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# JORDANIAN MEDICINAL PLANTS AS AN ALTERNATIVE SOURCE FOR NEW ANTIMICROBIALS AGAINST MULTI DRUG RESISTANT: REVIEW

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**Keywords:**

Jordan, Methicillin resistant *Staphylococcus aureus*, Bacterial resistance inhibitors, *Pseudomonas aeruginosa*, Plant extracts, Antibiotics, Medicinal plants

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**ABSTRACT:** Antibiotic resistance is one of the biggest threats to global health, food security, and development today. Medicinal plants have historically proven their value as a source of molecules with therapeutic potential. The interest in natural product-based drug discovery has revitalized in recent years, because synthetic compound libraries and high throughput screening for discovery of new drug leads did not meet the expectations. The aim of this study is to systematically review the use of Jordanian medicinal plants then identify the most attractive plant for the discovery and development of drugs against resistance *Staphylococcus aureus* and *Pseudomonas aeruginosa* based on data collected from previous studies, that investigate the inhibitory effects of methanolic extracts of 8 Jordanian plants and their combinations with three antibiotics, on resistance of *Staphylococcus aureus* and *Pseudomonas aeruginosa* and studies that collected information from local population concerning the use of medicinal plants in Jordan. The results suggested that *Artemisia herba-alba* used in Jordan as traditional medicine has been reported to have significant effect against resistance of *Staphylococcus aureus* and *Pseudomonas aeruginosa* when combined with chloramphenicol, gentamycin and cephalexin. *Artemisia herba-alba* that may help in the discovering of new antibiotic.

**INTRODUCTION:** Infectious diseases have been an important cause of morbidity and mortality throughout our history. Primitive people have used plants to cure a variety of human ailments. Even today, many people use higher plants as effective for the treatment of various diseases [1]. Medicinal plants have a historically proven their value as a source of molecules with therapeutic potential, and nowadays still represent an role as source of inspiration for novel drug compounds (leads) [2, 3].

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However, since natural product-based drug discovery is associated with some intrinsic difficulties, pharmaceutical industry has shifted its main focus toward synthetic compound libraries and high throughput screening for discovery of new drug leads [4]. The obtained results, however, did not meet the expectations as evident in a declining number of deliver lead compounds in key therapeutic areas [4, 5] as a result of that the interest in natural product-based drug discovery has revitalized in recent years [6, 7].

Natural product research continues to explore a range of lead structures, which may be used as templates for the development of new drugs optimization and provide intermediates that are used in the production of semi-synthetic drugs [8].

Worldwide, hundreds of higher plants are cultivated for substances useful in medicine and pharmacy [9]. The importance of natural products in providing a source of new pharmaceutical compounds cannot be denied [7]. According to the World Health Organization, antibiotic resistance has become a critical global public health issue of this century [10]. A massive overuse of antibiotics drugs has been considering a main cause of resistance development against many antibiotics. So, this has created a serious clinical problem in the treatment of infectious diseases [11]. One of the most problematic drug-resistant pathogens encountered today include methicillin-resistant *Staphylococcus aureus* among the gram-positive bacteria and multidrug-resistant *P. aeruginosa* among the gram-negative bacteria [12].

Since its discovery in 1880, *Staphylococcus aureus* has been recognized as a versatile micro-organism worldwide [13]. *S. aureus* may found on the face and hands as a part of the normal flora [14]. *S. aureus* is a leading cause of Hospital-Associated (HA) and Community-Associated (CA) bacterial infections in humans, associating with numerous mild skin and soft-tissue infections (SSTIs), as well as endo-vascular infections, endocarditis, osteomyelitis, septic arthritis, life-threatening pneumonia, bacteraemia and toxic shock syndrome [15]. The rising expansion of Meticillin Resistant *S. aureus* (MRSA) and its ability to resist multiple drugs has posed a earnest threat for infection control [16].

