
Extraction of Essential Oil from *Juniperus Communis* and Study its Effect on the Growth of Bacteria and Yeast isolated from urinary tract infections.

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Abstract: Extract of aerial parts of *Juniperus communis* was studied for their in vitro antimicrobial activity, this extract is essential oils (volatile oil). Microorganisms tested in this study were isolated from urinary tract infections which are *Staphylococcus aureus*, *E. coli*, *Klebsiella* spp. *Proteus* spp. *Pseudomonas aeruginosa* and *Candida albicans* essential oils of *Juniperus communis* achieved by hydrodistillation were highly active against bacterial and yeast growth.

Conclusions: In vitro essential oils of *Juniperus communis* exhibited a good antimicrobial activity against microorganisms isolated from urinary tract infections patients.

Keywords: *Juniperus communis*, essential oil, antimicrobial

Introduction:

The common juniper is a tree that grows in Europe, Asia, and North America^[1].

Constituents are acids (diterpene diols, ascorbic acid and glucaronic acid).

Flavonoids (Amentoflavone, quercetin, isoquercitrin, apigenin and various glycosides).^[2]

tannins (proanthocyanidins, gallic acid and epigallocatechin).^[3]

Volatile oils 0.2-3.42% primarily monoterpenes about 58%) including α -pinene, myrcene and sabinene (major), and camphene, camphor, 1,4-cineole, p-cymene, γ -cadinene, limonene, B-pinene, γ -terpinene, terpinen-4-ol, terpinyl acetate, α -thujene, borneol; sesquiterpenes including caryophyllene, epoxycaryophyllene and B-elemene-7&-ol.^[4,5]

Pharmacological actions that have been documented for juniper are primarily associated with the volatile oil components, it is reported to be generally non-sensitizing and non-phototoxic, although slightly irritant when applied externally to human and animal skin.^[6]

Other constituents of juniper are Geyerone (G12 terpenoid) junone (monocyclic cyclobutane monoterpenoid).^[7] Desoxydodecylphylloxin (lignan).^[8] Resins and sugars.

Material & Methods:

Plant collection:-

The plant was collected from local markets the aerial parts of this plant were air dried at room temperature and grinded into powder form.

Extraction of essential oils:-

The plant material (250g) was hydro distilled in a Clevenger-type apparatus for 5 hours.^[9] The oil was passed over anhydrous sodium sulphate and stored at (4-6 °C).^[10]

Samples:

The microorganisms isolated from urinary tract infections patients include *Staphylococcus aureus*, *E. coli*, *Klebsiella* spp, *Proteus* spp., *Pseudomonas aeruginosa* and *Candida albicans*. We take 10 samples from each microorganism and study the effect of volatile oil against its growth.

Preparation of culture media:-

5ml of nutrient broth medium was inoculated with the bacteria, incubated at 37 °C.

0.1ml of inoculated broth was transferred to nutrient agar plates (25ml). swabs were taken from nutrient broth and streaked in three directions on the dried surface of nutrient agar plates until the plate is completely and uniformly covered.

Preparation of essential oils for antimicrobial activity:-

The essential oils were diluted according to the method described by Ammash *et al.* (1993)^[11].

By using ethyleneglycol standard solutions which is not effective against the growth of any microorganisms.^[12]

Filter paper (Whatman No.1) cutting in uniform regular circle disks.

Sterilization process was done by putting them in glass Petri-dish and autoclaved at 121°C,

151b for 15 min and with sterile forceps were soaked the disks in different concentrations of essential oil, these disks were placed on the inoculated plates and incubated at 37°C for 24 hours.

We used disks soaked in ethylene glycol only as control disks

Reading the Results:-

After incubation, the diameters of the complete zone of inhibition were noted and metric ruler in millimeters. The end point, measured to the nearest millimeter, was taken as the area showing no visible growth. [13]

Result according to this system

- = inhibition zone zero (no effect)

+= inhibition zone size between 0.5-12mm

++= inhibition zone size between 13-18mm

+++ = inhibition zone size between 19-30mm

Results & Discussion:-

The essential oils of Juniperus communis showed an inhibitory effect on the growth of

bacteria and yeast isolated from urine of patients with urinary tract infections [14]. As shown in table (1) .Is the result of specific composition of the oil (highest concentration of alpha-pinene, p-cymene and beta—pinene). [15]. It is more effective against bacterial growth than yeast growth, and it has more an inhibitory effect on the growth of Gram-negative bacteria than in Gram-positive bacteria.

The most effective concentration of essential oils is 4000 ppm especially against pseudomonas aeruginosa, Klebsiella, and E. coli but 3000 ppm concentration is also effective against Klebsiella and E. coli in the same level of 4000 ppm concentration and less for other bacteria.

Testing and evaluation of the antimicrobial activity of essential oils is difficult because of their volatility, their water insolubility and their complexity.

Junipers communis is a good natural source for production and pharmaceutical preparation of antibacterial drugs.

Table (1) Effects of Essential oils (mean and range) on the growth of 10 samples of Bacteria and yeast

Conc. of Essential oils	Staph aureus	E.coli	Protes sp.	Klebsiella sp.	pseudomonas aeruginosa	Candida albicans
Control (ethlen glycol) only	-	-	-	-	-	-
1000ppm	(+) rang(7-10) mean(8)	(+) rang(6-10) mean(8.5)	(+) rang(7-10) mean(8.5)	(+) rang(6-11) mean(8.5)	(+) rang(7-10) mean(8)	(+) rang(6-9) m(7)
2000ppm	(+) rang(8-12) mean(11)	(+) rang(8-11) m(9.5)	(+) rang(8-12) mean(10)	(++) rang(14-17) mean(16)	(++) rang(13-16) mean(14.5)	(+) Rang(6-11) M(8)
3000ppm	(++) rang(13-16) mean(14.5)	(+++) rang(20-28) mean(23)	(+) rang(8-12) mean(11)	(++) rang(20-21) mean(26)	(++) rang(15-17) mean(16)	(+) rang(8-11) m(10)
4000ppm	(++) rang(15-18) mean(16)	(+++) rang(25-30) mean(28)	(++) (15-16) mean(15.5)	(+++) 27-29 mean(28)	(+++) rang(21-28) mean(25)	(++) rang(15-16) mean(15.5)

+ =inhibition Zone size between 0.5-12mm

+++ = inhibition Zone size between 19-30mm

++ = inhibition Zone size between 13-18mm

- = inhibition zone (zero) (no effect)

Conclusions:

Volatile oil of *Juniperus communis* showed highly inhibitory effect on the growth of bacteria and yeast isolated from patients with urinary tract infections in vitro.

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