

- Agarwal, P., Nagesh, L., and Murlikrishnan., 2010, Evaluation of the antimicrobial activity of various concentrations of Tulsi (*Ocimum sanctum* 4%) extract against *Streptococcus mutans*: An in vitro study, *IJDR*, 21(3):357
- Agrawal, S. S. and V. K. Singh., 1999, Immunomodulators : A Review of Studies on Indian Medicinal Plants and Synthetic Peptides Part I: Medicinal Plants. *PINSA*, 65(3 & 4): 179-204.
- Ahad, M., Bhat, M. A., Imran, M., Ahmad, M. S., Shayan, M., and Majid, S., 2016, Prevalence And Severity of Periodontal Disease in Type 2 Diabetes Mellitus (Non – Insulin Dependent Diabetes Mellitus) Patients In Srinagar City, *IOSR JDMS*, 15(6): 74–81.
- Awartini, F. A. and Zulqarnain, B. J., 1998, Comparison of the clinical effects of subgingival application of 25% *metronidazole gel* and scaling in the treatment of Adult Periodontitis, *Quintessence Int*, 29(1):41-8.
- Bansal, K., Rawat, M.K., Jain, A., Rajput, A., Chaturvedi, T.P., and Singh, S., 2009, Development of Satranidazole Mucoadhesive gel for the Treatment of Periodontitis, *AAP Pharm. Sci. Tech*, 10(3): 716-723.
- Benedetto, A., Gigante, I., Colucci, S., dan Grano, M., 2013, Periodontal disease: Linking the primary inflammation to bone Level, *CDI*, 6(5): 1-7.
- Bonamin, F., Moraes. T.M., Santos, R.C.A., Kushima, H., Faria, F.M., and Silva, M.A., 2014, The effect of a minor constituent of essential oil from *Citrus aurantium*: The role of  $\beta$ -myrcene in preventing peptic ulcer disease, *Chem-Bio Interactions*, 212(1): 11–19.
- BPTO, 2004, *Ocimum sanctum (Kemangi)*, Balai Penelitian Tanaman Obat, Departemen Kesehatan Republik Indonesia Badan Penelitian dan Pengembangan C, Pusat Penelitian dan Pengembangan Farmasi, Tawangmangu.
- Cafiero, C., and Matarasso, S., 2013, Predictive, preventive, personalised and participatory periodontology: ‘the 5Ps age’ has already started, *EPMA Journal*, 4(1): 16.
- Cowan, M.M., 1999, Plant Products as Antimicrobial Agents, *CMR*, 12(4): 564-582.
- Cutress, T.W., Ainamo, J., and Sardo-Infirri, J., 1987, The community periodontal index of treatment needs (CPITN) procedure for population groups and individuals, *Int Dent J*, 37(4): 222-33.
- Dahlan, M. Sopiudin., 2009. Besar Sampel dan Cara Pengambilan Sampel dalam Penelitian Kedokteran dan Kesehatan. Jakarta : Salemba Medika

Dwidjoseputro., 2005, Dasar-Dasar Mikrobiologi, 2nd ed, Djambatan, Yogyakarta, 138.

Eswar, P., Devaraj, C. G., and Agarwal, P., 2016, Anti-microbial activity of tulsi {*Ocimum sanctum* 4% (Linn)} extract on a periodontal pathogen in human dental plaque: An invitro study, *JCADR*, 10(3): 53–56.

Fardiaz, S., 2000, Riset Mikrobiologi Pangan untuk Peningkatan Keamanan Pangan di Indonesia. Bogor: Srikandi Foundation for Food Safety.

Feres, M., Haffajee, A. D., Allard, K., Som, S., Goodson, S., and Socransky, S. S., 2002, Antibiotic Resistance of Subgingival Species During and After Antibiotic Therapy, *J Clin Periodontol*, 29(8): 724-735.

Feitosa D.S., Santamaria, M.P., Casati, M.Z., Sallum, E.A., Junior, F.H., and Toledo S., 2010, *Risk Factors For Chronic Periodontal Diseases In: Periodontitis Symptoms, Treatment and Prevention*, Nova Science, New York, 35-37.

