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# The Effect of Black Cumin (*Nigella sative* L.) and Garlic (*Allium sativum* L.)Oils on *Derematophytosis*

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## *ABSTRACT*

*Ringworm is a fungal infection caused by a fungus called dermatophytosis or tinea that live on cells in the outer layer of the skin. The present study was conducted to detect the biological activity of essential oils from Black cumin (Nigella sative L.) and Garlic (Allium sativum L.) against dermatophytosis. Substances derived from Black cumin and Garlic by soxhlet extractor and targeted students their age between 8 to 19 infected by dermatophytosis. The study concluded that the effect of Garlic oil was more effective than Black cumin oil. The Garlic oil has an antifungal properties was inhibiting growth of fungus completely after six weeks.*

***Keywords:*** *dermatophytosis, Black cumin, Nigella sativa, Garlic, Allium sativum, subcutaneous.*

## Introduction:

Garlic (Allium sativum L.) has been used for thousands of years as a spice for cooking and medicinal herb, and several of its compounds have already been identified and studied for their pharmacological effects(Mamitt *etal*.,2021). Garlic is a species in the onion genus, Allium. Its close relatives include the onion, shallot and leek. Garlic is native to Central Asia and north-eastern Iran, and has long been a common seasoning worldwide, with a history of many years of human consumption and use (Chinedu and Jivini, 2019). Black cumin (Nigella sativa L.) is commonly known as Black seed, sometimes also referred to as miracle herb has been studied extensively for its various medicinal benefits. Apart from being used as a spice it is also used in various traditional systems of medicine including Ayurveda due to its healing properties in the treatment of various diseases (Belgaumi *etal*. 2020). medicinal herb is Nigella sativa L. (Ranunculaceae), also called black cumin or black seeds, which is famous for its culinary uses, and is historically precious in traditional medicine (Hannan, M.A.; *etal* ,2021). Garlic has also been used to treat acne, ringworm, high blood pressure, gastrointestinal problems as well as

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asthma (Deresse and Mohammed, 2009; Kumar *et al*., 2010). *Tinea* or ringworm is the other name for dermatophytosis. Inflammation as ring shape with clear center lesion is the well diagnostic clinical features of dermatophytosis. Few cases were reported about distributed of dermatophytes infection into deep tissues under skin. Symptoms are very limited with itching and odor in some type of tinea. Clinical signs are various based on the nature of infection and the location on human body (AL-Janabi, 2014).

**Material and methods :**

The seeds of Black cumin (*Nigella sative L*.) and samples of Garlic (*Allium sativum* L.) were obtained from the local market in Al hasaheisa City, Sudan.

This study was conducted at Khalawi Elsheikh Taha, located in the village of Sheikh Taha, which there are schools for the memorization of Koran .Located on the Khartoum road and border at north to Aldwynib village, south to Aikoura village and east to Blue Nile, with a population about 350 peoples. Students intended it from different parts of Sudan; they are 400 students and their age between 8 to 19 years and measured the infected area of injury in students' skin at weekly visits.

**Preparation of Black Cumin Extract by Hexane**

Taken 75 gram of fresh Garlic and placed in filter paper which placed into extraction thimble and 150 ml of hexane were put in soxhlet extractor, hexane heated to reflux and travels into thimble and soluble compound were transferred into the hexane this practice repeated to several hours.

**Preparation of Garlic Extract by Hexane**

Taken 75 gram of fresh Garlic and placed in filter paper which placed into extraction thimble and 150 ml of hexane were put in soxhlet extractor, hexane heated to reflux and travels into thimble and soluble compound were transferred into the hexane this practice repeated to several hours.

**RESULTS AND DISCUSSION**

**RESULTS:**

This study targeted the age of students between 8 to 19 years and the percentage of students' ages from 8 to 13 years was 68 % and the percentage of students' ages from 14 to19 was32%. This means that fungus is more prevalent in the younger group. Subjects by Age shown in Table (1)

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**Table 1: The Distribution of the Study Subjects by Age.**

| Age group | Frequency |
|---|---|
| 8-13 | 68 |
| 14-19 | 32 |

The antifungal activities of black cumin oil on *Dermatophytosis* infected human skin cells at different visits were observed on the growth of *Dermatophytosis*. From the results the black cumin oil was inhibiting growth of fungus completely in six weeks. Samples 13,16,23,25 had high measurements and improved in short period of time. As for samples 10, 21 their measurements were low and improved in a longer period of time shown in table (2).