In 1882, *P. aeruginosa* was successfully isolated in pure culture. *Pseudomonas aeruginosa* is an opportunistic pathogen associate with high morbidity and mortality rates worldwide [12]. *P. aeruginosa* causes urinary tract infections, Respiratory tract infections (*e.g.*, pneumonia), dermatitis, soft tissue infections, bloodstream (*e.g.* bacteremia), bone and joint infections(*e.g.*, osteomyelitis), gastrointestinal infections (*e.g.*, diarrhea, enteritis, enterocolitis), ear infections (*e.g.*, otitis externa and media) and a variety of systemic infections, mostly in patients with severe burns and in cancer and AIDS patients who are immuno suppressed [17].

Therefore, actions must be taken to reduce this problem, according to World Health Organization medicinal plants would be the best source to obtain a variety of drugs [18]. About 80% of individuals from developed countries use herbal medicinal products as a primary source of healthcare and traditional medical practice, which has compounds derived from medicinal plants [19]. For that reason, using antibiotic resistance inhibitors from plant origin become one of the most successful methods to reduce the resistance to antibiotics.

Jordan is a small country but has a great variety of wild plants due to the different geography and weather. About 2500 plant species (of which 2.5% species are listed as endemic) were recorded .The flora Jordan also contains medicinal and herbal species as well as aromatic and spice. Species from these plants, 485 species belonging to 99 different families are categorized as medicinal plants. These species have a broad distribution in the Jordan [20].

In the present work we correlated 8 Jordanian plants, known to have some antimicrobial effect. Against *Staphylococcus aureus*, *Pseudomonas aeruginosa* for their possible inhibitory effect on resistance to three different antibiotics. Two strains of *Staphylococcus aureus* and *Pseudomonas aeruginosa*. And then connected these results with collected information of concerning the use of medicinal plants from 3 different local in Jordan. This will help to made more focusing to find plants which could be play as templates for the development of new drugs against antibiotic resistance of *S. aureus* and *P. aeruginosa*.

**Literature Review:** The use of modern microbiological techniques demonstrates that higher plants frequently exhibit significant potency against human bacterial and fungal pathogens. As seen in [21] they studied the inhibitory effects of methanolic extracts of 19 Jordanian plants and their combinations with seven antibiotics, on the resistance of *Staphylococcus aureus*. Results showed that there are variations in the effect of some combinations used on the resistant and the standard strains probably due to structural changes.

Common results between the two strains showed that combinations of gentamicin and chloram-phenicol could be improved by the use of plant materials, whereas nalidixic acid activity cannot be improved when combined with plant materials.

Interest in plants as sources of medicines and of novel molecules [22] they studied the inhibitory effects of methanolic extracts of 19 Jordanian plants were combined with seven different antibiotics, on the resistance of *Pseudomonas aeruginosa*. Results showed that there are significant variations in the effects of some combinations used on the resistant and the standard strains probably due to structural changes. Almost all the plant materials used in combination with penicillin G and erythromycin allowed full growth of the standard strain, while the combination with some plant materials like *Gundelia tournefortii* L. and *Lepidium satium* L. inhibited the growth of the resistant strain. Chloramphenicol, gentamicin and cephalosporin can be given advantageously with almost all the plant materials used with few exceptions on the resistant strain. Nalidixic acid activity was improved significantly when combined with all plant materials and tested on standard strain. On the other hand, its activity on the resistant strain was slightly improved using the same combinations.

According to the World Health Organization (WHO), about 4000 million people in developing countries believe in the efficiency of plant remedies and use them regularly [20] gathered information from aboriginal Bedouins in North Badia region of Jordan about used medicinal herbs besides their folk uses. The data were collected from 40 practitioners who utilized medicinal plants and who were regarded as professional. Subsequently, the uses were compared with the reported ones in the literature. The informant consensus factor (Fic) and use value (UV) has been calculated to those herbs and the managed illnesses. The data of 73 species were collected; the vast majority of them are safe such as *Achillea falcata*, *Tamarix aphylla* and *Teucrium polium*. Treatment of inflammation and pain presented the major targeted use of these herbs. Gastrointestinal and respiratory systems as well as diabetes depicted the largest Fic values. *Artemisia herba-alba* possessed the highest UV value among the studied herbs.

