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COMPARATIVE ANALYSIS OF SEED EXTRACTS ON THE BLUETOOTH DROPS MICROFLORA (MIDDLE AGE ADULTS) FROM MEENKSHIPURAM MEERUT

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Abstract : Conventionally, crude extracts of different parts of **medicinal plants have been** broadly used **in the treatment** of some human diseases. Medicinal plants have quite a lot of phytochemicals such as flavonoids, alkaloids, **tannins** and terpenoids, which **have** antimicrobial and antioxidant properties. The antimicrobial **activity** of **a number of** plant species **has** been **extensively studied.** The present study focused to evaluate the antibacterial activity of various fruit seeds extracts prepared using petroleum ether, n-propanol and acetone as solvents against certain bacterial strains isolated from Bluetooth devices worn by middle aged persons from Meenakshipuram Meerut by using the well diffusion method. The acetone extract of Papaya seeds shows best antimicrobial activity shown by (5mm-30mm) zone of inhibition followed by n-propanol of papaya (5mm-25mm) and petroleum ether of sapota shows (5mm-20mm). The mean zone of inhibition of acetone extract produced range between (5mm-30mm) which shows the highest range of inhibition. Among all the extracts acetone extracts shown potential broad spectrum antimicrobial activity depicting that acetone is best solvent among three for extraction of antimicrobial compounds from seeds. Among different seed extracts Bitter gourd seeds showed maximum antimicrobial potential in the present study emphasising its potential to be used as antimicrobial drug. The study can be concluded that seeds extracts may find better application in antibacterial natural remedy.

IndexTerm : Bluetooth drops, seed extract ,microbes, antibacterial activity, well diffusion method

1. INTRODUCTION

Microorganisms are available naturally in the surrounding environment and as normal inhabitant of human body; from where they will inhabit the devices worn on human body such as blue tooth drops which are style statement for everyone these days. A no of bacteria are able to penetrate through Bluetooth devices like Earbuds, neckband, eardrops etc these infection occurs as local purulence (ear infection, fluid from the ear, glue ear, hearing loss, deafness, otitis) which can also cause serious disease acoustic neuroma (Yaegaki et al. 1999). The above mentioned problems are caused by microbes which is one of the problems in humans increase day by day. Treating this problem with plant materials will be better option within the last few years these infections have increased to a great extent due to more use of Bluetooth drops day by day in the past antibiotic is used for treatment but many of the pathogenic bacteria are now resistant to these antibiotic natural products of higher plant may offer new source of antibacterial agent for external use. Due to report of increasing developments of drug resistance in human pathogen as well as undesirable side effects of certain antimicrobial agents, it is necessary to search for new agents that are better, cheaper and without side effect for treating infectious diseases especially in developing countries. A wide variety of plant/natural products are used in the treatment of infections. The present study attempts to determine whether or not the empirical application of plant extract could be supported by scientific explanation for their use as antimicrobial agents (Marjorie et al. 1999). For this the acetone, n-propanol and petroleum ether were used to extract the phytochemicals from seeds of papaya (*Carica papaya*), pumpkin (*Cucurbita moschata*), bitter gourd (*Momordica charantia*), ridge gourd (*Luffa acutangula*) and sapota (*Manilkara zapota*). These seeds were chosen as they were readily available in every middle class family.

Papaya seed is rich in polyphenols it also contain phytochemical like saponin, tannin, alkaloids ,flavonoid and anthraquinones.

Pumpkin seed may be tiny but they are densely packed with useful nutrient and nutraceuticals such as amino acids, phytosterols, phenolic compound , tocopherols , cucurbitacins .

Spota is an excellent source of antioxidants with ascorbic acid .Polyphenols found in immature sapota fruit have been identified s 3-caffeoylquinic. Sapodilla also contain a high amount of tannin which may be responsible for the fruits high antioxidant capacity,although the amount of tannin decreases as it ripens.

Bitter gourd has bioactive compounds like terpenoids having antitumor property, saponins have antihyperglycemic, hypolipidmic and antiviral property.

Ridge gourd, is a vegetable consumed in many parts of India. This perennial plant is also native to southeast Asia and is used in various health conditions. It is rich in carotenoid, polyphenols and essential oils.

