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Studies on synergistic antimicrobial potential of aloe-wheatgrass extract combination

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Abstract

Wheatgrass and aloe vera are two of the important herbs consumed widely and are known for therapeutic and nutraceutical potential. Wheatgrass is known for its antiulcer and anticancer potential while aloe has wound healing and soothing potential. The current work was focused to evaluate antimicrobial potential of aloe-wheatgrass extract combination. The results demonstrated that extract of aloe- wheatgrass synergistically inhibited growth of microbes. Thus, it could be concluded that aloe-wheat grass combination could be a potential source of antimicrobial agents.

Keywords: *Aloe, wheat grass, synergistic, antimicrobial.*

Introduction

The beginning of 18th century witnessed the development of synthetic chemicals of therapeutic importance. Among them, antimicrobial agents were the one. Till date the discovery of antimicrobials has revolutionized the field of antimicrobial chemotherapy. Irrational prescribing of antibiotics has lead to development of phenomenon of antimicrobial resistance against pathogens like *Streptococcus pneumonia, Staphylococcus aureus, Klebsiella*, *Neisseria, Enterococci* etc[1, 2].

Nature serves to be an important repository of medicine. A large number of plants are known for therapeutic potential. Aloe[3] and wheat grass[4] are two indigenous plants used widely against a number of diseases. Aloe is known for soothing, cooling, wound healing and antiallergic potential [3, 4, 5] whereas wheatgrass is used for ulcerative colitis[7] the herb is also known for antioxidant potential[8].

These herbs find multifold use, still no reports on antimicrobial potential of their combination is reported. Therefore aim of the current work was to evaluate antimicrobial potential of combination of aloe and wheatgrass extract.

Material and Methods

Plant collection and extraction

Preparation of Aloe extract

Aloe was identified and authenticated by Dr. Mrs. Indu Gupta, Retd. Professor, Department of Botany, Model Science College, Jabalpur, M.P., India. Aloe was washed and dried in shade for 7 days. The grass was powdered and subjected to soxhlet extraction using ethyl acetate for 20 cycles. Extract was lyophilized and stored at 4°C till use.

Preparation of Wheat grass extract

Wheat grass from *Triticum aestivum* was grown in our laboratory. A 100 day matured leaflings were harvested at 3cm from root. Wheatgrass was identified and authenticated by Dr. (Ms.) Indu Gupta, Retd. Professor, Department of Botany, Model Science College, Jabalpur, M.P., India. The grass was washed and dried in shade for 7 days. The grass was powdered and subjected to soxhlet extraction using ethyl acetate for 20 cycles. Extract was lyophilized and stored at 4°C till use.

Chemicals

Until otherwise specified all the chemicals were purchased from CDH, India.

Test microorganisms

All the microorganisms were incubated at 37 ± 0.1ºC, for 24 h in Nutrient broth, C. albicans in YEPD broth at 28 ± 0.1ºC for 48 h.

Phytochemical analysis

Phytochemical analysis of various extracts was done by standard method[9].

Study design

The combination ratio used in present study is as follows:

C1: Aloe extract: Wheatgrass extract= 1:3

C2: Aloe extract: Wheatgrass extract= 2:2

C3: Aloe extract: Wheatgrass extract= 3:1

Antimicrobial studies

Nutrient Agar and YEPD Agar (20 ml) were poured into each sterilized Petri dish (10 X 100 mm diameter) after suabbing cultures (100µl) of bacteria and yeast and distributing medium in Petri dishes homogeneously. For the investigation of the antibacterial and anticandidal activity, the dried extracts were dissolved in distilled water to a final concentration of 20% and sterilized by filtration through a 0.22µm membrane filter. Each sample viz C1, C2 and C3 (100 µl) was filled into the wells of agar plates directly. Plates injected with the fungal cultures were incubated at 28 ºC for 48 h, and the bacteria were incubated at 37 ºC for 24 h. At the end of the incubation period, inhibition zones formed on the medium were evaluated in mm. Studies were performed in triplicate and the inhibition zones were

compared with those of reference discs. Amphotericin B (10µg) and tetracycline (30µg) were taken as reference[10]. Results are shown in Figure 1 and 2.