Medicinal plants are an important element of indigenous systems in Jordan. These resources are usually regarded as part of a culture's traditional knowledge [23]. The aim of them study is to collect information from local population concerning the use of medicinal plants of the Mujib region; identify the most important medicinal plants used; determine the relative importance of the species surveyed and calculate the informant consensus factor (Fic) in relation to medicinal plant use. Fifty-eight plants were identified to be still in use in traditional practice in Mujib. The results showed that the highest use values were recorded for the species *Artemisia sieberi* Bess. and *Silybum marianum* (L.) Gaertn. While the highest Fic was cited for digestive problems. Anthropologically.

The study of local knowledge about natural resources is becoming increasingly important in defining strategies and actions for conservation of medicinal plants [24]. They collected information from local population concerning the use of Ajloun Heights region medicinal plants; identify the most important species used; determine the relative importance of the species surveyed and calculate the Informant Consensus Factor (ICF) in relation to medicinal plant use. The results revealed that 46 plant species grown in the study region are still in use in traditional medicine for the treatment of various diseases. Most of the locals interviewed dealt with well-known safe medicinal plants such as *Achillea falcata*, *Matricaria aurea*, *Majorana syriaca*, *Allium sativum* and *Allium cepa*. The use of moderately unsafe or toxic plants was noted to be practiced by practitioners and herbalists rather than the locals. These plants include *Ecballium elaterium*, *E. hierosolymitana*, *M. autumnalis* and *Citrullus colocynthis*. Kidney problems scored the highest ICF while *Crocus hyemalis* was the plant of highest use value.

The development of new antibiotics from new chemical entities is becoming more and more expensive, time-consuming, and compounded by emerging strains that are drug resistant. Alkaloids are plant secondary metabolites which have been shown to have potent pharmacological activities [25]. They studied the effect of alkaloids from *Callistemon citrinus* and *Vernonia adoensis* leaves on bacterial growth and efflux pump activity after evaluated on *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The results shown that *Callistemon citrinus* alkaloids showed antibacterial activity as well as inhibiting ATP-dependent transport of compounds across the cell membrane. These alkaloids may serve as potential courses of compounds that can act as lead compounds for the development of plant-based antibacterials and/or their adjunct compounds.

*Achillea santolina* used usually as antidiabetic, anti-inflammatory and to reduce pain or dryness of the navel and stomach pain [26]. The concentration of the important oil in the dry *Achillea santolina* ranged from 0.11-0.20 % in ten genotypes of this species. It contained 54 volatile components. The main components were fragranyl acetate, terpin-4-ol, and1, 8-cineole, fragranol. *Achillea santolina* also contained flavones, particularly flavonoids and sesquiterpene lactones [27].

*Artemisia herba-alba* Asso commonly known as the desert wormwood (Arabic name: Sheeh) growing widely in Jordan and in the Middle East [23, 24]. Also it found in different periods, July (flowering phase), and October and November (vegetative phase) [28]. The essential oils yield ranged between 0.2% and 0.9% (v/d.w.). The main components were camphor, 1,8-cineole, borneol, pinocarvone, camphene, and chrysanthenone [29]. It is used to treat inflammatory disorders (colds, coughing, bronchitis and diarrhea), infectious diseases (skin diseases, scabies and syphilis) and others (diabetes, neuralgias). In Jordanian traditional medicine, this plant is used as antiseptic and against skin diseases, scabies, syphilis, fever as well as menstrual and nervous disorders [30].

*Cappari spinosa* which was commonly used as a medicinal plant contained many biologically active chemical groups including, alkaloids, glycosides, tannins, phenolic, flavonoids, triterpenoids steroids, carbohydrates, saponins and a wide variety of minerals and trace elements. It exerted many pharmacological effects significant as anti-diabetic, antisclerosis, antimicrobial, anti-oxidative, anti-inflammatory, immunomodulatory and antiviral activities providing a support to the ancient uses [31, 32].

