



RESEARCH ARTICLE

Effect Of Alum And Plant Extract Against For Bacterial Growth

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Abstract

Identification VRSA isolate according to the most common quick test employed to identify the colonies of *Staphylococcus aureus* is the catalase test. This simple and invaluable test can differentiate *Staphylococcus* from *Streptococcus*. The oxidase test is another quick test that can differentiate *Staphylococcus* from *Micrococcus*. However, the VRSA was used on Vitc² system that multidrug resistance. After solvent alum crystal in hot water 50% in concentration. Research effect the alum on VRSA strain and combination the alum with same plant after extraction. When used the well diffusion method the results were 2mm for each combined with peppermint (50%) and broad beans (50%) respectively compare in used the plant extracts which given 0.5mm in diameter for inhibition zone. But the alum alone was 2mm in diameter. The potency result was the combination alum with aloe vera 3 mm in diameter for alum (50%) but the aloe vera was 0.5mm alone.

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Introduction:-

Vancomycin-resistant strains of *S. aureus* (VRSA) were an important problem in hospitals, nursing homes, and other health care settings. Serious infections due to **these organisms currently necessitate use of non- β -lactam antibacterial therapy (1)**. VRSA strains, particularly hospital-acquired strains, are often resistant to other antibiotics as well as beta-lactams since *S. aureus* frequently produces an enzyme known as β -lactamase which makes the organism resistant to certain antibiotics that contain a beta-lactam ring structure such as penicillins. MRSA is a particularly difficult problem due to the emergence of resistant strains(2). Many hospital-acquired MRSA strains are only susceptible to vancomycin (3) ,thus, there are strong concerns about the possible development and spread of vancomycin resistance in *S. aureus*. Some vancomycin-resistant strains have been reported since 1996 (4,5)

The Alum was used in many subunit vaccines as an adjuvant to enhance the body's response to immunogens. Such as vaccines include hepatitis A and hepatitis B. Moreover, Alum in powder or crystal form, or in stypic pencils, is some times applied to cuts to prevent or treat infection. Powdered alum is commonly cited as a home remedy for canker sores. Preparations containing alum are used by pet owners to stem bleeding associated with animal injuries caused by improper nail clipping.

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Material and Method:-

Bacterial isolate:

A local isolate being isolated from severe inflamed wound infection and fully identified and characterized as multi-drugs resistant. The isolate was identified according to the most common quick test employed to identify the colonies of *Staphylococcus aureus* is the catalase test. This simple and invaluable test can differentiate *Staphylococcus* from *Streptococcus*. The oxidase test is another quick test that can differentiate *Staphylococcus* from *Micrococcus*. However, there are a multitude of latex agglutination tests available for the identification of *S. aureus*. Moreover, there are some kits that utilize passive hemagglutination for the identification of *S. aureus*, such as Staphyslide (7).

plant extraction: selected three type of plants included aloe vera, peppermint, bread bean. It were extracted each plants according:

Aloe vera extraction: This method was employed according to Adnan *et al* 2015 as the following:

- Distraction aloe vera plant by blender.
- Tak 50g from aloe vera suspension by 100 ml from water was preparation by steeped for 7 days before blender.
- Plant suspension was Filtration by filter papers.
- the extract was Sterile by microfiltration.

Peppermint extraction: this method was employed according to Hayyan, I, AL-Tweil (2014) as the following steps the firstly step, plant leaves suspension (water and alcoholic) was preparation by water extracts 10 g of peppermint leaf per 100 ml DW in flask steeped for 7 days and boiling for 20 minutes with cool before blender. Secondary step, ultra distraction the peppermint leaves by blender. Thirdly, plant suspension was filtration by filter papers. Finally, the extract was sterile by microfiltration.

broad bean extraction : this method working as the following:

- distraction broad bean seed by blender and take 50g from seeds suspension in 100ml of water and alcoholic
- after blender the seeds steeped at 7 days.
- Broad bean suspension was filtration by filter papers.
- The extract was sterile by microfiltration.