2. RESEARCH METHODOLOGY

2.1 Collection of sample

The present study was carried out on samples collected using sterile ear buds from bluetooth drops worn by 120 middle aged (35-45yrs) people from Meenakshipuram Meerut. The collected swabs were soaked in 2ml normal saline in a sterile plain container mixed well to ensure all micro-organisms diffuse in normal saline. The lab work was carried out at MIET, Meerut from March 2023-May 2023.

2.2 Characterization and identification of isolates

The bacterial and fungal isolates were screened for colonial morphology, cell morphology and biochemical characteristics. Confirmatory identities of the bacteria were made using the Bergey's Manual of Determinative Bacteriology (Holt., et al. 1994) microscopic characteristics, slide culture techniques and slide mount of each isolate in lactophenol-cotton (Oyeleke et al. 2016).

2.3 Preparation of seed extract

Seed of papaya, pumpkin, bitter gourd, sapota and ridge gourd were collected from local area of Meenakshipuram Meerut, India .The collected seeds were dried under room temperature for seven days in the absence of sunlight the dried seeds were grinded to make it as fine powder.

2.4Preparation of crude extract

For extraction,30 g powder of each tested plant material was soaked in 270 ml of n-propanol, petroleum ether and acetone (9:1) in round bottom flask and incubated at 37ºC and 150 rpm for 72 hours in orbital shaker (Xu et. al 2008). Liquid extracts obtained were separated from the solid residue by filtration using Whatman No.1 filter, and then concentrated using a rota vaccum evaporator yield of selected plants was calculated (Felhi et. al 2017).

Yield (%) = (X*100)/X1 Yield (%)

Where X refers to the weight of extracts after evaporation of solvent and X1 refers to the dry weight of the plant powder before extraction.

3.ANTIBACTERIAL ASSAY

A bacterial suspension of each isolate was prepared in liquid culture medium and equalized to 0.5 McFarland standard and the solution was seeded on the entire surface of Muller Hinton agar using a sterilized cotton bud (Barrow et. al 2011). After drying, a 9 mm diameter pore was made in each plate by using cork-borer with duplicate and control plates. Approximately, 0.1 ml of each of the plant extract, were injected to fill the wells. All inoculated Petri dishes were incubated at 37°C for 24 hours. The inhibition zone was then measured from the diameter of the clearing zone in millimetres. All the dishes were examined for the Minimum Inhibitory Concentration (MIC) that inhibits the bacterial growth after incubation (Bansode and Chavan, 2013)

2.6 Statistical analysis

MS- excel was used to compare the mean zone of inhibition values.

5.RESULT AND DISCUSSION

Five seed extracts were evaluated against microbes isolated from blue tooth drops of middle age groups. The microbes were tentatively identified as *Pseudomonas*, *Bacillus* sp., *Staphylococcus* sp., *Streptococcus* sp., *Enterococcus* sp. The fruits and vegetable seed extracts subjected to antimicrobial screening were mentioned in Table 1. In vitro antimicrobial activity of different seed extracts were depicted in Table 2. Present observation revealed that the acetone extract of *Carica papaya* (papaya) and *Momordica charantia* (karela) , n-propanol extract of *Cucurbita moschata* (Pumpkin) and *Momordica charantia* (Bitter gourd) and petroleum ether of *Manilkara zapota* (sapota) seed possessed good antimicrobial activity against bacteria.

Among all 5 seed, in acetone extract of various fruit Papaya and bitter gourd seed exhibited maximum inhibition zone (5mm-30mm) , n- propanol extract of pumpkin and bitter gourd exhibit maximum inhibition zone (5mm-25mm) and in petroleum ether extracts spota (5mm-20mm) exhibit maximum inhibition zone.