Francis, G., Zohar, K., Harinder, P.S.M., and Klaus, B., 2002, The biological action of saponins in animal sistems, *Brit J of Nutrition*, 88: 587–605

Gadiyar, A., Ankola, A., and Rajpurohit, L., 2017, Evaluation of the Antimicrobial Activity of *Ocimum sanctum* L. (Tulsi) Extract against Streptococcus Mutans and Lactobacillus Acidophilus - An in Vitro Study, *Int JHSAR*, 7(4): 224-228.

Gaur, J., Chandra, J., Chaudhry, S., Vaish, S., and Dodwad, V., 2015, Assessment of *Ocimum sanctum* 4% and 0.2% chlorhexidine irrigation as an adjunct to scaling & root planing in management of chronic periodontitis-a randomized controlled trial, *JDS*, 3(2): 217.

Greenstein, G., 1992, Periodontal Response to Mechanical Non-Surgical Therapy: A Review, *JPER*, 63(2):118–130.

Gupta, D., Bhaskar, D., Gupta, R., Karim, B., Jain, A., Singh, R., and Karim, W., 2014, A randomized controlled clinical trial of *Ocimum sanctum* 4% and chlorhexidine mouthwash on dental plaque and gingival inflammation, *JAAIM*, 5(2):109.

Hidayanto, A., Manikam, A.S., Pertiwi, W.S., dan Harismah, K., 2017, Formulasi Obat Kumur Ekstrak Daun Kemangi (*Ocimum Basilicum* L) dengan Pemanis Alami Stevia (*Stevia Rebaudiana* Bertoni), *URECOL UMM*, 8(9): 189-193.

Hussain, Al., Anwar, F., Sherazi, S. T. H., and Przybyslki, R., 2008, Chemical composition, antioxidant and antimicrobial activities of basil (*Ocimum basilicum*) essential oils depends on seasonal variations, *J Food Chem*, 108(3): 986-995.

Hendra, R., Ahmad, S., Sukari, A., Shukor, M.Y., and Oskoueian, E., 2011, Flavonoid analyses and antimicrobial activity of various parts of *Phaleria macrocarpa* (Scheff.) Boerl Fruit, *Int J Mol Sci*, 12(6): 3422-3431.

Ireland, R. Clinical textbook of dental hygiene and therapy. Singapura : Blackwell Munksgaard. 2006.p. 57-8

Issazadeh, K. N., Jahanpour, F., Pourghorbanali, G., Raeisi and Faekhondeh, J., 2013, Heavy metals resistance by bacterial strains. *Annals of Bio Res*, 4(2):60-63.

Idson, B. and J. Lazarus., 1994, *Semipadat dalam Teori dan Praktek Farmasi Industri*, 3<sup>th</sup> ed, UI Press, Jakarta, 1091- 1100.

Jayanti, I., Jalaluddin, M., Avijeeta, A., Ramanna, P. K., Rai, P. M., dan Nair, R. A., 2018, In vitro antimicrobial activity of *Ocimum sanctum* 4% (tulsi) extract on *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis*, *Jour of Cont Dent Pract*, 19(4): 415–419.

Jiao, Y., Wen, J., and Yux., 1999, Influence of Flavonoid of *Astragalus membranaceus* Stem and Leaves on the Function of Cell Mediated Immunity in Mice, *CJITAWM*, 19(6): 356-358

Joseph B. and Nair V.M., 2013, *Ocimum Sanctum* Linn (Holy Basil) : Pharmacology Behind Its Anticancerous Effect, *Int J of Pharm and Bio Scie*, 4(2): 556–575.

Khairina, A., 2011, pengaruh pemberian gel ekstrak daun kemangi (*ocimum sanctum l.*) terhadap percepatan penyembuhan luka paska pencabutan gigi , Skripsi, Fakultas Kedokteran Gigi, Universitas Airlangga.

Koneman, E.W., 2006, *Koneman's Color Atlas and Textbook of Diagnostic Microbiology*, 6<sup>th</sup> ed, Lippincott Williams and Wilkins, USA, 87-8.

