Extended Abstract

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Comparative Study of the Antibacterial Activity of the Underground Stem of Ginger (Zingiber officinale) and the Bulb of Garlic (Allium sativum) on Selected Aerobic Bacterial Species

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ABSTRACT

Background: In this study, Garlic extract was tested against the extract of Ginger. The rate of action, effect of temperature and pH were measured. Also, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were measured. The zone of inhibition observed in this study confirmed the use of Garlic as a more potent antibacterial agent. The rate of action of Garlic was very high eliminating 65% and 73% of Pseudomonas aeruginosa and Antibacterial, Activity, Aerobic, Garlic and Ginger pyogenes respectively while Ginger recorded 47% and 51% action in the first eight hours. The effect of pH and temperature did not alter significantly the activities of the extracts on the test microorganisms. Garlic extract showed a MIC and MBC of 0.0125 and 0.025 concentrations of the stock using Strep pyogenes; and MIC and MBC of 62.5mg and 125 mg concentrations on Ps. aeruginosa. Similarly, Ginger showed MIC and MBC of 125 mg and 250 mg concentrations on Strep pyogenes; and 250 mg and 500 mg concentrations of Ginger on Ps. aeruginosa. The analysis of variance showed that there is no significant difference ($P<0.05$) on the sensitive pattern of both organisms to the extracts. The correlation analysis (spearman's rank model) showed a weak relationship ($r=0.3$) with respect to responses of the microorganisms to pH and temperature but strong relationship with time ($r=0.8$).

Ginger and Garlic are widely used in Africa as herbal supplements in food and for medical purposes. These genera are bulb and rhizoid group of plants traditionally used in Southern Nigeria to add spice to food and to treat some disease. Garlic is a nature to Central Asia and has long been a staple in Mediterranean region as well as seasoning in Asia, Africa and Europe. It is used as fish and meat preservative in Asia and some part of Africa.

Medically, its allicin and phytoncide have antibiotic and antifungal activities respectively. Garlic is used traditionally for the treatment of upper respiratory tract infections such as cough and sore throat; and gastrointestinal tract infections. Fresh ginger is used as the main spice in making pulse, lentil curries and other vegetable preparations. Traditionally, it is used in preparing food for pregnant women and nursing mothers. Unlike garlic, not much is known about the antibacterial activities of ginger except that the studies conducted revealed that gingerol found in Ginger is known to have antibacterial properties. However, both fresh and dried roots of ginger have been used in the treatment of cold, colic, asthma, cough and loss of appetite. This study is aimed at having a comparative analysis of the extract of both plants in relation to the antibacterial activity of Gentamycin and Ciproxin antibiotics. The minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) of the extracts were determined. Also investigated were the effect of heat and pH; and the kinetics of the extracts.

This work has proved the antibacterial activity of both plant extract. Though more activity was shown by Garlic on Ps. aeruginosa and Str. pyogenes, Ginger showed promising antibacterial activity. Their stability under varying environmental conditions and encouraging MIC and MBC are advantages to be considered for their usage. It is, therefore, recommended that more work be done especially on Garlic to ascertain its bioavailability and biosafety on human cells.

Keywords

Antibacterial, Activity, Aerobic, Garlic and Ginger.

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