**Table 2: The effect of *Derematophytosis* of the Black Cumin oil**

| Name | Area of injury | Visit (1) | Visit (2) | Visit (3) | Visit (4) | Visit(5) | Visit (6) |
|---|---|---|---|---|---|---|---|
| Sample 1 | Head | 4 cm | 3 cm | 2 cm | 1 cm | 0.00 | 0.00 |
| Sample 2 | Head | 3 cm | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 |
| Sample 3 | Head | 3 cm | 2 cm | 1 cm | 0.00 | 0.00 | 0.00 |
| Sample 4 | Head | 3 cm | 1 cm | 0.00 | 0.00 | 0.00 | 0.00 |
| Sample 5 | Head | 4 cm | 3 cm | 3 cm | 1 cm | 0.00 | 0.00 |
| Sample 6 | Head | 4 cm | 3 cm | 2 cm | 1 cm | 0.00 | 0.00 |
| Sample 7 | Head | 3 cm | 2 cm | 0.5 cm | 0.00 | 0.00 | 0.00 |
| Sample 8 | Head | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 | 0.00 |
| Sample 9 | Head | 4cm | 3cm | 2cm | 1cm | 0.00 | 0.00 |
| Sample 10 | Head | 3cm | 2cm | 1cm | 1cm | 0.00 | 0.00 |
| Sample 11 | Head | 2 cm | 1 cm | 0.5 cm | 0.5 cm | 0.00 | 0.00 |
| Sample 12 | Head | 3 cm | 2 cm | 1 cm | 0.5 cm | 0.5 cm | 0.00 |
| Sample 13 | Head | 4 cm | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 |
| Sample 14 | Head | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 | 0.00 |
| Sample 15 | Head | 3cm | 2cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 16 | Head | 4cm | 2cm | 1cm | 0.5 cm | 0.00 | 0.00 |
| Sample 17 | Head | 4 cm | 3 cm | 2 cm | 1 cm | 0.00 | 0.00 |
| Sample 18 | Head | 3 cm | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 |
| Sample 19 | Head | 4 cm | 3 cm | 2 cm | 1 cm | 0.5 cm | 0.00 |
| Sample 20 | Head | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 | 0.00 |
| Sample 21 | Head | 3 cm | 2 cm | 1 cm | 0.5 cm | 0.5 cm | 0.00 |
| Sample 22 | Head | 5 cm | 4 cm | 3 cm | 1 cm | 0.00 | 0.00 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample 23 | Head | 4 cm | 2 cm | 1 cm | 0.5 cm | 0.00 | 0.00 |
| Sample 24 | Head | 3cm | 2cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 25 | Head | 4cm | 3cm | 1cm | 0,5 | 0.00 | 0.00 |
| Mean | | 3.32 | 2.16 | 1.22 | 0.5 | 0.06 | 0.00 |

The antifungal activities of Garlic oil on *Dermatophytosis* infected human skin cells at different visits were observed on the growth of *Dermatophytosis*. From the results the garlic oil was inhibiting growth of fungus completely in five weeks. Samples 8, 10, 19 had high measurements and improved in short period of time. As for samples 1, 20, 23 their measurements were low and improved in a longer period of time shown in table (3)

**Table 3: The effect of the *Derematophytosis* of the Garlic oil**

| Name | Area Of injury | Visit 1 | Visit 2 | Visit 3 | Visit 4 | Visit 5 | Visit 6 |
|---|---|---|---|---|---|---|---|
| Sample 1 | Skin | 2.5cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 2 | Skin | 3cm | 2cm | 1cm | 0.5 | 0.00 | 0.00 |
| Sample 3 | Skin | 2cm | 1cm | 0.5 | 0.00 | 0.00 | 0.00 |
| Sample 4 | Skin | 3cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 5 | Skin | 3cm | 2cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 6 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 7 | Skin | 3cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 8 | Skin | 4cm | 3cm | 2cm | 0.5cm | 0.00 | 0.00 |
| Sample 9 | Skin | 3cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 10 | Skin | 4cm | 3cm | 2cm | 0.5cm | 0.00 | 0.00 |
| Sample 11 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 12 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 13 | Skin | 3cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 14 | Skin | 3cm | 2.5cm | 1.5cm | 0.5cm | 0.00 | 0.00 |
| Sample 15 | Skin | 1.5cm | 1cm | 0.5cm | 0.00 | 0.00 | 0.00 |
| Sample 16 | Skin | 2.5cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 17 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 18 | Skin | 2cm | 1cm | 0.5cm | 0.00 | 0.00 | 0.00 |
| Sample 19 | Skin | 4cm | 3cm | 2cm | 0.5cm | 0.00 | 0.00 |
| Sample 20 | Skin | 3cm | 2.5cm | 1.5cm | 0.5cm | 0.00 | 0.00 |
| Sample 21 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 22 | Skin | 3cm | 2cm | 1cm | 0.00 | 0.00 | 0.00 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample 23 | Skin | 3cm | 2cm | 1cm | 0.5cm | 0.00 | 0.00 |
| Sample 24 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Sample 25 | Skin | 2cm | 1.5cm | 1cm | 0.00 | 0.00 | 0.00 |
| Mean | | 2.64 | 1.86 | 1.1 | 0.28 | 0.00 | 0.00 |

**DISCUSSION:**

The present study was conducted to estimate the biological activity of essential oils Black cumin and Garlic against the fungus *Dermatophytosis* infected human skin cells. The antifungal activities of Garlic oil at different visits were observed on the growth of *Dermatophytosis*. From the results the Garlic oil was inhibiting growth of fungus faster than black cumin. This result was in accordance with a previous studies conducted by (Marwa, 2019; Deresse D, Mohammed A 2009; Mamitt *etal*. 2021)

**Conclusions**:

The Garlic oil has antifungal properties and inhibited the growth of *Dermatophytosis* fungus completely after five weeks.

The Black cumin oil has also an antifungal properties, it inhibited the growth of fungus completely in the sixth weeks.

Compare between two oils tested, the garlic oil gave the best results.

**Recommendations:**

The study recommended investigating of the antibacterial effects of these oils as well as the antimicrobial effects of some other herbal essential oils.

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