

## Disinfectants of plant origin: emerging application, standardization and meta-analysis

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### ABSTRACT

This review evaluated plant extracts' effectiveness in treating and disinfecting water. According to data analysis, plant secondary metabolites with complex mechanisms of action are not widely used in water treatment. Only around 25% of studies reported the use of plant extracts for water purification, compared to almost three-quarters that reported antibacterial activity. Therefore, more research into plant-based technologies to cleanse and treat drinkable and safe water is required. According to reports, plants' seeds and flowers were employed in about half of the studies (24.53% and 20.75%, respectively), but less study has been done on how to use their bulbs, resin, bark, and tubers. Limited application of plant exists in developing associated products for water treatment because of the plant's availability, difficult extraction methods, lack of standardization, need for purification, slow rate of action, poor water solubility and yield of plant extract. This has caused a gap in the adoption for large and industrial scale applications. The technology needs to be improved so that it can be used in industrial settings more widely. Genomic, metabolomic, and proteomic methodologies need to be used for phytobiotic standardization. Water can be treated using plant products, but there are limitations. These limitations must be improved to increase acceptance of these products in the industry.

*Keywords:* Phytochemicals; Microbial resistance; Water treatment; Standardization

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