These results are in accordance with those of Masfufatun et. al 2019 and Dagne et al 2021. A great variation in ZOI of extract demonstrated in several investigation may be due to considerable variation in their method of extraction, constituents as well as bacterial strains used. Also, variation in ZOI of different plant extracts may arise from variation in their chemical constituents and volatile nature of their constituents. On the other hand, *Carica papaya* (Papaya) extract was found to be effective against *Pseudomonas*,

Bacillus sp., *Staphylococcus* sp., *Streptococcus* sp., *Enterococcus* sp., suppressing their growth. Papaya seeds were rich in alkaloids, flavonoids, steroids, polyphenols, tannins and saponins. Plants can provide a wide range of chemical compounds with different biological activities. These compounds from medicinal plants have helped eliminate many diseases caused by pathogenic bacteria. The importance of these plants is shown by the fact that they can be designed as a target material, unlike chemical antibiotics that act in the role of plants and drug-resistant bacterial diseases (Amenu, 2014). There is an urgent need to find new antibacterial drugs with new properties to fight the spread of new infectious diseases and the misuse of traditional antibiotics. Therefore, there have been interesting advances in the extraction of certain chemicals from different plants.

Some researchers have proposed that the antimicrobial components of plant extracts (terpenoids, alkaloids, and phenolic compounds) interact with enzymes and proteins in the microbial cell membrane, where disruption of the cell membrane interrupts the flow of protons to the outside of the cell, causing. Cell death or inhibit the necessary enzymes. For amino acid biosynthesis (Burt, 2004, Gill and Holley, 2006). Other researchers attributed the inhibitory effect of these plant extracts to the hydrophobicity of these plant extracts, which allows them to react with microbial cell membrane and mitochondrial proteins, disrupting their structures and changing their permeability (Friedman et al., 2004, Tiwari et al. 2009). This study proposed that potentially effective plant extracts can be used as natural preservatives to control food poisoning diseases and preserve food while avoiding the health risks of chemical preservatives.

Table 6.1 Binomial name, family, parts used and solvent used for extraction

Fruits/vegetable	source (binomial name)	family	part used	extract
Papaya	*Carica papaya*	Caricacaeae	seed	Acetone, n-propanol, petroleum ether
Bitter gourd	*Momordica charantia*	Cucurbitaceae	seed	Acetone, n-propanol, petroleum ether
Ridge gourd	*Luffa acutangula*	Cucurbitaceae	seed	Acetone, n-propanol, petroleum ether
Pumpkin	*Cucurbita moschata*	Cucurbitaceae	seed	Acetone, n-propanol, petroleum ether
Sapota	*Manilkara zapota*	Sapotaceae	seed	Acetone, n-propanol, petroleum ether

Table 6.2 Antibacterial activity from acetone solvent

	Zone of inhibition (ZOI) in mm diameter				
Fruit seed Extract	Against Gram Positive Organisms			Against Gram negative organism	
	Staphylococcus sp.	*Bacillus* sp.	*Streptococcus* sp.	*Enterococcus* sp.	*Pseudomonas* sp.
Papaya	+++	+++++	++++	++++	++++
Bitter gourd	++++	++++	+++	++	++
Ridge gourd	+++	-	-	+	+
Pumpkin	+ ++	++	++	-	+++++
Sapota	+++	++	+	+++	-

Figure 2: Showing antibacterial activity in acetone solvent

TABLE 6.3 Antibacterial activity from n-propanol solvent

Fruit seed Extract	Against Gram Positive Organisms			Against Gram negative organism	
	Staphylococcus sp.	*Bacillus* sp.	*Streptococcus* s p.	*Enterococcus* sp.	*Pseudomonas* sp.
Papaya	++	-	+	-	-
Bitter gourd	+	++++	+	++++	+++
Ridge gourd	+	+++	+	-	-
Pumpkin	++	++	+	+++	++++
Sapota	-	+	+	+	+

