Research & Reviews: Journal of Pharmaceutical Analysis

e-ISSN: 2320-0812
p-ISSN: 2347-2340

Review on Evolution of Antimicrobial Activities

Priyanka Etneni*

Department of Pharmaceutical Analysis, Mallareddy college of Pharmacy, Hyderabad, India

Research Article

Received: 27/08/2016
Revised: 29/08/2016
Accepted: 31/08/2016

***For Correspondence**

Priyanka Etneni, Department of Pharmaceutical Analysis, Mallareddy College of Pharmacy, Hyderabad, Telangana, India

E-mail:
priyankaetneni@gmail.com

Keywords: Microorganisms, Streptococcus infection, Metagenomics, pharmacodynamics

ABSTRACT

Antimicrobial specialists are the absolute most broadly, and regularly rashly, utilized restorative medications around the world. Vital contemplations while endorsing antimicrobial treatment incorporate acquiring an exact conclusion of disease; used for the effective treatment; distinguishing chances to change to restricted range, practical oral specialists for the most limited length; understanding medication attributes that are particular to antimicrobial operators, (for example, pharmacodynamics and viability at the site of contamination); representing host qualities that impact antimicrobial movement; and thus, perceiving the unfavorable impacts of antimicrobial operators on the host. It is likewise vital to comprehend the significance of antimicrobial stewardship, to know when to counsel irresistible illness experts for direction, and to have the capacity to distinguish circumstances when antimicrobial treatment is not required. By taking after these general standards, all honing doctors ought to have the capacity to utilize antimicrobial specialists in a mindful way that advantages both the individual patient and the group.

ANTIMICROBIALS

The word antimicrobial was given from the Greek word This is not synonymous with anti-infection agents, a comparable term got from the Greek word "anti-microbial" alludes to substances delivered by microorganisms that demonstrate against another microorganism [1-3]. Along these lines, anti-infection agents do exclude antimicrobial substances that are engineered (sulfonamides and quinolones), or semisynthetic (methicillin and amoxicillin), or those which originate from plants (quercetin and alkaloids) or creatures (lysozyme) [4-8].

An antimicrobial is a specialist that slaughters microorganisms or hinders their growth. Antimicrobial prescriptions can be gathered by microorganisms they act principally against. For instance, anti-toxins are utilized against microbes and antifungals are utilized against growths [9,10]. They can likewise be characterized by capacity. Specialists that kill organisms are called microbicidal, while those that just restrain their development are called biostatic. The utilization of antimicrobial drugs to treat or verify the contamination is known to be antimicrobial chemotherapy, while the utilization of antimicrobial pharmaceuticals to treat the disease is known as antimicrobial prophylaxis [11-13].

Utilization of substances with antimicrobial properties is known not been normal practice for no less than 2000 years. Old Egyptians and old Greeks utilized particular shape and plant concentrates to treat infection. More as of late, microbiologists, for example, Louis Pasteur and Jules Francois Joubert watched hostility between a few microorganisms and talked about the benefits of controlling these associations in medicine [14-17]. Alexander Fleming turned into the first to find a characteristic antimicrobial organism known as (*Penicillium rubens)*. The substance separated from the growth he named penicillin and it was effectively used to treat a Streptococcus infection. Penicillin additionally demonstrated fruitful in the treatment of numerous different irresistible ailments, for example, gonorrhea, strep throat and pneumonia, which were conceivably lethal to patients until then [18-22].

e-ISSN: 2320-0812
p-ISSN: 2347-2340

Numerous antimicrobial operators exist, for use against an extensive variety of infectious diseases which includes,

- Antibacterials
- Antifungals
- Antivirals
- Antiparasitics

Antibacterials

Antibacterials are utilized to treat bacterial contaminations. The lethality to people and different creatures from antibacterials is for the most part viewed as low [23-27]. Delayed utilization of specific antibacterials can diminish the quantity of flora, which may negatively affect health conditions Antibacterials are among the most regularly utilized medications; however anti-microbials are additionally among the medications generally abused by doctors, for example, utilization of anti-infection specialists in viral respiratory tract diseases [28-33]. As an outcome of far reaching and foolish utilization of antibacterials, there has been a quickened development of anti-toxin safe pathogens, bringing about a genuine risk to worldwide general wellbeing. The resistance issue requests that a restored exertion be made to look for antibacterial specialists compelling against pathogenic microorganisms impervious to current antibacterials [34-37]. Conceivable methodologies towards this goal incorporate expanded examining from various situations and utilization of metagenomics to distinguish bioactive mixes delivered by right now obscure and uncultured microorganisms and also the advancement of little particle libraries tweaked for bacterial targets [38-40].

