

The effect of hot aqueous extract of flax seeds and fenugreek seeds against bacteria that isolated from mouth of smoking people

Anmar Saadi Aboud *, Mohammed A. AL-Jaleel and Zena Hassan Jazar

Department of Biology, College of science, AL-Mustansiriyah University, Iraq.

Abstract

Research was done to check anti- bacterial activity of hot water extract of flax seeds and fenugreek seeds against bacteria that isolated from mouths of smoking people by using holes method on nutrient agar.

Extracts was prepared of seeds of plants that studying in stoke then bacteria that isolated from mouth of different people in different age categories and smokers (UN brush teeth regularly). Some species of bacteria were diagnosis in this experiment which were (*Pseudomonas spp.*, *Staphelococcus* and *Streptococcus spp.*) this experiment were measured the diameter of inhibition zone around the holes in petri dishes. Both extracts of Flax and Fenugreek seeds showed an antibacterial activity against bacteria in study, also the Fenugreek seeds extract present more effective than Flax seeds extract on bacteria.

Keywords: Flax; Fenugreek; Antimicrobial

1. Introduction

In recent years, studies on medicinal plants have increased, as they are considered an important source of many drugs, medicines and other medical materials from ancient times to the present. People use them to treat many diseases because they contain secondary metabolites, (Vaniseer,et.al. .2003).

1.1. Fenugreek (*Trigonella foenum-graecum*)

- Kingdom: Plantae
- Division: Magnoliophyta Class: Magnoliopsida
- Order: Fabales
- Family: Fabaceae
- Genus: Trigonella
- Species: *T. foenum-graecum*. (Dave K.1994).

The fenugreek (*Trigonella foenum-graecum*) belongs to the family Fabaceae and is a multiuse and commercially important spice crop grown for its seeds, tender shoots, and fresh leaves. It is an annual plant, extensively cultivated as a food crop in India, the Mediterranean region. North Africa, and Yemen. Fenugreek seeds and herbs are well known for their distinct aroma and slightly bitter taste. The cultivation of this crop is conned to areas with moderate or low rainfall and a cool growing season without extreme temperatures. It can tolerate 10-15°C frost. (Samantora R..2016), it has been reported to be grown under a wide range of soil and climatic conditions in many countries of Europe, Asia, Africa, Australia, and America Fenugreek has economic value as food, fodder, medicine, and in cosmetics.

* Corresponding author: Anmar Saadi Aboud

Department of Biology, College of science, AL-Mustansiriyah University, Iraq.

According to the natural medicines comprehensive database, 523 commercial products containing fenugreek have been reported, including 50 Canadian licensed products (Natural Database 2010).

1.1.1. Chemical constitutes

- Alkaloids: Trimethylamine, Neurin, Trigonelline, Choline, Gentianine, Carpaine .and Betain
- Amino acids: Isoleucine, 4-Hydroxyisoleucine, Histidine, Leucine, lysine, L- tryptophan, Argenine.
- Saponins: Graecunins, fenugrin 18, fenugreek, trigofenosides A-G. Steroidal saponogens : yamogenin diosgenin, smilagenin, sarsasapogenin, tigogenin, neotigogenin, gitogenin, neogitogenin, yuccageninaponaretin. Flavonoids: Quercetintinetixin isovetixin.
- Fibers: Gum, neutral detergent, fiber
- Other: Coumarin, lipids, vitamins, minerals 28%. (Kim, et.al..2006).

1.1.2. Pharmacological Uses

- Antidiabetic activity
- Antiplasmodic activity
- Hypolipidemic activity
- Immunological activity
- Antibacterial activity
- Anthelmintic activity
- Antioxidants activity. (S.Vyas ,et.al..2008).

1.2. Flax (*Linum usitalissimum*)

- Kingdom : Plantae
- Subkingdom : Tracheobionta
- Superdivision : spermatophyta
- Division : Magnoliophyta
- Class : Magnoliopsida
- Subclass: Rosidae
- Order : Linales
- Family: Linaceae
- Genum: *Linum*
- Species: *usitalissimum*

Is a member of the genus *Linum* (flax) in the family Linaceae. It is a food and fiber crop cultivated in color regions of the world. The textiles made from Flax are known in the Western countries as linen, and traditionally used for bed sheets, underclothes, and table linen. The oil is known as linseed oil. In addition to referring to the plant itself, the word "flax" may refer to the unspun fibers of the flax plant. The plant species is known only as a cultivated plant, and appears to have been domesticated just once from the wild species *Linum bienne*, called pale flax. (Allaby R., et.al...2005) & (Hussien & Aziz .2021).

1.2.1. Chemical constitutes

- Glycosides
- Alkaloids
- Flavonoids
- Saponins
- Resins
- Protein (22.2%)
- Oil (45.19%)
- Carbohydrates (28.09%). (Prassad K.1999).

1.2.2. Pharmacological Uses

Antidiarrheal activity analgesic activity immunological activity reduce danger of cancer Antioxidant activity it used as laxative reduce danger cancer. (Mohammed .1990).