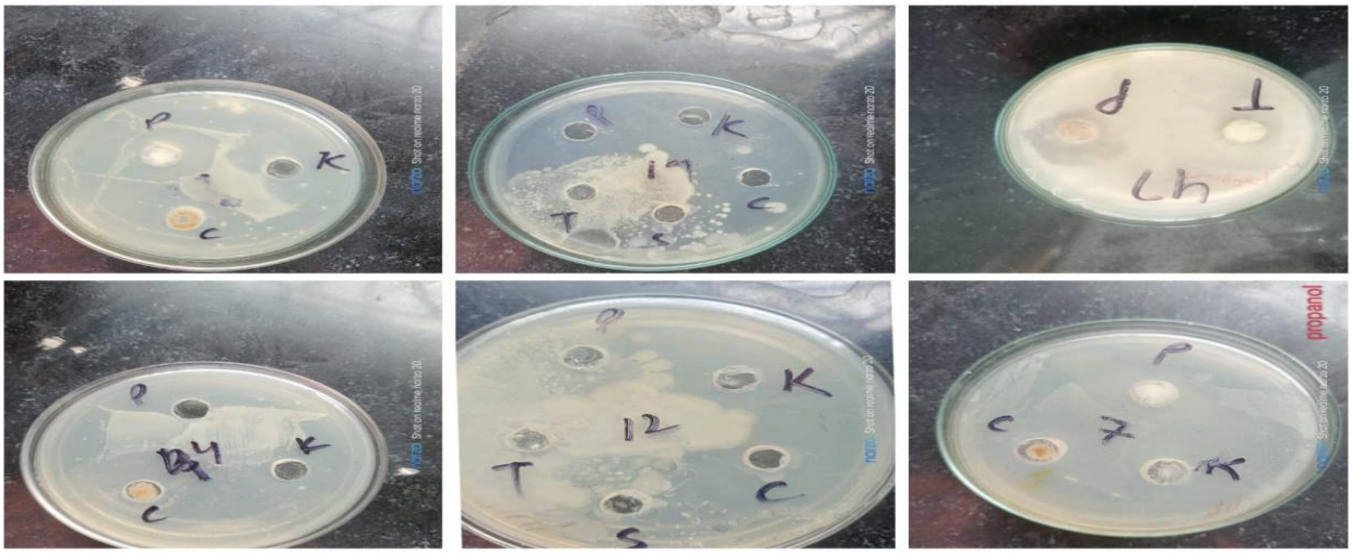


Figure 3: Showing antibacterial activity in n-propanol solvent

TABLE 6.4 Antibacterial activity from petroleum ether solvent

Fruit seed Extract	Against Gram Positive Organisms			Against Gram negative organism	
	Staphylococcus sp.	*Bacillus* sp.	*Streptococcus* sp.	*Enterococcus* sp.	*Pseudomonas* sp.
Papaya	+	+	-	++	+
Bitter gourd	+	-	+	-	-
Ridge gourd	-	+	+	++	+
Pumpkin	+	+	-	+	+
Sapota	+++	++	+++	+++	+++