Madduluri, S., Rao, K., Babu., and Sitaram, B., 2013, In Vitro Evaluation of Antibacterial Activity of Five Indegenous Plants Extract Against Five Bacterial Pathogens of Human. *Int J of Pharm and Pharm Scie*, 5(4): 679-684.

Mallikarjun, S., Rao, A., Rajesh, G., Shenoy, R., and Pai, M., 2016, Antimicrobial efficacy of Tulsi leaf ( *Ocimum sanctum* 4%) extract on periodontal pathogens: An in vitro study, *JISP*, 20(2):145–50.

Müller, H. P., Holderrieth, S., Burkhardt, U., and Höffler, U., 2002, In Vitro Antimicrobial Susceptibility of Oral Strains of *Actinobacillus actinomycetemcomitans* to Seven Antibiotics, *J Clin Periodontol*, 29(8): 736-742.

Mondal, S., Varma, S., Bamola, V. D., Naik, S. N., Mirdha, B. R., Padhi, M. M., and Mehta, N., 2011, Double-blinded randomized controlled trial for immunomodulatory effects of Tulsi (*Ocimum sanctum* Linn.) leaf extract on healthy volunteers, *J of Ethnopharm*, 136(3): 452–456.

Nagel, J.L. and Aronoff, D.M., 2015, *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 28<sup>th</sup> ed*, 350-357.

Newman, M.G., Takei, H.H., Carranza, F.A., and Klokkevold, P.R., 2012, *Carranza's Clinical Periodontology, 11<sup>th</sup> ed*, W.B. Saunders, Philadelphia, 127-136, 146-149, 160-164, 199-213, 550-555, 587.

Nurwaini, S. and Wikantyasning, E.R., 2011, Formulasi Tablet Ekstrak Daun Kemangi (\_Ocimum sanctumL\_): Pengaruh Kadar Natrium Karboksimetil Selulosa sebagai Bahan Pengikat terhadap Sifat Fisik Tablet, *J. Penelitian Sains & Teknologi*, 12 (1): 45-57.

Neyrinck, A.M., Emilie, C., Florence, M.S., Patrice, D.C., Barbara, D.P., Laure, B.B., Nathalie, M.D., 2015, Lack of Anti-inflammatory Effect Of Coenzym Q10 Supplementation in The Liver of Rodents after Lipopolysaccharide Challenge, *Clinical Nutrition Experimental*, 1: 10-18 Page, R. C. & Eke, P. I., 2007, Case Definitions for Use in Population-based Surveillance of Periodontitis. *Journal of Periodontology* 78, 1387-1399.

Oda, S., Nitta, H., Setoguchi, T., Izumi, Y., and Ishikawa, I., 2004, Current Concepts and Advances in Clinical Parallel Magnetic, *Periodontology 2000*, 15(3): 129-158.

Palmer, R.M., Matthews, J.P., and Wilson, R.F., 1998, Adjunctive system and locally delivered metronidazole in the treatment of periodontitis: a controlled clinical study, *BDJ*, 184(11):548-52.

Papapanou, P. N. and Susin, C., 2017, Periodontitis epidemiology: is periodontitis under-recognized, over-diagnosed, or both?, *Periodontology 2000*, 75(1): 45-51.

Prasad, V.M., 2014, Antifatigue and Neuroprotective Properties of Selected Species of Ocimum L, *Depart of Biochem*.

Pranati, E.C.G., Devaraj., and Payal, A., 2016, Anti-microbial Activity of tulsi (Ocimum Sanctum (Linn.)). Extract on a Periodontal Pathogen in Human Dental Plaque: an- invitro study, *JCADR*, 10(3): ZC53-ZC56.

Raja, S., 2010, *Treatment in Periodontitis In: Periodontitis Symptoms, Treatment and Prevention*, Nova Science, 35-72.

Rebelo, M.A.B., and Queiroz, A.C., 2011, Gingival Indices: State of Art, Gingival Diseases – Their Aetiology, Prevention and Treatment, *Intechopen*, 41-54.