Antimicrobial susceptibility testing:

It used two methods for antimicrobial susceptibility as:

- Detected VRSA according to Vitc² system. The results of susceptibility interpreted according to CLSI, 2010, (9)..
- Detection Antimicrobial susceptibility of plant extract (alum, peppermint, aloe vera and bean bread) by wells diffusion method. It was used for Muller-Hinton agar (Oxoid)
- Detection the combination of plant extract with alum according to the Table (1):

Table (1):- Combination plant extract with alum method.

Plant Extracts	Peppermint (50%)	Broad Beans (50%)	Aloe Vera (50%)
alum(50%)	AL+BE	AL+BB	AL+AV

Results:-

In present study a total of 50 sample collected from patients suffering from severe inflamed wound. 20 specimens from patients with age (10 - 15) years, 5 specimens from age (16 - 20) years, 4 specimens from patients with age (21 - 25) years and 9 specimens from acne patients with age (26 - 30) years but 12 specimens of more than thirty as shown in table (2).

Table (2) Distribution of samples among age and sex

Age	Sex	
	Male	Female
10-15	8	12
16-20	-	5

21-25	-	4
26-30	7	2
30>	4	8
Total 50 (100%)	19 (38%)	31(62%)

All samples were inoculated in nutrient agar incubated aerobically at 37°C overnight for primary isolation. The results were 13 (26%) samples gave positive growth culture and 37 (47%) gave negative growth culture as the following table (3).

Table (3):- Growth culture for samples.

Growth culture	percentage (%)
Positive culture	26%
Negative culture	74%

In clinical microbiology Vitec® 2 used as an auto instrument system for the identification (ID) and antibiotic susceptibility testing (AST). AST cards was used code 580 for G+ve bacteria. only 6/13 (46.2%) was other bacteria and 7/13 (53.8%) specimens show positive results on culture identified as *S. aureus* as shown in the **Figure(1)**..

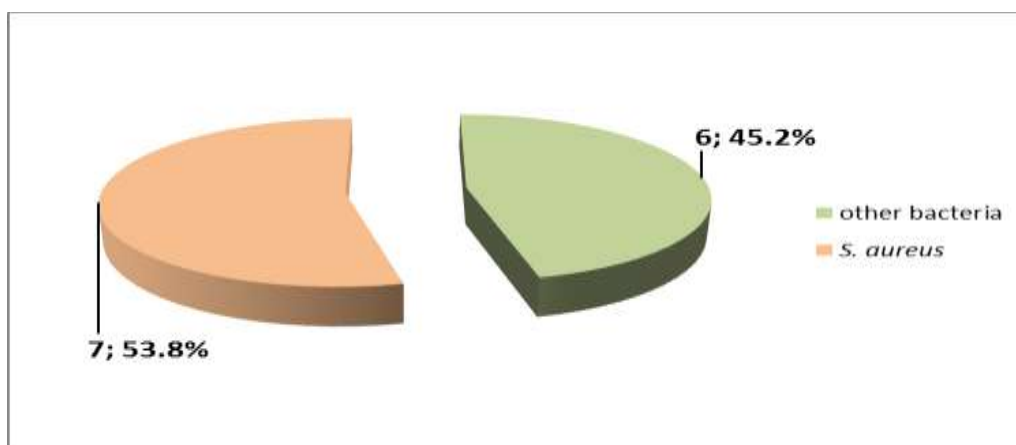


Figure (1):- Prevalence of *S. aureus* among other etiological agents associated with sample isolated.