2. Material and methods

We took dried seeds of two mentioned plants (flax and Fenugreek) then we grinded them. then we added 10g of powder of both plants to 300ml of boiled distill water in conical flask and close it tightly and leave in for 24 hours. In the next day we filtrate the solution of the extract that we prepared we get clear extract then we pour extract of both mentioned plants in flat dishes (such as petri dish) and let them until dry. After we have dry extract we have to scrape it to have powder extract (Mashadian & Rakshandeh .2005). Then 2 concentration were prepared which were (0.5% & 1%) from both extracts.

2.1. Preparation of nutrient agar media

8.4g of Nutrient agar powder is weighted and dissolve in 300ml of distal water (2.8g per 100ml) then sterile the solvent by autoclave for 20 minute at 121 centigrade after 20 minutes we let it cooled then pour it in petri dishes there we have ready media to culture samples . (American Puplic Health Association .1917).

2.2. Culture samples

We took sample swabs from mouth of people in different categories (male or female) ,they were smokers and all samples were un regularly teeth brush. As shown in Table (1).

Table 1 Samples taken from mouth

No.	Age	Male or female	Diagnose
1	23	Male	Staphylococcus & streptococcus
2	35	Female	Staphylococcus
3	26	Male	streptococcus
4	25	Male	Pseudomonas
5	36	Male	Staphylococcus
6	32	Male	No growth
7	41	Female	streptococcus
8	21	Male	Staphylococcus& fungi
9	20	Male	Pseudomonas
10	39	Female	Staphylococcus
11	22	Male	Staphylococcus& fungi
12	40	Male	Staphylococcus& fungi
13	38	Female	streptococcus
14	27	Male	Streptococcus& fungi
15	36	Male	Pseudomonas

The isolated bacteria appears in cultured samples were diagnosis according to (Williams.1958) & (Habh, et.al..2015) & (Brown.2005).

2.3. Test inhibition activity of extracts

Bacterial samples are used to check their sensitivity to hot water extract.

Prepare nutrient agar then take swab from taken samples and make holes on dishes. on the plate (by adding the prepared concentration into the hole 0.5% and 1%) and inoculate with extract until the hole fill with extract then incubate the samples for 18-20 hours to see result.

3. Results and discussion

3.1. Bacterial diagnosis

Three genus of bacteria were diagnosis in this experiment which:

- *Pseudomonas* spp.
- *Staphelococcus* spp.
- *Streptococcus* spp.
- Fungi.

3.2. Flax seeds

After preparing the isolates and placing the extracts in the dish as described above in the methods of work and after incubation for 18-24 hours, the effect of Flax seeds extract on the bacterial isolates shown.

The results are as shown in the table (2), the hot aqueous extract appear an active role to prevent growth the bacteria, these.

Table 2 Inhibition zones of Flax hot extract against bacteria by (mm)

Sample	Inhibition zone (mm)	
	Concentration 0.5%	Concentration 1%
1	3	5
2	4	6.5
3	3.5	6
4	4.5	7
5	5	8
6	3	5
7	4	7
8	4.5	7.5
9	2.5	4
10	4.5	7
11	5	9
12	4	6
13	5	8
14	4	8
15	4	7

Results due to the compounds were in extract which causes the death of bacteria around the holes in petri disc. These results were agree with another studies which aims to an antibacterial effect on oral pathogens bacteria cultured on nutrient a gar such (*Pseudomonas* spp. And *Streptococcus* spp.) . (Almad, et.al..2018) & (Son & Song .2017).

Also the results in this experiment agree with, (Zuk, et.al..2014) which showed the hot extract components of flax seeds had antibacterial activities, and were useful as a preventative against bacterial infection.

3.3. Fenugreek Extract

After preparing the isolates and placing the extracts in the dish as described above in the methods of work and after incubation for 18-24 hours, the effect of the Fenugreek seeds extract on the bacterial isolates is shown in table (3).

Table 3 Inhibition zones of Fenugreek hot extract against bacteria by (mm)

Sample	Inhibition zone (mm)	
	Concentration 0.5%	Concentration 1%
1	4	8
2	5	9
3	6	10
4	7	12
5	6	11
6	5.5	11
7	4.5	10
8	4	7
9	7	12
10	7	13
11	4	8
12	4.5	7.5
13	5	10
14	4	8.5
15	6	10

The results in this experiment appears an active role for hot aqueous of fenugreek on bacteria under study, the compounds in extract showed an obvious antibacterial effect on bacteria.

These results were agree with other studies like (Alwhibi & Solimen .2014), which mentioned that the hot aqueous extract showed an antibacterial activity against six isolate of bacteria (*pseudomonas*, *E.coli*, *salmonella*, *staphelococcus*, *klebseilla*, *Shigella*). Also agree with (Walli R., et.al.2015), which showed the hot aqueous extract of fenugreek seed had antimicrobial effect against G⁺, G⁻ & fungi.

4. Conclusion

The results in this experiment appears an active role for hot aqueous of fenugreek on bacteria and, the compounds in extract showed an obvious antibacterial effect on bacteria.

Recommendation

We recommended that adding an extracts of Flax and Fenugreek seeds to paste and oral antiseptics will maybe useful for preventing or reducing the growth of pathogenic bacteria in mouth.

Compliance with ethical standards

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Disclosure of conflict of interest

Authors declared that there was no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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