



Determination of the Effect of Sound on *Pandanus amaryalifolious* Leaves Extracts using Phytochemical Analysis

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Abstract In this work two samples of a (*Pandanus amaryalifolious*) leaves extracts, were exposed to sound waves length of (528 nm and 741 nm) while the third sample of the leaves was left without exposure to any sound. Phytochemical analysis was used to find the effect of different wave lengths absorption by the samples; it showed a dramatic difference at the concentrations of some organic elements.

Keywords *Pandanus amaryalifolious*, Sound, leaves extracts

Introduction

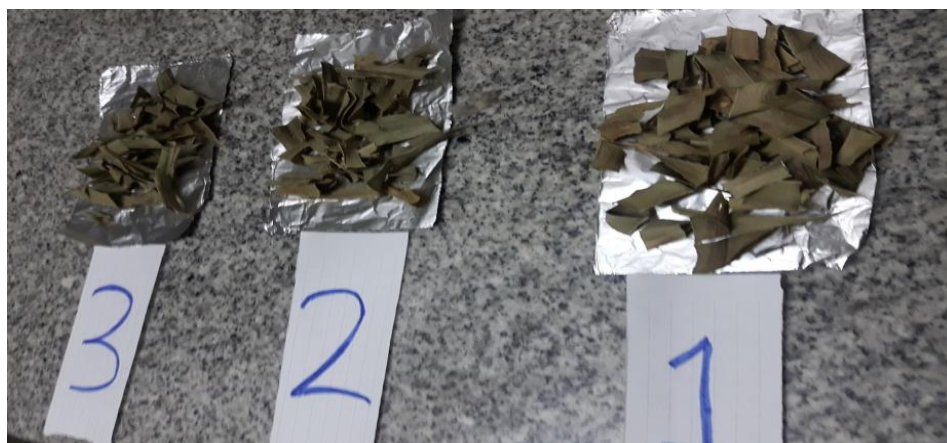
Sound can propagate through a medium such as air, water and solids as longitudinal waves and also as a transverse wave in solids. The sound waves are generated by a sound source, such as the vibrating diaphragm of a stereo speaker. The sound source creates vibrations in the surrounding medium. As the source continues to vibrate the medium, the vibrations propagate away from the source at the speed of sound, thus forming the sound wave. At a fixed distance from the source, the pressure, velocity, and displacement of the medium vary in time. At an instant in time, the pressure, velocity, and displacement vary in space. Note that the particles of the medium do not travel with the sound wave. This is intuitively obvious for a solid, and the same is true for liquids and gases (that is, the vibrations of particles in the gas or liquid transport the vibrations, while the *average* position of the particles over time does not change). During propagation, waves can be reflected, refracted, or attenuated by the medium.

Materials and Methods

Collection of Plant Material

The fresh and healthy leaves of plant were collected from different location of Khartoum – Sudan during September 2020. The plants were identified by *Rasihida Abu Sin*, Leaves were washed with distilled water so as to remove dirt and soil particles. The leaves were crushed and dried in a shaded area at room temperature for a period of a week. Then the dried leaves were grinded with an ordinary grinder and then sieved through server.





Dry Leaves of Plants Samples (1, 2, 3)

Preparation of Extracts for Phytochemical Analysis

The collected leaves of *Pandamus amaryaliolious* were washed and then dried under shade. The coarse powder was soaked in 500 ml of distilled water and extracted in the cold for 3 d with occasional shaking. The solvent from the total extract was filtered & concentrated on a water bath for 8 h. The remaining was used for the analysis of phytochemicals test.

Phytochemical Analysis

Test for Alkaloids

The presence of alkaloids in extracts was tested by using Wagner reagent prepared.1 then, 2 mL of Wagner reagent was added to 2 mL of extracts. The formation of reddish-brown precipitate indicated the presence of alkaloids.

Test for Steroids

Test for steroids was done according to the method with modifications.1Hence, 1 mL of extract was taken in a test tube and dissolved with 10 mL chloroform, and then equal volume of concentrated H_2SO_4 was added to the test tube by sides. The upper layer in the test tube appears red and sulphuric acid layer showed yellow with green fluorescence, which indicated the presence of steroids

Test for Flavonoids

2 mL of extract was taken in a test tube and 2-3 drops of dilute NaOH was added.11 An intense yellow color has appeared in the test tube. The solution became colorless when few drops of dilute H_2SO_4 was added confirming the presence of flavonoids.

Test for Saponin and Terpenoids

Two grams of the powdered sample was boiled in 20 mL of distilled water in a water bath and filtered.2 To the filtered sample (10 mL), about 5 mL distilled water was added, shaken vigorously and observed for a stable persistent frothing for 25 min.