*Hibiscus sabdariffa* L. has been used commonly as a food, in herbal drinks, in hot and cold beverages, as a flavouring agent in the food industry and as a herbal medicine [33]. Showed many pharmacological effects significant as antibacterial, anti-oxidant, nephro- and hepato-protective, renal/diuretic effect, effects on lipid metabolism (anti-cholesterol), anti-diabetic and anti-hypertensive effects among others. This might be linked to strong antioxidant activities. The main constituents of *Hibiscus sabdariffa* Linn. relevant in the context of its pharmacological are organic acids, anthocyanins, polysaccharides and flavonoids [34].

*Lepidium sativum* L. belongs to family Cruciferae (cabbage family) [35]. The plant is known to contain imidazole, lepidine, semilepidinoside A and B, β-carotenes, ascorbic acid, linoleic acid, oleic acid, palmitic acid, stearic acid [14], sinapic acid and sinapin [36]. *Lepidium sativum* Linn. is widely used in folk medicine for the treatment of hyperactive airways disorders, such as asthma, bronchitis and cough. Seeds are considered to be galactogogue, emmenagogue and recommenced in inflammation, bronchitis, muscular pain and rheumatism [37].

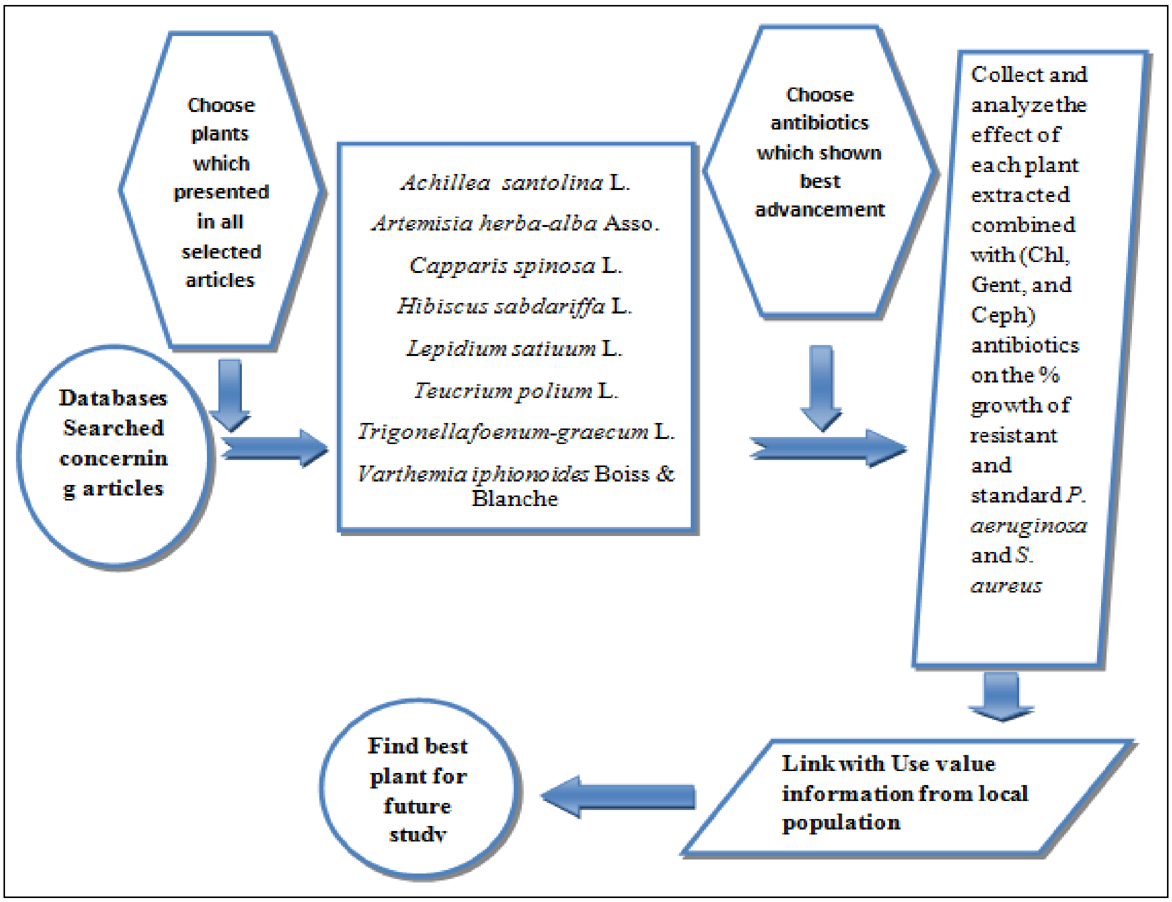
*Teucrium polium* L. (family Lamiaceae) is a wild-growing flowering plant, found abundantly in South-Western Asia, Europe and North Africa [38]. Traditionally, *Teucrium polium* L. has been used for different pathological conditions such as gastrointestinal disorders, inflammations, diabetes, rheumatism, abdominal pain, indigestion, common cold and type 2 diabetes [39, 40, 41]. It contained different classes of compounds such as neoclero-dane diterpenoids, the chemotaxonomic markers of the genus, monoterpenes, sesquiterpenes, poly-phenols, flavonoids, and fatty acid esters. Up to now, more than 134 active substances with wide structural and chemical diversities have been isolated and characterized from the aerial parts, roots and seeds of *T. polium* L. subspecies [39, 41].