Rudhart, A., Purucker, P., Kage, A., Hopfenmuller, W., and Bernimoulin, J.P., 1998, Local metronidazole Application in Maintenance Patients. Clinical and Microbiological Evaluation, *J Periodontol*, 69:1148-54.

Saputri, F.C. dan Zahara, R., 2016. Uji Aktivitas Anti-Inflamasi Minyak Atsiri Daun Kemangi (Ocimum americanum L.) pada Tikus Putih Jantan yang Diinduksi Karagenan, *Pharm Sci Res*, 3(3):107-119.

- Sarma, D., Sai, K., Babu, A., and Venkata, S., 2011, Pharmacognostic and phytochemical Diah Ayu Larasati | Efek Potensial Daun Kemangi (*Ocimum basilicum* L.) sebagai Pemanfaatan Hand Sanitizer, *MAJORITY*, 3(3):337-347.
- Setiabudy, R., 2007, *Farmakologi dan Terapi*, 5th ed, Gaya Baru, Jakarta.
- Shankar, A., Sun, L., Klein, B.E.K., Lee, K.E., Muntner, P., and Nieto, F.J., 2011, Markers of inflammation predict the long-term risk of developing chronic kidney disease: a population-based cohort study, *ISNJ*, 80(11):1231-8.
- Shoukheba, M.Y.M. and Ali, S.A., 2014, The effects of subgingival application of ozonated olive oil gel in patient with localized aggressive periodontitis. A clinical and bacteriological study, *Tanta Dent Jl*, 11(1): 63–73.
- Siddiqui, H.H., 1993, Safety of herbal drugs – An overview, *Drugs News Views*, 1:7–10.
- Siswandono, S., 1995, *Prinsip-Prinsip Rancangan Obat*, 1st ed, Airlangga University Press, Surabaya, 249-251
- Slots, J., 2004, Systemic antibiotics in periodontics, *J Periodontol*, 75(11): 1553-1565.
- Stezel, M. and Flores-deJacoby L., 1996, Topical metronidazole application compared with sub gingival scaling (A clinical and microbiological study on recall patients), *J Clin Periodontol*, 23(1):24-9.
- Sukandar, E. Y., Andrajati, R., Sigit, J.I., Adnyana, I. K., Setiadi, A. P., dan Kusnandar., 2008, *ISO Farmakoterapi*, Ikatan Sarjana Farmasi Indonesia, Jakarta.
- Thomas, E.r. and Jorgen, S., 1996, Local delivery of antimicrobial agents in the periodontal pocket in a systemic and topical antimicrobial therapy in periodontics, *Periodontology* 2000, 10:139-59.
- Tizard, I. 1988. *Pengantar Imunologi Veteriner*. Edisi Ke 2. Terjemahan Masduki Partodirejo. Airlangga University Press, Surabaya.
- Trijani, S., 2003, *Efek Klinis Aplikasi Subgingival Racikan gel Metronidasol 25% dan Larutan Povidon-Iodin 10% sebagai Terapi Penunjang Skeling-Penghalusan Akar pada Periodontitis Kronis*, Tesis, Fakultas Kedokteran Gigi Universitas Indonesia.
- Velnar, T., Bailey, T., Smrkolj, V., 2009, The Wound Healing Process : an Overview of Cellular and Molecular Mechanism, *The J of International Medical Research*, 1528-42.
- Vergani, S.A., Silva, E.B., Vinholis, A.H., and Marcantonio, R.A.C., 2004, Systemic Use Ofmetronidazole in The Treatment of Chronic Periodontitis: A Pilot



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Study Using Clinical, Microbiological, and Enzymatic Evaluation, *Braz Oral Res*, 18(2): 121-127.

Vishwakarma, B., Dwivedi, S., Dubey, K., and Joshi, H., 2016, Formulation and Evaluation of Herbal Lipstick, *Int J of Drug Discovery and Herbal Res*, 1(1): 14-19.

Winarno, F.G., 1994. *Bahan Tambahan Makanan* . Gramedia Pustaka utama, Jakarta.