Rosella (*Hibiscus sabdariffa* L.) Asal KAB. Enrekang (Sulawesi Selatan). *As-Syifaa.* 2012;04:159–75.
23. Idris, Ibrahim N, Nugrahaani AW. Studi Tanaman Berkhasiat Obat Suku Mori Kecamatan Petasia, Petasia Barat, Dan Petasia Timur Kabupaten Morowali Utara Sulawesi Tengah. *Biocелеbes.* 2018;12:23–31.

24. Agustina S, Wiraningtyas A, Bima K. Skrining Fitokimia Tanaman Obat Di Kabupaten Bima. *Cakra Kim.* 2016;4:71–6.
25. Cholidah AI, Danu D, Nurrosyidah IH. Pengaruh Lama Waktu Fermentasi Kombucha Rosela (*Hibiscus sabdariffa* L.) Terhadap Aktivitas Antibakteri *Escherichia coli*. *J Ris Kefarmasian Indonesia.* 2020;2:186–210.
26. Doreddula SK, Bonam SR, Gaddam DP, Srinivasa B, Desu R, Ramarao N, et al. Nootropic Activities of Aqueous and Methanolic Seed Extracts of Ladies Finger (*Abelmoschus esculentus* L.) in Mice. *Sci World J.* 2014;2014:1–14.
27. Momin MAM, Bellah SF, Rahman SMR, Rahman AA, Murshid GMM, Emran T Bin. Phytopharmacological evaluation of ethanol extract of *Sida cordifolia* L. roots. *Asian Pac J Trop Biomed.* 2014;4:18–24.
28. Jain A, Choubev S, Singour PK, Rajak H, Pawar RS. *Sida cordifolia* (Linn) - An overview. *J Appl Pharm Sci.* 2011;1:23–31.
29. Da-costa-rocha I, Bonnlaender B, Sievers H, Pischel I, Heinrich M. Hibiscus sabdariffa L. - a phytochemical and pharmacological Review. *FOOD Chem.* 2014;1–72.
30. Islam MT. Phytochemical information and pharmacological activities of Okra (*Abelmoschus esculentus*): A literature - based review. *Phyther Res.* 2019;72–80.
31. Reece C, Mitchell. *Biologi. Ill.* Erlangga; 2004. 74 p.
32. Aripin I. Pendidikan Nilai Pada Materi Konsep Sistem Imun. *J Bio Educ.* 2019;4:01–11.
33. Walzem F, Kilsen R, Kerpan I. *Mikrobiologi Ill: Imunologi. III.* Cambridge Stanford Books; 2020. 3 p.
34. Safrida. *Anatomi dan Fisiologi Manusia.* Syiah Kuala University Press; 2018. 111 p.
35. Widhyari SD. Peran dan Dampak Defisiensi Zinc (Zn) Terhadap Sistem Tanggap Kebal. *Wartazoa.* 2012;22:141–8.
36. Baratawidjaja, Karnen Garna Rengganis I. *Imunologi Dasar.* 8th ed. *Imunologi Dasar.* Jakarta: Balai Penerbit Fakultas Kedokteran Universitas Indonesia; 2010. 4–7 p.
37. Sompayrac L. *How The Immune System Work.* 6th ed. UK: WILEY