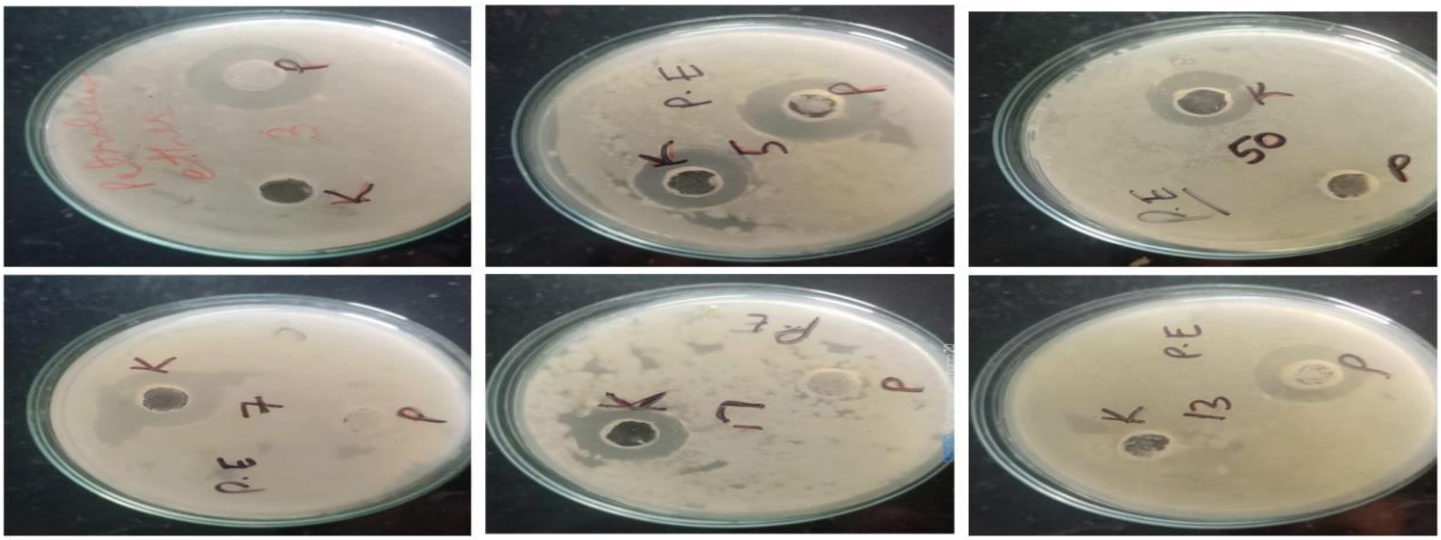
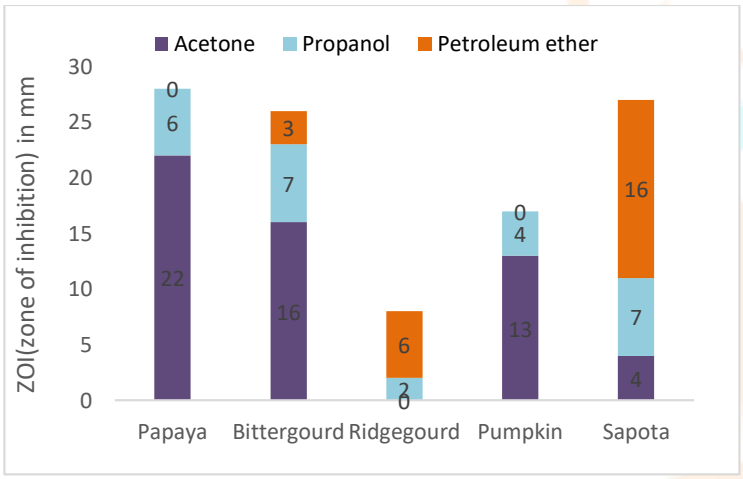
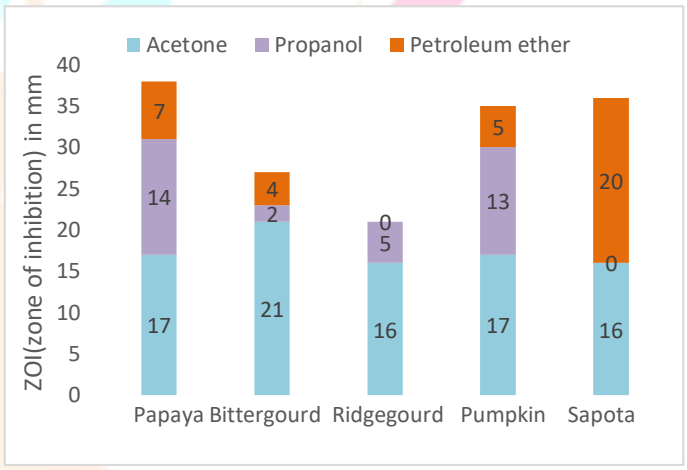