Fenugreek (*Trigonella foenum-graecum*) is traditional medicinal plant extracts have been evaluated for their potential application in the medicinal purposes. Fenugreek has been used in food as a flavouring agent while ancient times [42]. Fenugreek seed is a good source of calcium, minerals, iron, *β*-carotene and several vitamins like vitamins A and D. It is rich source of available carbohydrates and dietary fiber [43]. It is a source of free amino acids; 4-hydroxyisoleucine, histidin, arginine and lysine (25.8%), moisture (11.76%), crude fibre (6.28%), ash content (3.26%) protein (20-30%), fat (6.53%), and energy (394.46 Kcal/100 g seed) [44]. It contains lecithin, choline, minerals, B. complex, phosphates and Para-Amino Benzoic acid (PABA). In addition, the main chemical compounds in fenugreek are saponins, fenugreekine, trigonelline, coumarin, scopoletin, phytic acid and nicotinic acid [42].

*Varthemia iphionoides* Boiss and Blanche is commonly used as a Jordanian folk-medicine for the treatment of gastrointestinal disorders and diabetes mellitus good source of active phyto-chemical compound Eudesmane sesquiterpene, flavonoids: jaceidine, kumatakenine, xanthomicrol, seven 3-methoxy flavones [45, 46].

**METHODOLOGY:** English language articles from January 2001 through March 2011 were searched in the electronic databases Pubmed and Science Direct. The Cochrane Library was searched using the following terms as key words: (Bacterial resistance inhibitors, Methicillin resistant *Staphylococcus aureus*, *S. aureus*, *P. aeruginosa*, plant extracts; antibiotics, ethnopharmacology, Traditional medicine, Medicinal plants, Informant Consensus Factor, Use value, Jordan, Ajloun, Mujib, Northern Badia and Folkloric medicine). No further restrictions were imposed on either search. All articles selected were read to determine whether they met inclusion criteria.

**Work Procedures:** This study based on two studies concerned about bacterial resistance inhibitors, Methicillin resistant *Staphylococcus aureus*, *Pseudomonas aeruginosa*, plant extracts; antibiotics, ethnopharmacology in Jordan, traditional medicine and medicinal plants [20-24].