- Blackwell; 2019. 11 p.
38. Antari AL. *Imunologi Dasar*. 1st ed. Yogyakarta: Deepublish; 2017. 12 p.
 39. Vinay Kumar, Abdul Abbas JA. *Buku Ajaran Patologi Dasar Robbins*. 10th ed. Maria Francisca Ham MS, editor. Singapore: Elsevier Inc.; 2018. 121 p.
 40. Hidayat AN. *Manajemen HIV/AIDS Terkini, Komprehensif, dan Multidisiplin*. Surabaya: Airlangga University Press; 2019. 3–20 p.
 41. Kementerian Kesehatan. *Pedoman Pengobatan Antiretoviral*. Jakarta: Kemenkes RI; 2014. p. 1–121.
 42. Akbar MIA. *SLE Dalam Kehamilan*. Surabaya: Airlangga University Press; 2019. 1–9 p.
 43. Kumar D, Arya V, Kaur R, Ali Z, Kumar V, Kumar V. Review Article A review of immunomodulators in the Indian traditional health care system. *J Microbiol Immunol Infect*. 2012;45:165–84.
 44. Nugroho RA, M.Nur F. *Potensi Bahan Hayati Sebagai Imunostimulan Hewan Akuatik*. Yogyakarta: Deepublish; 2018. 21 p.
 45. Maesaroh K, Kurnia D, Anshori J Al. Perbandingan Metode Uji Aktivitas Antioksidan DPPH, FRAP dan FIC Terhadap Asam Askorbat, Asam Galat dan Kuersetin. *Chim Nat Acta*. 2018;6:93–100.
 46. Sahebnaasagh A, Saghafi F, Avan R, Khoshi A, Khataminia M, Safdari M, et al. The prophylaxis and treatment potential of supplements for COVID-19. *Eur J Pharmacol*. 2020;887:173530.
 47. Carr AC, Maggini S. Vitamin C and immune function. *Nutrients*. 2017;9:1–25.
 48. Shakoor H, Feehan J, Al Dhaheri AS, Ali HI, Platat C, Ismail LC, et al. Immune-boosting role of vitamins D, C, E, zinc, selenium and omega-3 fatty acids: Could they help against COVID-19?. *Maturitas*. 2021;143:1–9.
 49. Fowler AA, Truwit JD, Hite RD, Morris PE, Dewilde C, Priday A, et al. Effect of Vitamin C Infusion on Organ Failure and Biomarkers of Inflammation and Vascular Injury in Patients with Sepsis and Severe Acute Respiratory Failure: The CITRIS-ALI Randomized Clinical Trial. *JAMA - J Am Med Assoc*. 2019;322:1261–70.
 50. Colunga Biancatelli RML, Berrill M, Catravas JD, Marik PE. Quercetin and Vitamin C: An Experimental, Synergistic Therapy for the Prevention and

- Treatment of SARS-CoV-2 Related Disease (COVID-19). *Front Immunol.* 2020;11:1–11.
51. Read SA, Obeid S, Ahlenstiel C, Ahlenstiel G. The Role of Zinc in Antiviral Immunity. *Adv Nutr.* 2019;10:696–710.
 52. Aladin A, Syarif T. Tahu Potensi Mengatasi Covid 19. I. Yogyakarta: Nas Media Pustaka; 2021. 42–44 p.
 53. Kaushik N, Anang S, Ganti KP, Surjit M. Zinc: A Potential Antiviral Against Hepatitis e Virus Infection? *DNA Cell Biol.* 2018;37:593–9.
 54. te Velthuis AJW, van den Worml SHE, Sims AC, Baric RS, Snijder EJ, van Hemert MJ. Zn²⁺ inhibits coronavirus and arterivirus RNA polymerase activity in vitro and zinc ionophores block the replication of these viruses in cell culture. *PLoS Pathog.* 2010;6.
 55. Harthill M. Review: Micronutrient selenium deficiency influences evolution of some viral infectious diseases. *Biol Trace Elem Res.* 2011;143:1325–36.
 56. Tjandrawinata RR, Susanto LW, Nofiarny D. The use of *phyllanthus niruri* L. as an immunomodulator for the treatment of infectious diseases in clinical settings. *Asian Pacific J Trop Dis.* 2017;7:132–40.
 57. Fatmawati S. Bioaktivitas Dan Konstituen Kimia Tanaman Obat Indonesia. Yogyakarta: Deepublish; 2019. 67 p.
 58. Febryantono H, Siswanto, Purnama Edy Santosa, Hartono M. Pengaruh Pemberian Dosis Ekstrak Meniran (*Phyllanthus Niruri* L.) Terhadap Titer Antibodi Newcastle Disease Dan Avian Influenza Pada Broiler Jantan. *J Ris dan Inov Peternak.* 2020;4:52–8.
 59. Wahyuni, Leorita M, Fristiohady A, Yusuf MI, Malik F, Febriansyah H, et al. Efek Imunomodulator Ekstrak Etanol Spons *Xestospongia* Sp . Terhadap Aktivitas Fagositosis Makrofag Pada Mencit Jantan Galur Balb / C. *J Mandala Pharmacoon Indonesia.* 2019;5:1–16.
 60. Manayi A, Vazirian M, Saeidnia S. *Echinacea purpurea*: Pharmacology, phytochemistry and analysis methods. *Pharmacogn Rev.* 2015;9:63–72.
 61. Signer J, Jonsdottir HR, Albrich WC, Strasser M, Züst R, Ryter S, et al. In vitro virucidal activity of Echinaforce®, an *Echinacea purpurea* preparation, against coronaviruses, including common cold coronavirus 229E and SARS-CoV-2. *Virol J.* 2020;17:1–24.
 62. Jo S, Kim S, Shin DH, Kim MS. Inhibition of SARS-CoV 3CL protease by