Test for Tannins

Test for tannins was done with some modifications.2 From the dried powdered sample, 0.5 g was boiled in 20 mL water in a test tube and then filtered. One milliliter of 0.1% Ferric Chloride (0.01 Mol/dm^3) was added to 2 mL of extract. Brownish green colorations were indicated. the presence of tannins.

Results and Discussion

The results (table 1) of chemical test with leaves extract of *Pandamus amaryaliolious* contain phytochemicals like steroids, tannin, flavonoids, alkaloids, and saponins.

According to Harborne and Williams [3], flavonoids exhibit anti-inflammatory, antimicrobial, antioxidant, vascular activities along with other medicinal properties. There are several reports on the antimicrobial activity of flavonoids



[4-5]. The crude extracts with flavonoids, steroids, and triterpenes have significant activity against various strains of *Staphylococcus aureus*, *Escherichia coli* and *Streptococcus faecalis* [6]. Tannin may be toxic to the organisms like bacteria, yeast and filamentous fungi [7] having a potential antiviral [8] and antibacterial activity [9,10]. Alkaloids are used as anesthetic agents [11]. Terpenoids exhibit various important pharmacological activities, i.e., anti-inflammatory, anticancer, antimalarial, inhibition of cholesterol synthesis, antiviral and antibacterial activities [12].

Table 1: Metabolites Identified in *Pandanus amaryaliolius* Leaves Extract

Phytochemical	Index
Tannins	+
Flavonoids	+
Saponins	+
Steroids	+
Alkaloids	+
Commarins	+

Key + present

Conclusion

The *Pandanus amaryaliolius* leaves extract was found a rich source of secondary metabolite, however it possesses antibacterial activity. These results confirm the presence of antibacterial compounds in *Pandanus amaryaliolius*. The leaves extract was effective against *Staphylococcus aureus* might be used as a source for finding the antibiotics effective against bacterial and fungus infections. This research concluded that, the energy of the wave sound can change the amount of secondary metabolites that present naturally in plant.

References

- [1]. Patil RS, Bhise KK. Evaluation of phytochemicals and *in vitro* antimicrobial activity of aqueous and ethanolic extract from seeds of *Ricinus communis* Linn. Eur J Biotechnol Biosci 2015;3:19-23.
- [2]. Patil RS, Harale PM, Shivangekar KV, Kumbhar PP, Desai RR. Phytochemical potential and *in vitro* antimicrobial activity of *Piper betle* Linn. leaf extracts. J Chem Pharm Res 2015;7:1095-101.
- [3]. Harborne JB, Willians CA. Advances in flavonoid research since 1992. Phytochem Oxford 2000;55:481-504.
- [4]. Baez DA, Vallejo LGZ, Jimenez-Estrada M. Phytochemical studies on *Sennaskinneriand Sennawishizeni*. Nat Prod Lett Berks 1999;13:223-8.
- [5]. Xu HX, Lee SF. The activity of plant flavonoids against antibiotic-resistant bacteria. Phytother Res London 2001;15:39-43.
- [6]. Chattopadhyay D, Maiti K, Kundu AP, Chakraborty MS, Bhadra R, Maudal SC, et al. Antimicrobial activity of *Alstoniamacrophylla*: A folklore of bay islands. J Ethnopharmacol Lausanne 2001;77:49-55.
- [7]. Harborne JB. Photochemical methods: a guide to modern techniques of plant analysis. Chapman and Hall London; 1973.p. 279.
- [8]. Lin LU, Shu-wen L, Shi-bo J, Shu-guang W. Tannin inhibits HIV-1 entry by targeting gp41. Acta Pharmacol Sin 2004;25:213-8.
- [9]. Akiyama H, Kazuyasu F, Yamasaki O, Oono T, Iwatsuki K. Antibacterial action of several tannins against *Staphylococcus aureus*. J Antimicrobial Chemother 2001;48:487-91.
- [10]. Funatogawa K. Antibacterial activity of hydrolysable tannins derived from medicinal plants against *Helicobacter pylori*. Microbiol Immunol 2004;48:251-61.
- [11]. Hérouart D, Sangwan RS, Fliniaux MA, Sangwan-Norreel BS. Variations in the leaf alkaloid content of androgenic diploid plants of *Daturainnoxia*. Planta Med 1988;54:14-7.
- [12]. Mahato SB, Sen S. Advances in triterpenoid research, 1990-1994. Phytochemistry 1997;44:1185-236.
- [13]. Patil RS, Desai AB, Wagh SA. Comparative study of antimicrobial compounds extracted from leaves of *Nicotiana Tabacum* and cigarette. World J Pharm PharmSci 2015;4:1511-8.