**SCHEME 1: WORK PROCEDURES**

Chl, chloramphenicol; Gent, gentamycin; Ceph, cephalexin, P, Pseudomonas; S. Staphylococcus

**Study Hypotheses:** In light of the study objectives and models, we derive the following study hypotheses:

H0: the population means are equal: $\mu 1 = \mu 2 = \mu 3 = \mu 4$ there are no significant differences between % growth of resistant and standard *Pseudomonas aeruginosa* and Staphylococcus. H1: the population means are not equal: $\mu 1 \neq \mu 2 \neq \mu 3 \neq \mu 4$ there are significant differences between % growth of resistant and standard *Pseudomonas aeruginosa* and Staphylococcus.

**Statistical Analysis:** Our primary statistical analysis investigated the relationship between plant type and the growth of resistant and standard *Pseudomonas aeruginosa* and *Staphylococcus aureus*. We employed a modified intent-to-treat approach whereby we used the most inclusive sample analyzed in the original publication of each of the two studies **Table 2**. To investigate the association between plant type and the growth we conducted compared mean (one way ANOVA) that controlled the effect of the study from which the data originated.

**RESULTS:** By using descriptive analysis, it was determined that the mean of % growth of resistant and standard *Pseudomonas aeruginosa* and *Staphylococcus aureus* as shown in **Table 1**.

**TABLE 1: DESCRIPTIVE STATISTICS**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| *Achillea santolina* L. | 12 | .0 | 73.9 | 23.142 | 32.0361 |
| *Artemisia herba-alba* Asso. | 12 | .0 | 146.5 | 30.329 | 46.5894 |
| *Capparis spinosa* L. | 12 | .0 | 121.2 | 30.075 | 43.3282 |
| *Hibiscus sabdariffa* L. | 12 | .5 | 95.4 | 33.267 | 41.3360 |
| *Lepidium satiuum* L. | 12 | .5 | 95.6 | 24.933 | 36.0594 |
| *Teucrium polium* L. | 12 | .0 | 91.3 | 26.983 | 37.1719 |
| *Trigonella foenum-graecum* L. | 12 | .0 | 104.0 | 26.008 | 41.4546 |
| *Varthemia iphionoides* Boiss & Blanche | 12 | .0 | 86.1 | 20.350 | 31.4422 |
| Valid N (listwise) | 12 | | | | |

**TABLE 2: ONE-WAY ANOVA**

| Plant | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| F | 8.889 | 1.624 | 3.045 | 5.208 | 19.463 | 24.243 | 114.337 | 43.093 |
| Sig. | 0.006 | 0.259 | 0.092 | 0.028 | 0 | 0 | 0 | 0 |

1. *Achillea santolina* L, 2. *Artemisia herba-alba* Asso. 3. *Capparis spinosa* L. 4. *Hibiscus sabdariffa* L. 5. *Lepidium satiuum* L. 6. *Teucrium polium* L.7. *Trigonella foenum-graecum* L8. *Varthemia iphionoides* Boiss & Blanche

**TABLE 3A: MULTIPLE COMPARISONS SCHEFFE OF *ARTEMISIA HERBA-ALBA* ASSO**

| Bacterial strain type | Bacterial strain type | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Resistant *Pseudomonas aeruginosa* | Stander *Pseudomonas aeruginosa* | .394 | -58.168 | 187.468 |
| | Resistant *Staphylococcus aureus* | .974 | -106.651 | 138.985 |
| | Stander *Staphylococcus aureus* | .472 | -64.285 | 181.351 |
| Stander *Pseudomonas aeruginosa* | Resistant *Pseudomonas aeruginosa* | .394 | -187.468 | 58.168 |
| | Resistant *Staphylococcus aureus* | .614 | -171.301 | 74.335 |
| | Stander *Staphylococcus aureus* | .998 | -128.935 | 116.701 |
| Resistant *Staphylococcus aureus* | Resistant *Pseudomonas aeruginosa* | .974 | -138.985 | 106.651 |
| | Stander *Pseudomonas aeruginosa* | .614 | -74.335 | 171.301 |
| | Stander *Staphylococcus aureus* | .703 | -80.451 | 165.185 |
| Stander *Staphylococcus aureus* | Resistant *Pseudomonas aeruginosa* | .472 | -181.351 | 64.285 |
| | Stander *Pseudomonas aeruginosa* | .998 | -116.701 | 128.935 |
| | Resistant *Staphylococcus aureus* | .703 | -165.185 | 80.451 |

*. The mean difference is significant at the 0.05 level.