flavonoids. *J Enzyme Inhib Med Chem.* 2020;35:145–51.

63. Rahman H, Aldi Y, Mayanti E. Aktivitas Imunomodulator dan Jumlah Sel Leukosit Dari Ekstrak Kulit Buah Naga Merah (*Hylocereus lemairei* (Hook.) Britton & Rose) Pada Mencit Putih Jantan. *J Farm Higea.* 2016;8:44–58.
64. Trihastuty A, Aini SR, Hamdin CD. Efek Ekstrak Petroleum Eter Daun Ara (*Ficus racemosa* Linn.) pada Indeks Fagositosis Mencit (*Mus musculus*). *J Ilmu Kefarmasian Indonesia.* 2019;17:169–74.
65. Rosnizar R, Maulida S, Eriani K, Suwarno. Potensi ekstrak daun flamboyan [*Delonix regia* (Boj . Ex Hook .) Raf .] terhadap peningkatan aktivitas dan kapasitas makrofag. *BIOLEUSER.* 2017;1:104–15.
66. Fitria N, Hon Tjong D, Zakaria IJ. Fisiologis Darah Ikan Baung (*Hemibagrus nemurus* Blkr.). *J Metamorf.* 2019;6:33–8.
67. Khusnawati NN, Pramono S, Sasmito E. Effect Of 50 % Ethanolic Extract of Pegagan Herb (*Centella asiatica* (L.) Urban) On Cell Proliferation Of Lymphocytes In Balb / c Male Mice Induced By Hepatitis B Vaccine. *Tradit Med J.* 2015;20:164–9.
68. Ansori ANM. A mini-review of the medicinal properties of Okra (*Abelmoschus esculenus* L.) and potential benefit against SARS-CoV-2. *Indian J Forensic Med Toxicol.* 2021;15:852–6.
69. Pi CC, Chu CL, Lu CY, Zhuang YJ, Wang CL, Yu YH, et al. Polysaccharides from *Ganoderma formosanum* function as a Th1 adjuvant and stimulate cytotoxic T cell response in vivo. *Vaccine.* 2014;32:401–8.
70. Ilyas AN, Rahmawati R, Widiastuti H. Uji Aktivitas Antikolesterol Ekstrak Etanol Daun Gedi (*Abelmoschus Manihot* L. Medik) Secara In Vitro. *Wind Heal J Kesehat.* 2020;3:57–64.
71. Guo JM, Lu YW, Shang EX, Li T, Liu Y, Duan JA, et al. Metabolite identification strategy of non-targeted metabolomics and its application for the identification of components in Chinese multicomponent medicine *Abelmoschus manihot* L. *Phytomedicine.* 2015;22:579–87.
72. Ai G, Liu Q, Hua W, Huang Z, Wang D. Hepatoprotective evaluation of the total flavonoids extracted from flowers of *Abelmoschus manihot* (L.) Medic: In vitro and in vivo studies. *J Ethnopharmacol.* 2013;146:794–802.
73. Pan X, Tao J, Jiang S, Zhu Y, Qian D, Duan J. Characterization and immunomodulatory activity of polysaccharides from the stems and leaves of