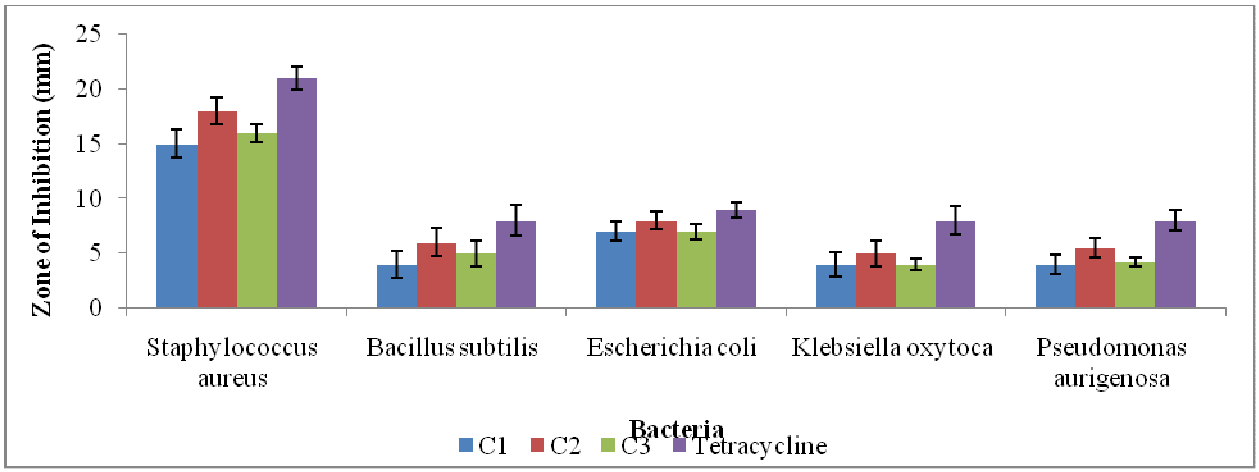

Figure1: Antimicrobial effect of Aloe-wheatgrass extracts combination

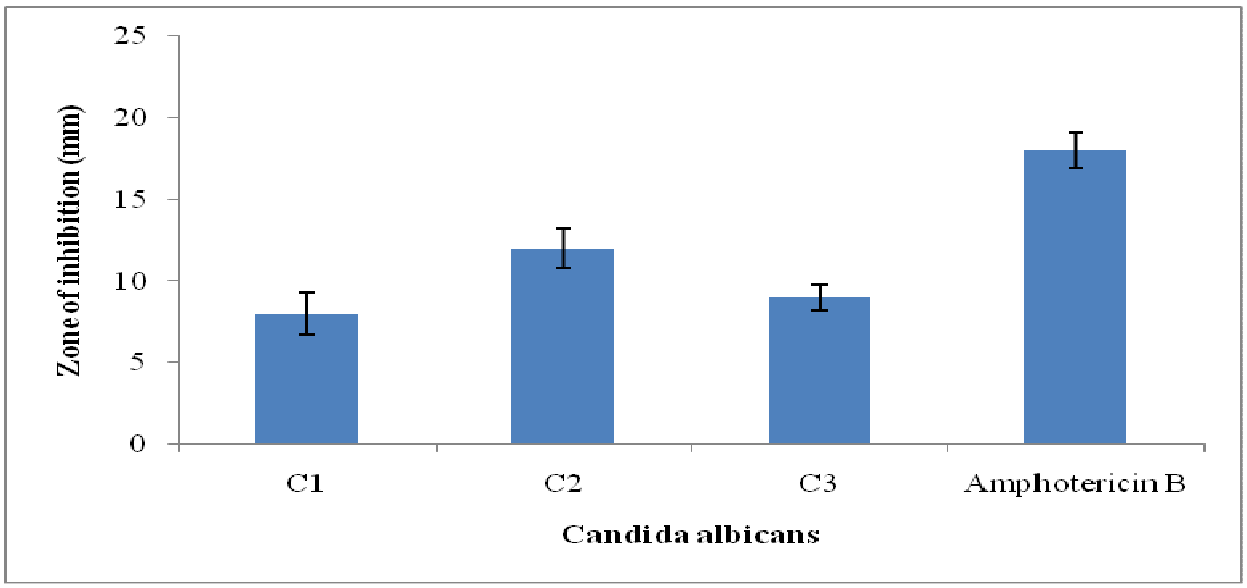

Figure2: Antifungal effect of Aloe-wheatgrass extract combination

Results and Discussion

Plants are integral source of phytochemicals and phytopharmaceuticals. A number of plants are used as folk remedies in the various parts of the world. The current work was designed to evaluate antimicrobial potential of aloe-wheat grass combination. Results of phytochemical screening revealed aloe extract contained a number of phytochemicals like alkaloids, glycosides, tannins, phenolics and flavonoids, whereas wheatgrass extract was found to contain flavonoids, tannins, alkaloids.

Results of antimicrobial studies of the three combinations viz. C1, C2 and C3 were found to be encouraging. Out of this, C2 demonstrated significant higher antimicrobial potential (figure 1 and 2). Plants are important source of potentially useful structures for the development of new chemotherapeutic agents [10]. The first step towards this goal is the *in vitro* antibacterial activity assay. Many reports are available on the antiviral, antibacterial, antifungal, anthelmintic, antimolluscal and anti-inflammatory properties of plants. The current work demonstrated synergistic potential of aloe-wheatgrass combination. A detailed study on its mechanism of action is in progress in our laboratory.

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