**TABLE 3B: MULTIPLE COMPARISONS SCHEFFE OF *CAPPARIS SPINOSA* L.**

| Bacterial strain type | Bacterial strain type | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Resistant *Pseudomonas aeruginosa* | Stander *Pseudomonas aeruginosa* | .156 | -24.766 | 173.233 |
| | Resistant *Staphylococcus aureus* | .720 | -65.800 | 132.200 |
| | Stander *Staphylococcus aureus* | .184 | -28.466 | 169.533 |
| Stander *Pseudomonas aeruginosa* | Resistant *Pseudomonas aeruginosa* | .156 | -173.233 | 24.766 |
| | Resistant *Staphylococcus aureus* | .579 | -140.033 | 57.966 |
| | Stander *Staphylococcus aureus* | .999 | -102.700 | 95.300 |
| Resistant *Staphylococcus aureus* | Resistant *Pseudomonas aeruginosa* | .720 | -132.200 | 65.800 |
| | Stander *Pseudomonas aeruginosa* | .579 | -57.966 | 140.033 |
| | Stander *Staphylococcus aureus* | .645 | -61.666 | 136.333 |
| Stander *Staphylococcus aureus* | Resistant *Pseudomonas aeruginosa* | .184 | -169.533 | 28.466 |
| | Stander *Pseudomonas aeruginosa* | .999 | -95.300 | 102.700 |
| | Resistant *Staphylococcus aureus* | .645 | -136.333 | 61.666 |

*. The mean difference is significant at the 0.05 level.

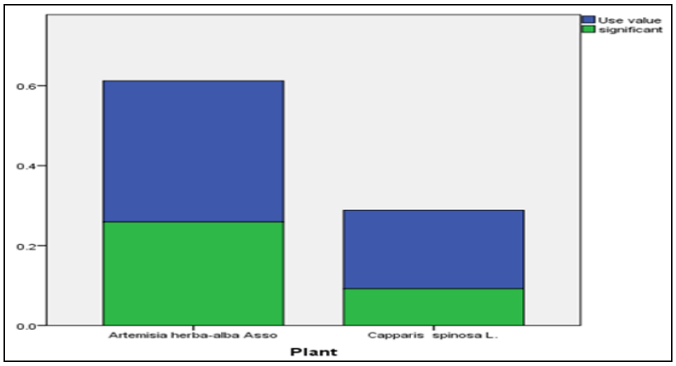



**FIG. 1: SHOWN USE VALUE AND ONE-WAY ANOVA SIG. VALUE**

**DISCUSSION:** The results confirm that plant extracted when combined with chloramphenicol, gentamycin and cephalexin antibiotics affect on the % growth of resistant and standard *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

The results of *Achillea santolina* L. and *Varthemia iphionoides* Boiss & Blanche., *Hibiscus sabdariffa* L., *Lepidium satiuum* L., *Teucrium polium* L., *Trigonella foenum-graecum* L., Shown in **Table 2** showed there was a statistically significant difference in % growth of resistant and standard of *Pseudomonas aeruginosa* and *Staphylococcus aureus* as determined by one-way ANOVA with F(8.889, 5.208, 19.463, 24.243, 114.337 and 43.093) with p value of (0.006, 0.028, 0.0, 0.0 and 0.0) respectively. Based on these results we rejected the null hypothesis for *Achillea santolina* L. and *Varthemia iphionoides* Boiss & Blanche., *Hibiscus sabdariffa* L., *Lepidium satiuum* L., *Teucrium polium* L., *T. foenum-graecum* L.

