



# EVALUATION OF PROPOLIS ACTIVITY TO INHIBITION OF OPPORTUNISTIC FUNGI ISOLATE FROM SOIL

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## Abstract

Experiment was carried out in the college of agriculture / Al-Qasim green University in 2017 to study the biological activity of propolis against of some soil fungi. Fungi was collected and isolated from soil by soil sprinkling method included *Alternaria* spp., *Penicillium* spp., *Fusarium* spp. and *Aspergillus* spp. Suitable quantity of Propolis was collected to prepare Aqueous extracts of propolis according to (Krell, 1996). Results showed that the values of inhibition were 79.26% , 78.15% and 74.81% and 71.62% in 50% concentration of propolis for *Alternaria* spp., *Penicillium* spp., *Aspergillus* spp. and *Fusarium* spp. respectively with significant different compared with control treatment (without propolis).

**Key words:** Propolis, opportunistic fungi, soil.

## Introduction

Propolis is a natural material a yellow or brown resinous substance collected by honeybees from tree buds of wide types of tree (Duran *et al.*, 2008). Honeybees used propolis to fill crevices and to fix and varnish honeycombs. Propolis has biological activity that used to defense against enemy act as an insect repellent and used to cover insects after killing to prevent decomposition and analysis . Propolis act as anti-bacterial, antiviral, anti-fungal and anti-cancer (Marcocci, 2001). Propolis has good activity on *Trichomonas* (Xu and Shi, 2006). This experiment carried out to study the effect of propolis to inhibition growth of some fungi which isolate from soil.

## Material and Methods

### Preparation of propolis extracts

Quantity of Propolis was collected from honey apiaries in north of Hilla city in 2017 and after cleaning the quantity transferred to the laboratories of agriculture collage placed in suitable containers far away of heat and light.

10 gm was taken from propolis with 100 ml steril and distilled water then mix well and placed under room temperature for 10 days with mix each two days, so the solution was filtrated by whatman paper no. 1 and evaporated by rotary evaporation under 45°C and placed

in dark container in the refrigerator till use so propolis extracts was sterile by membrane filtration (Millipore, 0.45 nm) then 10 gm propolis was soluble in 20ml of sterile and distilled water to prepare solution with 50% concentration and other concentrations by the same way to prepare (10, 20, 30, 40, 50)%. Propolis extracts for each concentrations were added to potato dextrose agar media (PDA) 10% volume/volume which prepare for this purpose and mix well before incubation, transferred to refrigerator till using in the follow experiments with leaving some replicates of (PDA) media without additions of propolis for control treatments and to isolate of fungi from the soil (Trushiva *et al.*, 2006).

### Isolation and diagnosis of fungi

Fungi were isolated from soil of agriculture collage from the surface of soil on deep 0-30 cm. (PDA) media were preparation with antibiotic chloromphenicol 50 mg/L. (PDA) media placed in petri dishes with diameter 90 mm, 12 ml to each of dishes then by soil sprinkling method soil sprinkled on (PDA) media in the petri-dishes on the media, without propolis incubated on 25°C for 3 days then after colonies appearance colonies were examined under microscope. This fungi were purification on a new (PDA) media and incubated on 25°C for 7 days till the fungi complete the growth to prepare for following experiments and diagnosis according to (Koneman *et al.*,

**Table 1:** Effect of Propolis on average of Fungal growth.

Concentration of Propolis %							Fungal Spp.	Average of Fungal growth /mm
LSD	0 control	50	40	30	20	10		
3.012	90.00	22.67	25.67	35.33	39.67	42.67	<i>Aspergillus</i> spp	
1.143	90.00	25.54	27.00	37.44	40.55	44.88	<i>Fusarium</i> spp	
2.442	90.00	19.66	24.33	32.66	36.66	41.33	<i>Penicillium</i> spp	
2.697	90.00	18.66	25.33	31.33	35.00	40.00	<i>Alternaria</i> spp	
	-	1.251	2.019	0.887	1.068	2.075	LSD	

**Table 2:** Effect of Propolis on average of Fungal growth.

Concentration of Propolis %							Fungal Spp.	% of Fungal in hibition
LSD	0 control	50	40	30	20	10		
3.99	0.00	74.81	71.47	60.74	55.92	53.58	<i>Aspergillus</i> spp	
5.34	0.00	71.62	70.00	58.40	54.94	50.13	<i>Fusarium</i> spp	
4.78	0.00	78.15	72.96	63.71	59.26	54.07	<i>Penicillium</i> spp	
2.88	0.00	79.26	71.85	65.18	61.11	55.55	<i>Alternaria</i> spp	
	-	4.254	3.019	1.444	2.088	3.073	LSD	

1978, Buckley, 1989, Kwon Chung and Bennett, 1992, Ellis, 1994).

### Test of propolis activity in inhibition of fungal growth

After growth of fungi was completed one disc with 5mm diameter from each spp of fungi from external edge of petri-dishes was taken and placed on (PDA) media in petri-dishes with 3 replicates for each media with propolis and without propolis placed in incubator for 7 days on 25°C.

### Estimate the percentage of inhibition

After 7 days all the fungi complete the growth, percentage of inhibition of growth was estimated by measured average of two vertically diameters going through the center of each dish using the following equation according to (Okegbo R.N., 2000).

% for inhibition = Average of fungal growth for control\_ Average for treatment / Average of fungal growth for control × 100

## Results and discussions

Table 1 and 2 showed that the addition propolis to (PDA) media with different concentration caused decrease of growth of fungi and the highest value was to concentrations 50% of *Fusarium* spp. which gave 25.54 mm and increase percentage of inhibition of fungi and the highest value was to concentrations 50% to *Alternaria* spp. Because propolis contains important compounds include phenolic acids, Terpinoids, Flavonoids, Aromatic acids, Ester and Fatty acids this compounds inhibited some enzymes include phospholipase, lipoxigenase (Duran *et al.*, 2008). Propolis can affect on DNA and mitochondria respiration and activity of electron transport for cellular membrane of fungi (Sforcin, 2007).

## Conclusions and Recommendations

### Conclusions

1. Four species of fungi were isolated from soil *Aspergillus*, *Fusarium*, *Penicillium* and *Alternaria*.

2. Propolis has good biological activity against fungi.

3. The highest value of inhibition was to *Alternaria* spp which was 79.26% with significant different compared with control treatment (media without propolis).

### Recommendations

1. Test propolis activity with others fungi and bacteria that cause many diseases.

2. Test propolis activity to treat some disease of plant and human.

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