Antifungals

Antifungals are utilized to kill or counteract further development of parasites. In drug, they are utilized as a treatment for diseases, for example, competitor's foot, ringworm and thrush and work by abusing contrasts amongst mammalian and contagious cells [41-44]. They murder off the parasitic life form without hazardous impacts on the host. Not at all like microscopic organisms, are both parasites and people eukaryotes. Consequently, parasitic and human cells are comparable at the atomic level, making it harder to discover an objective for an antifungal medication to assault that does not likewise exist in the tainted creature. Subsequently, there are frequently reactions to some of these medications [45-51]. Some of these symptoms can be life-debilitating if the medication is not utilized legitimately [51-57].

Antivirals

Antiviral medications are a class of pharmaceutical utilized particularly to treat viral contaminations. Like anti-infection agents, particular antivirals are utilized for particular infections. They are moderately safe to the host and along these lines can be utilized to treat contaminations [58-64]. Vital antiretroviral drugs incorporate the class of protease inhibitors. Herpes infections, best known for bringing about mouth blisters and genital herpes, are generally treated with the nucleoside simple acyclovir [65-73]. Viral hepatitis are brought about by five irrelevant hepatotropic infections and are additionally normally treated with antiviral medications relying upon the sort of disease [74,75].

Antiparasitics

Antiparasitics are a class of medicines used for the treatment of disease by parasites, for example, nematodes, cestodes, trematodes, irresistible protozoa, and amoebae [76-79]. Like antifungals, they should kill the infecting particles without harming to the host [80-86].

The terms antimicrobial and anti-biotic incorporate a wide specification of pharmaceutical specialists that incorporate antibacterial, antifungal, antiviral, and antiparasitic drugs. The main differences amongst the anti-microbial and antibacterial substances are Antibiotics are utilized to slaughter microorganisms (actually 'life').

- Antimicrobials are utilized to kill or avert further development of microorganisms,
- Antibacterials are utilized to kill or prevent further development microscopic organisms,
- Antivirals are utilized to treat viral contaminations,
- Antifungal are utilized to kill or to prevent further development of organisms

e-ISSN: 2320-0812
p-ISSN: 2347-2340

- Antiparasitic act against parasites

Infectious Disease Diagnosis

Diagnosis of infectious diseases can be known by the site of contamination, characterizing the host (eg, immunocompromised, diabetic, of cutting edge age), and building up, when conceivable, a microbiological conclusion. It is difficult to separate the particular pathogen in numerous genuine [87-92], life-debilitating contaminations, particularly for circumstances that are liable to require delayed treatment (eg, endocarditis, septic joint inflammation, plate space disease, and meningitis). Thus, when a patient does not profit by antimicrobial treatment picked on the premise of clinical presentation, extra examinations are expected to decide the etiologic operator or avoid noninfectious judgments. To enhance an exact microbiological analysis, clinicians should guarantee that analytic examples are legitimately acquired and expeditiously submitted to the microbiology research facility [93-97], ideally before the establishment of antimicrobial treatment. Despite the fact that the microbiological determination is in a perfect world taking into account information, for example, bacterial or contagious society or serologic testing, as often as possible the "doubtlessly" microbiological etiology can be summarised from the clinical presentation [98]. For instance, cellulitis is most as often as possible thought to be created by streptococci or staphylococci, and antibacterial treatment can be regulated without a positive society.

The basics precautions which we need to take to prevent the infectious diseases from antimicrobial agents should be followed like self-immunization, healthy food conditions, antibiotics should be used only when infections caused by the bacteria, regular exercise should be done and avoid tobacco and illegal drug usages which may prevent you from infectious diseases [99-100].