On the other hand, results of *Artemisia herba-alba* Asso. and *Capparis spinosa* L. Shown in **Table 2** indicated that statistically no significant difference in % growth of resistant and standard of *Pseudomonas aeruginosa* and *Staphylococcus aureus* as determined by one-way ANOVA with (F (1.624 and3.045) with p value of (0.259 and 0.092) respectively. Based on these results we accept the null hypothesis for *Artemisia herba-alba* Asso. and *Capparis spinosa*.

Multiple Comparisons of *Artemisia herba-alba* Asso. and *Capparis spinosa* L. Shown in **Table 3** of Resistant *Pseudomonas aeruginosa* versus Stander *Pseudomonas aeruginosa*, versus Resistant *Staphylococcus aureus* and versus Stander *Staphylococcus aureus* comparison, the significance level was more than p 0.05 among them, thus; The results of each groups are not significantly different, and all results shown homogeneity with F-test ratio (1.624 and 3.045) for *Artemisia herba-alba* Asso. and *Capparis spinosa* L. respectively, which is not sufficiently large. As a result, we conclude that all means are statistically equal.

Study found that extracts of *Artemisia herba-alba* affect against *Staphylococcus aureus* and *Pseudomonas aeruginosa* which are matching the findings of [47]. The chloroform extracted of *Artemisia herba-alba* has an antibacterial activity against *P. aeruginosa* and *Staphylococcus aureus*. Furthermore [48] studied ethanol and chloroform extracted from different parts of *Capparis spinosa* (flowers, fruits, leaves and roots) and founded that *Capparis spinosa* L. roots showed good inhibitory effects against tested *Pseudomonas aeruginosa* and *Staphylococcus aureus* compared with standard antibiotics.

We linked previous studies finds with studies that screened *Artemisia herba-alba* and *Capparis spinosa* as traditional medicine used in Jordan (Ajloun, Mujib and Northern Badia). *Artemisia herba-alba* showed higher UV value at (Ajloun, Mujib and Northern Badia) with 0.2, 0.54 and 0.32 respectively, with mean of 0.355. While, *Capparis spinosa* showed lesser UV value at (Ajloun, Mujib and Northern Badia) with 0.06, 0.23, 0.3 respectively, with mean of 0.196. As use-value (UV), is a quantitative method that demonstrates the relative importance of species known locally the *Artemisia herba-alba* have higher UV value than *Capparis spinosa*.

Ancient civilizations have used plants to cure a variety of human ailments. Even today, many people use higher plants as effective for the treatment of various diseases, Medicinal plants have proven, historically, their value as a source of molecules with therapeutic potential, and nowadays still represent a role as source of inspiration for novel drug compounds (leads) [49]. For that reason, using antimicrobial resistance inhibitors from plant origin like *Artemisia herba-alba* could become one of the most successful methods to reduce the resistance to antimicrobial.

*Artemisia herba-alba* will be the best choice for future studies of discovery and development for drugs against resistance *S. aureus* and *Pseudomonas aeruginosa*. Because of its popularity in Jordan (From different locations) in comparison with *Capparis spinosa* and its effectiveness against *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

**CONCLUSION:** The 21st century witnesses major global health care problem which threaten the entire human life as the appearance and prevalence of multi-drug resistant microorganisms. We must understand that the battle against these microorganisms never end, but we can beat them by changing our strategy by returning back to nature, using active ingredients from plants that survived against microbes since millions of years. The results of *Artemisia herba-alba* used in traditional medicine had been reported to have significant effect against resistance of *S. aureus* and *Pseudomonas aeruginosa* when combined with chloramphenicol, gentamycin and cephalexin. Besides it has good use-value which demonstrates relative importance of species known in Jordan. Serious interests should be by focusing on extracting drugs from *Artemisia herba-alba*. Hopefully, the area of antimicrobial research based on medicinal plant might be proving fruitfully.

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**CONFLICT OF INTEREST:** Nil

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