In the figure (2) was detected other bacteria by Vitec® 2 compact. The results were 2/6(33%) *Staphylococcus epidermidis*, 1/6 (17%) *Staphylococcus simulans* and 3/6 (50%) coagulase negative staphylococcus

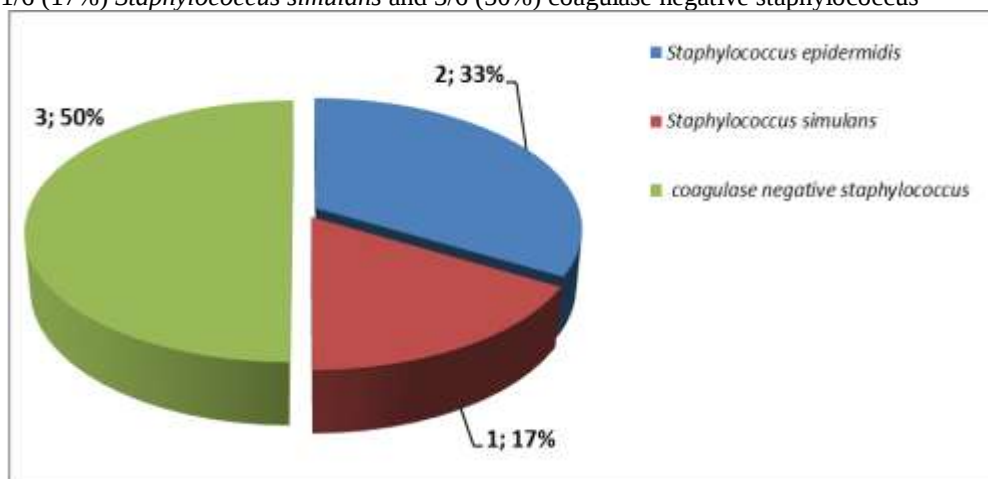
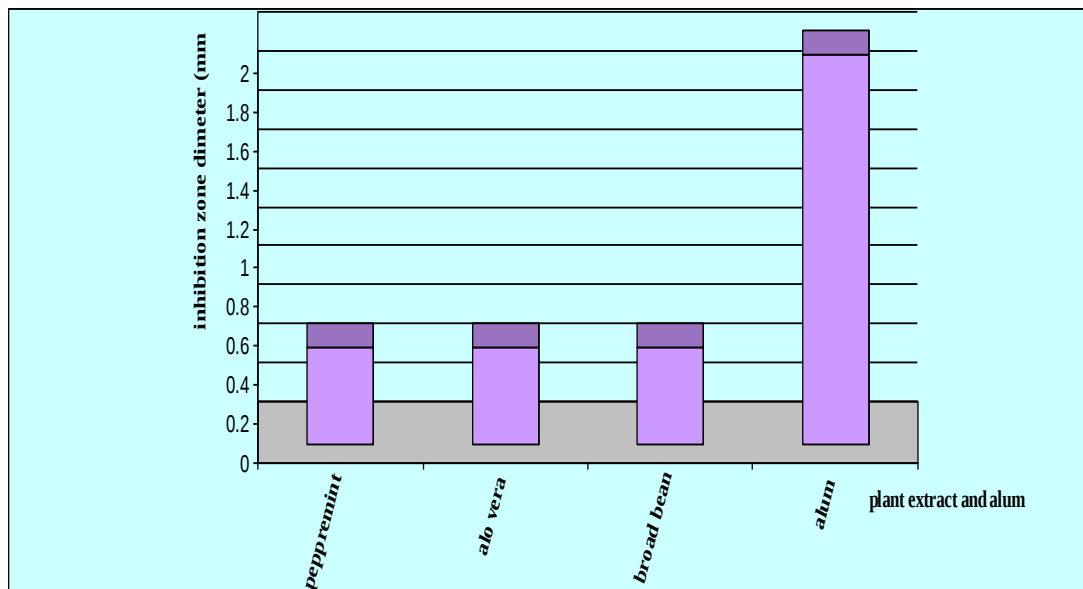


Figure (2):- Other bacteria detected by Vitec® 2 compact.

The result of antibiotic susceptibility testing (AST) for *S. aureus* give 1/7(14.7%) Vancomycin resistance *S. aureus* and 6/7(85.3%) multi drug resistance *S. aureus* by used Vancomycin in Vitec[®] 2 compact.

In well diffusion results the vancomycin resistance *S. aureus* were 0.6 mm for each Peppermint, broad beans but the aloeeviera was 0.5mm in the diameter while the inhibition zone of alum was 2mm as to show in the following figure(3).