CONCLUSION

Antimicrobial resistance is encouraged by the wrong utilization of pharmaceuticals, for instance, when taking substandard measurements or not completing an endorsed course of treatment. Low-quality meds, wrong medicines and poor disease counteractive action and control likewise support the improvement and spread of medication resistance. Absence of government duty to address these issues, poor observation and a decreasing arsenals stockpile of devices to analyze, treat and forestall likewise impede the control of antimicrobial medication resistance.

REFERENCES

1. Venkatesh T, et al. Synthesis, Antimicrobial and Antioxidant Activity of Chalcone Derivatives Containing Thiobarbitone Nucleus. Med Chem (Los Angeles). 2016;6:440-448.
2. Rachuonyo HO, et al. In Vitro Antimicrobial Activity of Crude Leaf Extracts from Aloe secundiflora, Bulbine frutescens, Vernonia lasiopus and Tagetes minuta against Salmonella typhi. J Trad Med Clin Natur. 2016;5:187.
3. Batool Z, et al. Antimicrobial Resistance of ESBL Producing Coliforms Isolated from Retail Meat Samples. J Biom Biostat. 2016;7:316.
4. Amin Mir M, et al. Antimicrobial Activity of Various Extracts of Taraxacum officinale. J Microb Biochem Technol. 2016;8:210-215.
5. Mir AS, et al. Analysis of Phytochemistry and Antimicrobial activity of Tridax procumbens Linn. Chem Sci J. 2016;7:132.
6. Karlton-Senaye B, et al. Interaction of Gums and Antimicrobial Agents on Susceptibility of Selected Foodborne Pathogens. J Antimicro. 2016;2:121.
7. Lakehal S, et al. Essential Oil Composition and Antimicrobial Activity of Artemisia herba–alba Asso Grown in Algeria. Med Chem (Los Angeles). 2016;6:435-439.
8. Krishnaveni V. Analysis of Chemical Components and Antimicrobial Activity on Vetiver Extract for Home Textile Applications. J Textile Sci Eng. 2016;6:259.
9. Vinoda BM, et al. One Pot Synthesis, Antimicrobial and In Silico Molecular Docking Study of 1,3-Benzoxazole-5-Sulfonamide Derivatives. Organic Chem Curr Res. 2016;5:163.