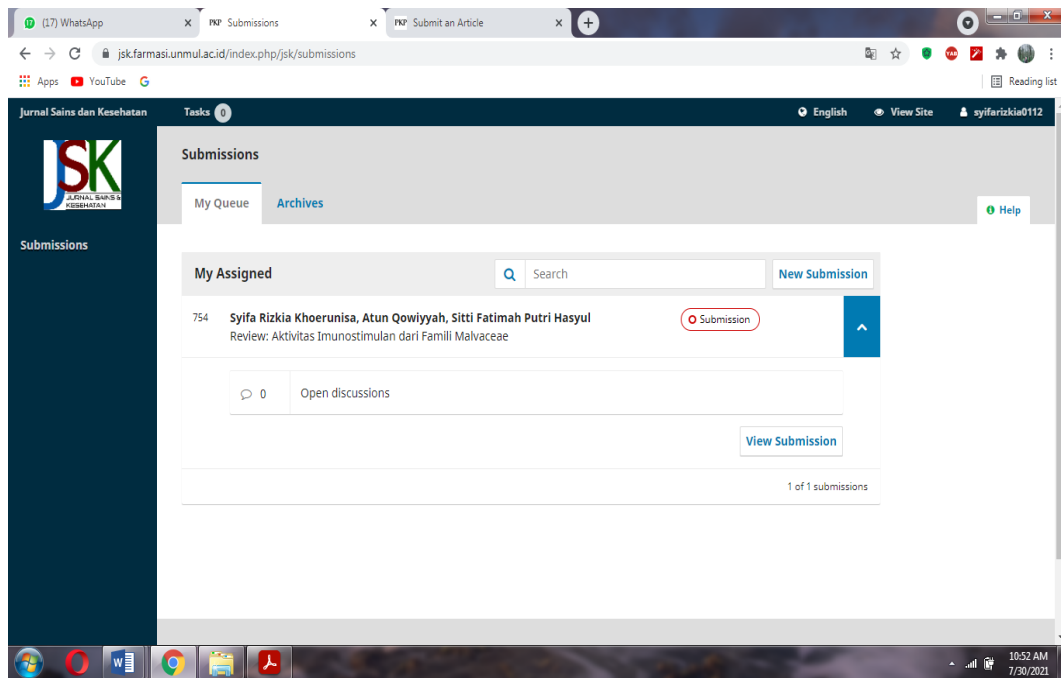
- Abelmoschus manihot* and a sulfated derivative. *Int J Biol Macromol.* 2017;1–31.
74. Lee SJ, Rim HK, Jung JY, An HJ, Shin JS, Cho CW, et al. Immunostimulatory activity of polysaccharides from Cheonggukjang. *Food Chem Toxicol.* 2013;59:476–84.
75. Li JE, Nie SP, Xie MY, Li C. Isolation and partial characterization of a neutral polysaccharide from *Mosla chinensis* Maxim. cv. Jiangxiangru and its antioxidant and immunomodulatory activities. *J Funct Foods.* 2014;6:410–8.
76. Hwang PA, Chien SY, Chan YL, Lu MK, Wu CH, Kong ZL, et al. Inhibition of lipopolysaccharide (LPS)-induced inflammatory responses by *sargassum hemiphyllum* sulfated polysaccharide extract in RAW 264.7 Macrophage Cells. *J Agric Food Chem.* 2011;59:2062–8.
77. Shen C, Zhang W, Jiang J. Immune-enhancing activity of polysaccharides from *Hibiscus sabdariffa* Linn . via MAPK and NF- κ B signaling pathways in RAW264 . 7 cells. *J Funct Foods.* 2017;34:118–29.
78. Byeon SE, Lee J, Kim JH, Yang WS, Kwak YS, Kim SY, et al. Molecular mechanism of macrophage activation by red ginseng acidic polysaccharide from Korean red ginseng. *Mediators Inflamm.* 2012;2012:7–9.
79. Seo JY, Lee CW, Choi DJ, Lee J, Lee JY, Park Y Il. Ginseng marc-derived low-molecular weight oligosaccharide inhibits the growth of skin melanoma cells via activation of RAW264.7 cells. *Int Immunopharmacol.* 2015;29:344–53.
80. Shen CY, Jiang JG, Yang L, Wang DW, Zhu W. Anti-ageing active ingredients from herbs and nutraceuticals used in traditional Chinese medicine: pharmacological mechanisms and implications for drug discovery. *Br J Pharmacol.* 2017;174:1395–425.
81. Mishra N, Tandon VL, Gupta R. Immunomodulation by *Hibiscus rosa-sinensis*: Effect on the Humoral and Cellular Immune Response of Mus Musculus. *Pakistan J Biol Sci.* 2012;15:277–83.
82. Chai HY, Lam SM, Sin JC. Green synthesis of magnetic Fe-doped ZnO nanoparticles via *Hibiscus rosa-sinensis* leaf extracts for boosted photocatalytic, antibacterial and antifungal activities. *Mater Lett.* 2019;242:103–6.
83. Das A, Jawed JJ, Das MC, Sandhu P, De UC, Dinda B, et al. Antileishmanial and immunomodulatory activity of lupeol a triterpene compound isolated