Figure(3):- The inhibition zone diameter of alum and plant extracts alone.

It can be concluded that VRSA seems to be a multi-resistance for plant extracts and alum resistant. To detect the response at this organism against combination of alum with plant extracts, according to table (1) and tested against VRSA isolate included in this study. Accordingly alum (50%) that combined with peppermint (50%), broad beans(50%) and aloe vera (50%). The inhibition zones were 2mm, 2mm and 3 mm in diameter respectively compared with 0.5mm inhibition zone for plant extracts aloe vera exception the alum was 2 mm as shown in figure(4)

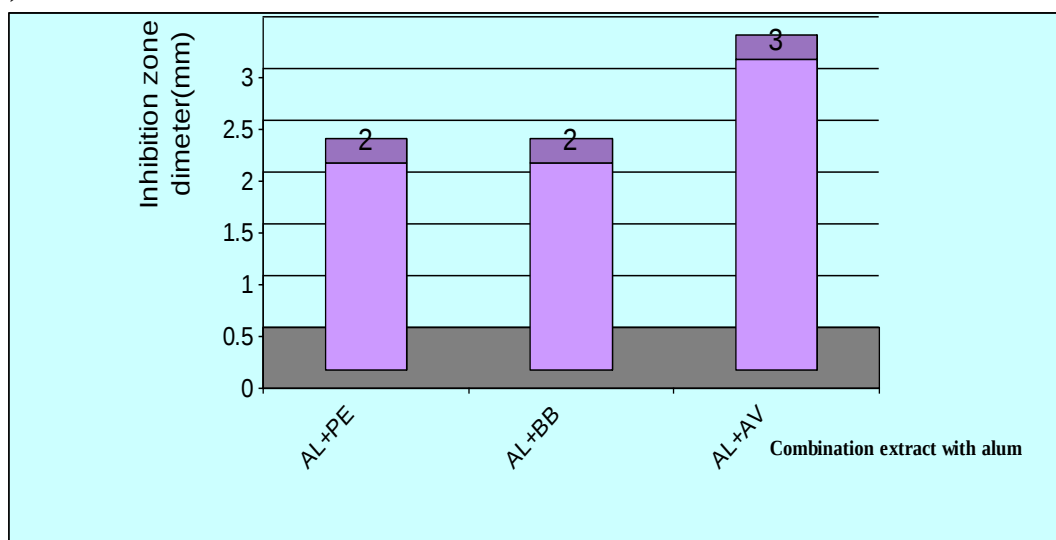


Figure (4):- Inhibition zone of combination plant extract with alum

The potency result was the combination alum with aloe vera 3 mm in diameter for alum (50%).

Discussion:-

On the light of the results, it was the alum appeared synergism effect when combination with plant extract compare thin the extract aloe vera. But the potency result was combination between aloe vera with alum since the activity of aloe vera inner gel against both gram positive and gram negative bacteria has been demonstrated by several different methods[12]. Anthraquinones isolated from the exudate of aloe vera have shown wide antimicrobial activity. The antibacterial activity of emodin against *E coli* was proposed to be mediated through inhibition of solute transport in membranes. Many anthraquinones have shown antiviral and/or virucidal effects on enveloped viruses[13].

These results were in agreement with the studies done by SemaAgaoglu et al, (2009). and Agarr O.O et al (2005). Results achieved with alcohol and chloroform extracts may suggest the components of aloevera are more soluble in those liquid extract media.

Because the some chemical material in plant became it is evident from the above data that the antibacterial activity significantly increased on coordination. It has been suggested that the ligands with nitrogen and oxygen donor systems inhibit enzymes activity. Coordination reduces that polarity of the metal ion mainly because of the partial sharing of its positive charge with the donor groups within the chelate ring system[8,9].

Recommendation:-

Aloevera could be used as alternative to chemicals used in medication. This help to reduce the toxicity of the chemicals used in medications. It is recommended that ethanol extraction is most preferable to other extraction methods.

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