e-ISSN: 2320-0812
p-ISSN: 2347-2340

10. Amer HH, et al.Synthesis and Antimicrobial Activity of New Synthesized Benzimidazole Derivatives and their Acyclic Nucleoside Analogues. Organic Chem Curr Res. 2016;5:157.
11. Hassan W, et al. Antimicrobial Activity of Cinnamomum tamala Leaves. J Nutr Disorders Ther. 2016;6:190.
12. Jaiswal AK, et al. Antimicrobial Activity of Bimetallic Cu/Pd Nanofluids. J Adv Chem Eng. 2016;6:151.
13. Tripathi YB, et al. Antimicrobial and Anti-Inflammatory Activity of Press Cake ofJatropha curcas. Appl Micro Open Access. 2016;2:116.
14. Bueno J. Antimicrobial Adjuvants Drug Discovery, the Challenge of Avoid the Resistance and Recover the Susceptibility of Multidrug-Resistant Strains. J Microb Biochem Technol. 2016;8:169-176.
15. Li YH and Tian XL. Undecaprenyl Pyrophosphate Phosphatase-Encoding Gene in Gram-Positive Bacteria as a New Antimicrobial Target . Immunogenet open access. 2016;1:103.
16. Utami AT, et al. Study of Antimicrobial Activity of Black Cumin Seeds (Nigella sativa L.) Against Salmonella typhi In Vitro. J Med Surg Pathol. 2016;1:127.
17. Angela Q, et al. In Vitro Antimicrobial Activity of Natural Essence and Distilled Extract of Bergamot against Drug Resistance Clinical Isolates. Med Aromat Plants. 2016;S3:007.
18. Keleher J, et al. Synthesis and Characterization of a Chitosan / PVA Antimicrobial Hydrogel Nanocomposite for Responsive Wound Management Materials. J Microb Biochem Technol. 2016;8:065-070.
19. Williams ME, et al. Molecular Validation of Putative Antimicrobial Peptides for Improved Human Immunodeficiency Virus Diagnostics via HIV Protein p24. J AIDS Clin Res. 2016;7:571.
20. Opinde HR, et al. Antimicrobial Evaluation of Crude Methanolic Leaf Extracts from Selected Medicinal Plants Against Escherichia coli. J Bacteriol Parasitol. 2016;7:272.
21. Mugweru FG, et al. Antimicrobial Activity of Aqueous Extracts of Maytemus putterlickoides, Senna spectabilis and Olinia usambarensis on Selected Diarrhea-Causing Bacteria. J Bacteriol Parasitol. 2016;7:270.
22. Beyene T, et al. Identification and Antimicrobial Susceptibility Profile of Salmonella Isolated from Selected Dairy Farms, Abattoir and Humans at Asella Town, Ethiopia. J Veterinar Sci Technol. 2016;7:320.
23. Singh BR, et al. Antimicrobial Activity of Methanolic Extract and Ether Extract of Ageratum conyzoides. Pharm Anal Acta. 2016;7:471.
24. Mneimne M, et al. Chemical Composition and Antimicrobial Activity of Essential Oils Isolated from Aerial Parts of Prangos asperula Boiss. (Apiaceae) Growing Wild in Lebanon. Med Aromat Plants. 2016;5:242.
25. López-Martín JI, et al. Isolation and Antimicrobial Susceptibility of Salmonella Typhimurium and Salmonella Enteritidis in Fecal Samples from Animals. J Antimicro. 2016;2:109.
26. Karthikeyan R, et al. Dendrimeric Biocides - A Tool for Effective Antimicrobial Therapy. J Nanomed Nanotechnol. 2016;7:359.
27. Rachuonyo HO, et al. Antimicrobial Potency of Methanolic Leaf Extracts from Selected Medicinal Plants against Staphylococcus aureus. J Med Microb Diagn. 2016;5:219.
28. Ngoc Tran DH and Koon HW (2016) Antimicrobial Peptides: An Emerging Approach to Treating Colitis. J Colitis Diverticulitis. 2016;1:e002.
29. Trivedi MK, et al. Antimicrobial Susceptibility of Proteus mirabilis : Impact of Biofield Energy Treatment. J Microb Biochem Technol. 2016;8:025-029.
30. Tejesvi M, et al. MB1533 is a Defensin-Like Antimicrobial Peptide from the Intracellular Meristem Endophyte of Scots Pine Methylobacterium extorquens DSM13060. J Microb Biochem Technol. 2015;8:445-449.
31. Kumar S, et al. Preliminary Phytochemical Screening and Antimicrobial Activity of Salvadora persica Linn. Extracts against Oral Pathogens. Fungal Genom Biol. 2016;6:131.
32. Eid R, et al. Potential Antimicrobial Activities of Probiotic Lactobacillus Strains Isolated from Raw Milk. J Prob Health. 2016;4:138.
33. Morrell JM. Antimicrobials in Boar Semen Extenders – A Risk/Benefit Analysis. J Antimicro. 2016;1:107.
34. Holthaus KB, et al. Microbicide Activity of Two Reptilian Antimicrobial Peptides on Gram Positive and Gram Negative Bacteria. J Immuno Biol. 2016;1:104.
35. Agyare C, et al. Antimicrobial and Anti-Inflammatory Properties ofAnchomanes difformis (Bl.) Engl. and Colocasia esculenta (L.) Schott. Biochem Pharmacol (Los Angel). 2016;5:201.
36. Achika JI, et al. Phytochemical Screening and Antimicrobial Studies of the Aerial Part of Aeschynomene unifloraMey. Ind Chem. 2016;2:113.
37. Nadeem F, et al. Red Sea Microbial Diversity for Antimicrobial and Anticancer Agents. J Mol Biomark Diagn. 2016;7:267.