Figure 4: Showing antibacterial activity in petroleum ether solvent

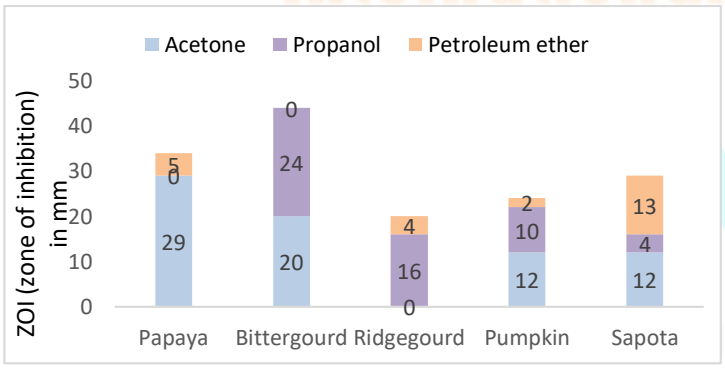
7. GRAPHS



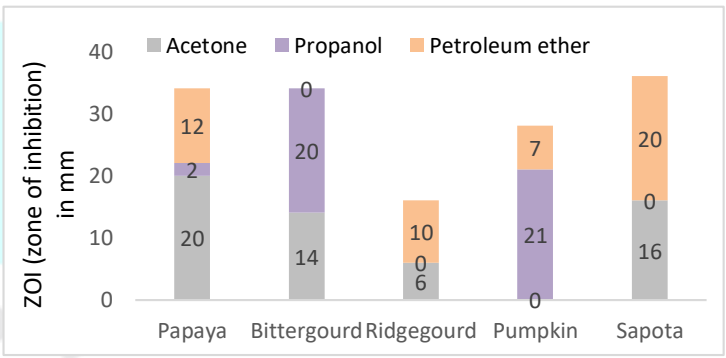
Graph 7.1 Zone of inhibition of *Streptococcus* sp.



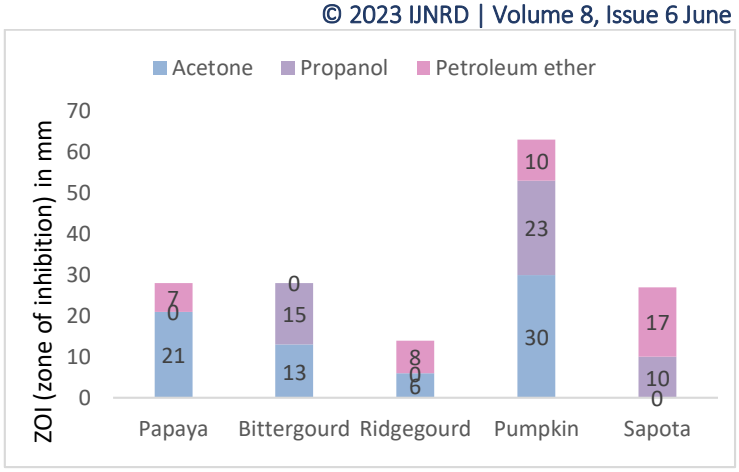
Graph 7.2 Zone of inhibition of *Staphylococcus* sp.



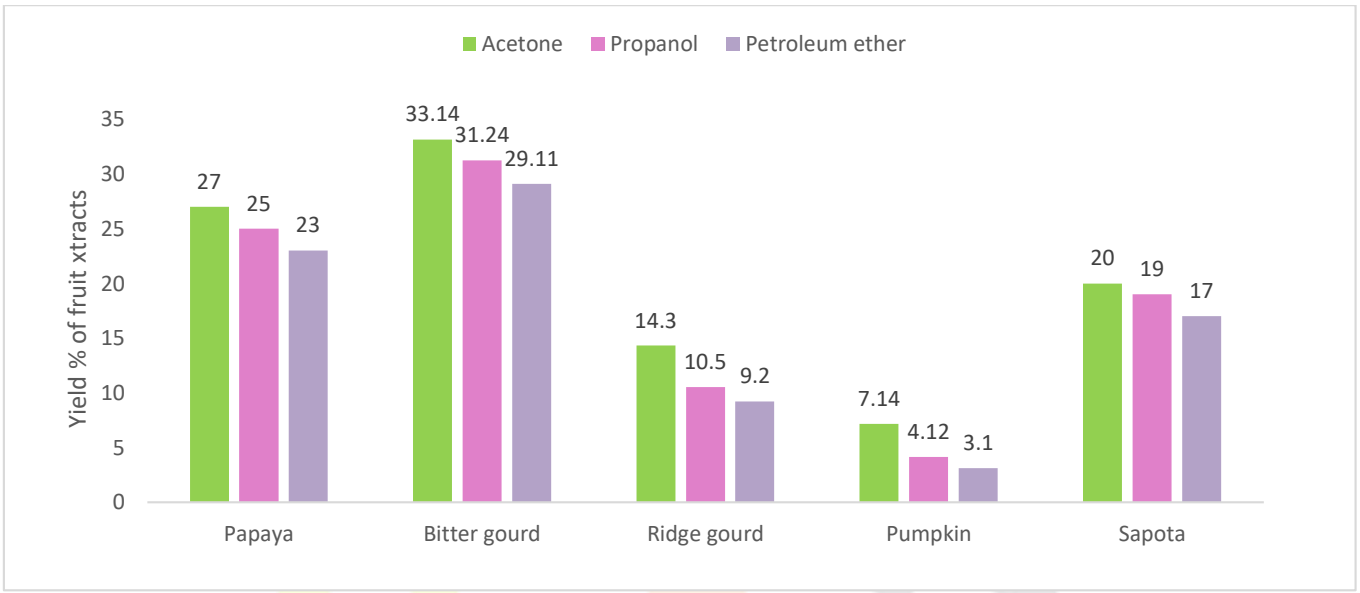
Graph 7.3 Zone of inhibition of *Bacillus* sp.