from *Sterculia villosa*. *Int J Antimicrob Agents*. 2017;1–22.

84. Das A, Das MC, Das N, Bhattacharjee S. Evaluation of the antileishmanial potency, toxicity and phytochemical constituents of methanol bark extract of *Sterculia villosa*. *Pharm Biol*. 2017;55:998–1009.
85. Rosa RL da, Nardi GM, Januário AG de F, Renata B, Bagatini KP, Bonatto SJR, et al. Anti-inflammatory, analgesic, and immunostimulatory effects of *Luehea divaricata* Mart. & Zucc. (Malvaceae) bark. *Brazilian J Pharm Sci*. 2014;50:600–10.
86. Dewi LK, Widyarti S, Rifa'i M. Pengaruh Pemberian Ekstrak Etanol Daun Sirsak (*Annona muricata* Linn.) terhadap Peningkatan. *J Trop Biol*. 2013;1:24–6.
87. Pallela PNVK, Ummey S, Ruddaraju LK, Pammi SVN, Yoon SG. Ultra Small, mono dispersed green synthesized silver nanoparticles using aqueous extract of *Sida cordifolia* plant and investigation of antibacterial activity. *Microb Pathog*. 2018;124:63–9.
88. Srinithya B, Kumar VV, Vadivel V, Pemaiah B, Anthony SP, Muthuraman MS. Synthesis of biofunctionalized AgNPs using medicinally important *Sida cordifolia* leaf extract for enhanced antioxidant and anticancer activities. *Mater Lett*. 2016;170:101–4.
89. Kumar S, Lakshmi PK, Sahi C, Pawar RS. *Sida cordifolia* accelerates wound healing process delayed by dexamethasone in rats: Effect on ROS and probable mechanism of action. *J Ethnopharmacol*. 2019;235:279–92.
90. Ouedraogo M, Konaté K, Lepengué AN, Souza A, M'Batchi B, Sawadogo and LL. Free radical scavenging capacity, anticandidal effect of bioactive compounds from *Sida Cordifolia* L., in combination with nystatin and clotrimazole and their effect on specific immune response in rats. *Ann Clin Microbiol Antimicrob*. 2012;11:1–10.
91. Karasawa K, Otani H. Anti-allergic properties of a matured fruit extract of the date palm tree (*Phoenix dactylifera* L.) in mite-sensitized mice. *J Nutr Sci Vitaminol (Tokyo)*. 2012;58:272–7.
92. John CM, Sandrasaigaran P, Tong CK, Adam A, Ramasamy R. Immunomodulatory activity of polyphenols derived from *Cassia auriculata* flowers in aged rats. *Cell Immunol*. 2011;271:474–9.

LAMPIRAN 1

BUKTI SUBMIT MANUSKRIP



Gambar III.4 Bukti submit manuskrip.

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PENDIDIKAN

Universitas Garut (2017-2021)

- **Pelatihan dan Kegiatan**
 - PKL PT. Berkah Alam Nusantara, Garut
 - PKL Apotek Assyifa, Garut
 - Pelatihan Kimia *Atomic Absorption Spectrophotometer (AAS)* dan *Fourier Transform Infra Red (FTIR)* -2019

SMAN 1 Sumedang (2013-2016)

Jurusan IPA

- **Prestasi**
 - Juara umum ke 9 nilai ujian sekolah paling tinggi tahun 2016 di SMAN 1 Sumedang.