e-ISSN: 2320-0812
p-ISSN: 2347-2340

38. Shanthakumar SP, et al. Antimicrobial Compound Cladding by Successive Ionic Layer Adsorption and Reaction (SILAR) Method for Antifomite Clinical Tools. J Antimicro. 2016;1:105.
39. Padalia H and Chanda S. Antimicrobial Efficacy of Different Solvent Extracts of Tagetes erecta L. Flower, Alone and in Combination with Antibiotics. Appli Micro Open Access. 2015;1:106.
40. Xu L, et al. Antimicrobial Activity and Identification of Actinomycete Strains from a Folk Medicinal Soil in China. Appli Micro Open Access. 2015;1:105.
41. Amabye TG. Evaluation of Physiochemical, Phytochemical, Antioxidant and Antimicrobial Screening Parameters ofAmaranthus spinosus Leaves. Nat Prod Chem Res. 2015;4:199.
42. Amabye TG. Evaluation of Phytochemical, Chemical Composition, Antioxidant and Antimicrobial Screening Parameters of Rhamnus prinoides (Gesho) Available in the Market of Mekelle, Tigray, Ethiopia. Nat Prod Chem Res. 2015;4:198.
43. Opawale BO, et al. Evaluation of Antimicrobial, Antioxidant and Cytotoxic Activity of Lovoa trichiliodesExtracts and Essential Oils. Med Aromat Plants. 2015;5:222.
44. Amabye TG and Mussa S. In Vitro Antimicrobial Efficacy of Fractions from Demakese (Ocimum lamifolium) Leaves Extract from Mekelle Tigray, Ethiopia. Nat Prod Chem Res. 2015;3:196.
45. Fatima A, et al. Design, Synthesis, Antimicrobial and Anti-inflammatory Activity of N-Pyrazolyl Benzamide Derivatives. Med Chem. 2015;5:521-527.
46. Monte-Serrano M, et al. Effective Antimicrobial Coatings Containing Silver-Based Nanoclays and Zinc Pyrithione. J Microb Biochem Technol. 2015;7:398-403.
47. Bueno J. Metabolomics in Antimicrobial Drug Discovery: The Success of the Chemical Diversity. J Microb Biochem Technol. 2015;7:380-383.
48. El-Attar MAZ, et al. Design and Synthesis of Some New 1,2,4-Triazolo[4,3-a]Quinoxaline Derivatives as Potential Antimicrobial Agents. Med chem. 2015;5:489-495.
49. Ale CE, et al. Microencapsulation of Bovine Vaginal Lactobacilli in Alginate Using Emulsiongelation: Freeze-drying, Storage and Antimicrobial Activity. J Bioprocess Biotech. 2015;5:262.
50. Gangwar M, et al. Isolation and Evaluation of Antimicrobial Activities of Endophytic Fungal Extract from Mallotus philippinensis Muell. Appli Micro Open Acces. 2015;1:103.
51. Tchouya GRF, et al. Phytochemical Analysis, Antioxidant and Antimicrobial Properties of the Leaves and Stem Bark of Scyphocephalium ochocoa Warb (Myristicaceae). J Pharmacogn Nat Prod. 2015;1:111.
52. Singh BR, et al. Antimicrobial Activity of Citronella Essential Oil on Antimicrobial Drug Resistant Bacteria from Veterinary Clinical Cases. Clin Med Biochem Open Access. 2015;1:106.
53. Trivedi MK, et al. Characterization of Antimicrobial Susceptibility Profile of Biofield Treated Multidrug-resistant Klebsiella oxytoca. Appli Micro Open Access. 2015;1:101.
54. Elbadry MA, et al. Evaluation of Antimicrobial, Cytotoxic and Larvicidal Activity ofZygophyllum Coccineum North Sinai, Egypt. Med Aromat Plants. 2015;4:214.
55. Vadhana P, et al. Emergence of Herbal Antimicrobial Drug Resistance in Clinical Bacterial Isolates. Pharm Anal Acta. 2015;6:434.
56. Krithiga J and Briget Mary M. Synthesis of Agnps of Momordica charantia Leaf Extract, Characterization and Antimicrobial Activity. Pharm Anal Acta. 2015;6:427.
57. Ghoneim AA and Assy MG. Synthesis and Characterization of Antimicrobial Activity of Azoles and Azines Derivatives from Tertiary Butyl Carbazate. Organic Chem Curr Res. 2015;4:148.
58. Mubarak S, et al. Synthesis Characterization and Antimicrobial Activity of N-nitroso-2, 6-Diphenylpiperidin-4-One Semicarbazone. Organic Chem Curr Res. 2015;4:141.
59. Trivedi MK, et al. Effect of Biofield Treatment on Antimicrobials Susceptibility Pattern of Acinetobacter baumannii - An Experimental Study. J Clin Diagn Res. 2015;3:117.
60. Trivedi MK, et al. Investigation of Biofield Treatment on Antimicrobial Susceptibility, Biochemical Reaction Pattern and Biotyping of Enteropathogenic Multidrug-Resistant Escherichia coli Isolates. Gen Med (Los Angel). 2015;S2:002.
61. Trivedi MK, et al. Antimicrobial Sensitivity, Biochemical Characteristics and Biotyping of Staphylococcus saprophyticus: An Impact of Biofield Energy Treatment. J Women's Health Care. 2015;4:271.
62. Ayub M, et al. Acute Otitis Media: Identification of Causative Pathogens with Antimicrobial Comparative Efficacy. J App Pharm. 2015;7:205.