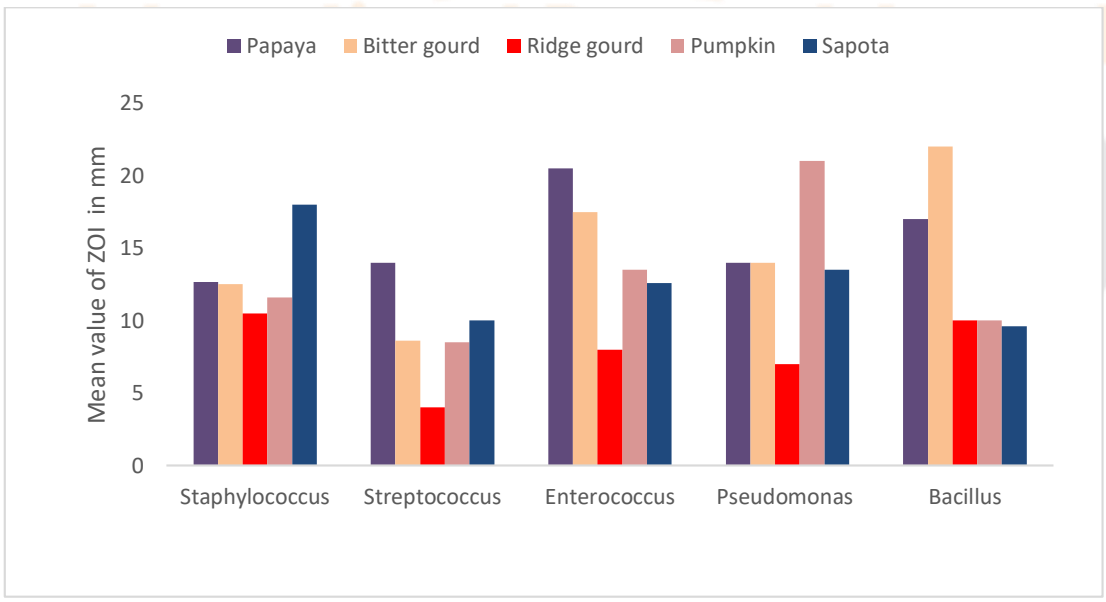
Graph 7.4 Zone of inhibition of *Enterococcus* sp.



Graph 7.5 Zone of inhibition of *Pseudomonas* sp.



Graph 7.6 Yield % of fruit extracts



Graph 7.6 Mean value of ZOI (zone of inhibition) and their S.D (standard deviation)

8.CONCLUSION:

In this study, antimicrobial activities of 5 seed extracts were assessed. The result showed potential antibacterial effects of papaya seed extracts against bacterial strains tested, whereas bitter gourd, pumpkin, ridge gourd and sapota were effective only against gram positive bacteria.

Even though potent in vitro activity of a plant extracts for certain bacteria, it may not be translated in vivo. Instead of cold percolation method, Soxhlet extraction, subfraction, semi pure compound, or a pure compound isolated from these plants might exhibit better antibacterial activity.

Further investigations are necessary to evaluate the studied plant extracts as a potential antimicrobial agent along with the cytotoxicity studies without which plant extracts that are more toxic to the cells than to bacteria may have no therapeutic value. This investigation help to pave a way to use seed extract as potent disinfectant for fomites.

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