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Title: Synergistic potential of aegle marmelos essential oil in combination with antifungal drugs against drug resistant fungal pathogens

Abstract:

Drug resistance among fungal infections has increased in recent years and the efficacy of antibiotics has declined. By combining antibiotics with the essential oil from the leaves of *Aegle marmelos* (L.) Correa this study provides a unique strategy against fungal infections. The GC-MS analysis identified nine phytochemicals, the most abundant of which were α -Phellandrene and D-Limonene. Further evaluation of *A. marmelos* essential oil's (AMEO) anti-candida activity revealed a zone of inhibition of 24 ± 0.5 and 22 ± 0.30 mm against the two *Candida albicans* strains (ATCC 90028 and MTCC277), respectively, when tested using the agar well diffusion assay. The MIC ranged from 0.312 to 0.156% (v/v), indicating a fungicidal activity against the *C. albicans* ATCC90028 and MTCC277 strains. It was determined to have strong and efficient antifungal action against *C. albicans*. Time kill assay and checkerboard method were used to determine synergistic potential, and the results showed that the antifungal efficacy of clinical medicines was boosted by 16 and 32 folds, respectively, resulting in total cell death after 16 hours. Field Emission Scanning Electron Microscopy (FESEM) observations were used to evaluate the mode of action of essential oil and antibiotics individually and in combination. Essential oil and antibiotics were able to completely break and damage the fungal membrane of *C. albicans* cells, also when utilized separately, they caused shrinkage and cell death. This serves as a refinement in drug design and a potential treatment for candidiasis.

Biography

Dr. Riya Bhattacharya has completed her PhD in Biotechnology from Shoolini University in Himachal Pradesh, India. She also holds a postdoctoral researcher position from the same University. From both her undergraduate and postgraduate degree in biotechnology she was a gold medalist of the respective batches. She is currently serving as Assistant Professor at the School of Technology in Woxsen University. She has published 21 academic articles with well reputed journals and has 13 patents to her name. She is also a part of various academic committees and has been active in outreach programs as well.