e-ISSN: 2320-0812
p-ISSN: 2347-2340

63. Abdulkadir IS, et al. Phytochemical Screening and Antimicrobial Activities of Ethanolic Extracts of Moringa oleifera Lam on Isolate of Some Pathogens. J App Pharm. 2015;7:203.
64. Dundar A, et al. Antioxidant, Antimicrobial, Cytotoxic and Anticholinesterase Activities of Seven Mushroom Species with their Phenolic Acid Composition. J Horticulture. 2015;2:161.
65. Isabel Maestre-López M, et al. Antimicrobial Effect of Coated Leather Based on Silver Nanoparticles and Nanocomposites: Synthesis, Characterisation and Microbiological Evaluation. J Biotechnol Biomater. 2015;5:171.
66. Chairman M, et al. Phytochemical Screening and Antimicrobial Activity of Curcuma longa Natural Dye. Gen Med (Los Angel). 2015;3:171.
67. Dong X, et al. Superior Antibacterial Activity of Photochemical Synthesized Ag-CNT Composites and their Synergistic Effects in Combination with other Antimicrobial Agents. J Nanomed Nanotechnol. 2015;6:279.
68. Reta A, et al. Nasal Carriage, Risk Factors and Antimicrobial Susceptibility Pattern of Methicillin Resistant Staphylococcus aureus among School Children in Ethiopia. J Med Microb Diagn. 2015;4:177.
69. Jeeva S, et al. Phytochemical and Antimicrobial Study of the Flowers of Griff – An Endemic Palm of Southern Western Ghats. Med Aromat Plants. 2015;4:181.
70. Kaur M, et al. Isolation and Characterization of Constituents from the Leaves of Xanthium strumarium and their Evaluation for Antioxidant and Antimicrobial Potential. Nat Prod Chem Res. 2015;3:168.
71. Opoku F and Akoto O. Antimicrobial and Phytochemical Properties of Alstonia Boonei Extracts. Organic Chem Curr Res. 2015;4:137.
72. DeSear KE, et al. Evaluation of an Interactive Educational Model to Enhance Antimicrobial Stewardship at an Academic Medical Center. J Pharma Care Health Sys. 2015;S2:S2-001.
73. Sánchez RR, et al. Antimicrobial Susceptibility of Beta Haemolytic Streptococci Isolated from Paediatric Patients with Pharyngoamigdalitis. Fam Med Med Sci Res. 2015;4:151.
74. Adekunle OC and Onilude AA. Antimicrobial Resistance and Plasmid Profiles of Campylobacter Species from Infants Presenting with Diarrhoea in Osun State, Nigeria. J Med Microb Diagn. 2015;4:172.
75. Perchyonok VT, et al. Insights into Functional Erythromycin/Antioxidant Containing Chitosan Hydrogels as Potential Bio-active Restorative Materials: Structure, Function and Antimicrobial Activity. Adv Tech Biol Med. 2014;2:116.
76. Pratiwi SUT, et al. Antimicrobial effects of Indonesian Medicinal Plants Extracts on Planktonic and Biofilm Growth of Pseudomonas aeruginosa and Staphylococcus aureus. J Horticulture. 2015;2:119.
77. Yan L, et al. In Vitro Synergism Testing Of Three Antimicrobial Agents against Multidrug-Resistant and Extensively Drug- Resistant Mycobacterium Tuberculosis by Checkerboard Method. J Mol Pharm Org Process Res. 2015;2:123.
78. Xuhong J, et al. Preparation of the Silicone-Modified Antimicrobial Polyethylene Endotracheal Tube (PE ETT). J Med Microb Diagn. 2014;3:163.
79. Das SK, et al. Ethnomedicinal, Antimicrobial and Antidiarrhoeal Studies on the Mangrove Plants of the Genus Xylocarpus: A Mini Review. J Bioanal Biomed. 2014;S12:004.
80. Seelolla G, et al. Synthesis, Antimicrobial and Antioxidant Activities of Novel series of Cinnamamide Derivatives having Morpholine Moiety. Med Chem. 2014;4:778-783.
81. Narasimhan B, et al. Esters, amides and substituted derivatives of cinnamic acid: synthesis, antimicrobial activity and QSAR investigations. Eur J Med Chem. 2004;39:827-834.
82. Natella F. Benzoic and cinnamic acid derivatives as antioxidants: structure-activity relation. J Agri Food Chem. 1999;47:1453-1459.
83. Richards LA, et al. Synergistic effects of amides from two piper species on generalist and specialist herbivores. J Chem Ecol. 2010;36:1105-1113.
84. Yoshida K, et al. MexAB-OprM specific efflux pump inhibitors in Pseudomonas aeruginosa. Part 6: Exploration of aromatic substituents. Bioorg Med Chem. 2006;14:8506-8518.
85. Burits M and Bucar F. Antioxidant activity of Nigella sativa essential oil. Phytother Res. 2000;14:323-328.
86. Preeti J. Antibacterial and antioxidant activities of local seeded banana fruits. African J Pharma Pharmacol. 2011; 5:1398-1403.
87. Debabandya M. Banana and it's by product utilization: an overview. J Sci Ind Res. 2010;69:323-329.
88. Kalita D and Bikash D. Some folk medicines used by Sonowal Kacharis Tribe of the Brahmaputra valley. Natural Product Radiance. 2004;3:240-246.

e-ISSN: 2320-0812
p-ISSN: 2347-2340

89. Partridge SR. Analysis of antibiotic resistance regions in Gram-negative bacteria. FEMS Microbiol Rev. 2011;35:820-855.
90. Partridge SR, et al. Gene cassettes and cassette arrays in mobile resistance integrons. FEMS Microbiol Rev. 2009;33:757-784.
91. Murakami K, et al. Identification of methicillin-resistant strains of staphylococci by polymerase chain reaction. J Clin Microbiol. 1991;29:2240-2244.
92. Eraç B and Gülay Z. Molecular epidemiology of PER-1 extended spectrum beta-lactamase among gram-negative bacteria isolated at a tertiary care hospital. Folia Microbiol (Praha). 2007;52:535-541.
93. Nesvera J, et al. An integron of class 1 is present on the plasmid pCG4 from gram-positive bacterium Corynebacteriumglutamicum. FEMS Microbiol Lett. 1998;169:391-395.
94. El-Ghodban A, et al. PCR detection of toxic shock syndrome toxin of Staphylococcus aureus from Tripoli, Libya J Med Microbiol. 2006;55:179-182.
95. Zarmouh MM, et al. Studies on Methicillin resistant Staphylococcus aureus (MRSA) prevalence rate in Miserata, Libya. Ind J Nat Sci. 2012;10:734-740.
96. Shebani OA, et al. Clinical relevance of Methicillin-resistant Staphylococcus aureus isolated from surgical site infections. Jordan Med J. 2004;3:46-49.
97. Kumar V and Yadav SK. Plant-mediated synthesis of silver and gold nanoparticles and their applications. J Chem Technol Biotechnol. 2009;84:151-157.
98. Kleemann W. Random-field induced antiferromagnetic, ferroelectric and structural domains states. Int J Mod Phys B. 1993;7:2469-2507.
99. Sondi I and Salopek-Sondi B. Silver nanoparticles as antimicrobial agent: a case study on E. coli as a model for Gram-negative bacteria. J Colloid Interface Sci. 2004;275:177-182.
100. Ogunjobi AA and Abiala MA. Antimicrobial activity of Sennaalata and Phyllanthusamarus. Global J Pharmacol. 2013;7:198-202.