Identification of *Nigella sativa* for Access and Benefit sharing purpose

By: Edeget Merawi

Submitted to Genetic resource Access and Benefit Sharing Directorate

May 2016

Addiss Ababa, Ethiopia

1. Introduction

Bioprospecting is the exploration of biodiversity for commercial valuable genetic and biochemical resources. The Ethiopian Biodiversity Institute is the legal mandated institute to access genetic resources and community knowledge for commercial and non-commercial purpose. Therefore, the institute is calling any local and international company or organization to access *Nigella sativa* considering the use, potential distribution and interest of the institution as per the proclamation No. 482/2006. (Access to genetic resources and community knowledge, and community rights proclamation.

2. Taxonomy and the plant biology

Taxonomically, this species is classified as the family Ranunculaceae. The English name is black seed or the black cumin. Locally, the species has different names in different localities. For example in Amharic, the species is named as “Tiqure Azemude” (Volume 2 part 1, 1988). It is an indigenous, annual and branched herb up to 0.7m tall. Structurally, the Stem is ribbed, sometimes hollow when old. Leaves with blade up to 7 x 5 mm, having segments very narrow and basal leaves with light green petiole, greatly widened at the base. A cultivated plant mostly grown in back gardens of homesteads, also on heavier Soils as a field crop, tolerating a wide range of soils, occasionally found growing as wild; 1500-2500 m a.s.l. Seeds found in most local markets and assumed to be grown through-out the agricultural highlands (Ermias Dagne, 2009).

3. Multi-use of *Nigella sativa* in Ethiopia

This species is an important spice to Ethiopia, commonly used to add flavor to bread. Medicinally, the plant is very essential for many complaints. In Ethiopia the seeds are an important spice used in preparing hot pepper sauce and other dishes. They are also used to give flavor for bread. They are mixed with melted butter, wrapped in a piece of cloth and sniffed to relieve some types of headaches (Pers. Observ.). According to Inga and Sebsebe Demissew (2000), the seeds of *Nigella sativa* are used to induce an abortion.

4. Traditional uses of *Nigella sativa*

Nigella sativa has been traditionally used for the treatment of a variety of disorders, diseases and conditions pertaining to respiratory system, digestive tract, kidney and liver function, cardio-vascular system and immune system support, as well as for general well-being.

Black seeds usually stimulate the body's energy and helps recovery from fatigue and dispiritedness. Black seeds and their oil have a long history of folklore usage in Ethiopia and other country. The seeds have been traditionally used for the treatment of several diseases and ailments including asthma, bronchitis, rheumatism and related inflammatory diseases. A tincture prepared from the seeds is useful in digestion, loss of appetite, diarrhoea, dropsy, amenorrhoea, dysmenorrhoea and in the treatment of worms and skin eruptions. Externally the oil is used as an antiseptic and local anesthetic (Padmaa and Paarakh, 2010).

5. Scientific researches and pharmacological potentials of *Nigella sativa*

It is believed to be a miraculous herb that can cure multiple ailments and disorders. The positive inhibition may be attributed to the two important active ingredients of *N. sativa,* TQ and melanin. Different crude extracts of *N. sativa* were tested for antimicrobial effectiveness against different bacterial isolates. Crude extracts of *N. sativa* showed a promising effect against some of the test organisms. The most effective extracts were the crude alkaloid and water extracts. Antibacterial activity of *N. sativa* against clinical isolates of methicillin resistant *Staphylococcus aureus* was investigated (Hannan *et al*., 2008). Antibacterial activity of *N. sativa* against and triple therapy in eradication of Helicobacter Pylori in patients with non-ulcer dyspepsia was investigated. It was showed that *N. sativa* seeds possess clinically useful for anti *H. pylori* activity. The antibacterial activity of TQ and its biofilm inhibition potencies were investigated (Hannan *et al*. 2008).

6. Medicinal use (Antifungal activity) of *Nigella sativa*

Methanolic extracts and chloroform extracts of *N. sativa* have the strongest antifungal effect against different strains of *Candida albicans*. The aqueous extract of *N. sativa* seeds exhibits inhibitory effect against candidiasis in mice (Khan *et al.*, 2012). Anti dermatophyte activity of *N. sativa* extract was tested against eight species of dermatophytes, show a positive effect. The

anti yeast activity of the black cumin seed quinines, dithymoquinone and thymohydroquinone, were evaluated against six dairy spoilage yeast species. It was found that Antifungal effects of the quinones were compared with those of preservatives commonly used in milk products and show a positive effect (Abdel-Moneim *et al.*, 2013).

7. Compounds isolated from *Nigella sativa*

Many active compounds have been isolated, identified and reported so far in different varieties of black seeds. The most important active compounds are thymoquinone thymohydroquinone, dithymoquinone, p-cymene carvacrol, terpineol , t-anethol, sesquiterpene longifolene, α-pinene and thymol. Black seeds also contain some other compounds in trace amounts. Seeds contain two different types of alkaloids; i.e. isoquinoline alkaloids and pyrazol alkaloids or indazole ring bearing alkaloids which include nigellidine and nigellicine. Moreover, *N. sativa* seeds also contain alpha-hederin, a water soluble pentacyclic triterpene and saponin, which have a potential anticancer agent (Abdel-Moneim *et al.,* 2013).

The seed contain up to 40 % fixed oil, for which there is ample evidence in the literature for its hypoglycemic, antioxidant, liver protecting, analgesic, antithrombotic and spasmolytic activity (Abdel-Moneim *et al.*, 2013).

Black Cumin seeds have an aromatic odor and bitter taste. They are used as an essential ingredient in soup component, Sausages, cheese, cakes and candies. The Ethiopian variety of Cumin seed accumulate up to 50% thymol, amonocyclic phenolic compound. The presence of this compound makes cumin valuable source for health care Industry (Black et.al, 2005) and medicinal purposes. In Ethiopia, it is commonly used in Amharic "*Berbere*" in which it tends to reduce its hotness (Ermias Dagne, 2009).

8. Geographical Distribution of *Nigella sativa* in Ethiopia

According to Inga and Sebsebe Demissew (2000), Nigella *sativa* is found in an altitudinal range between 1500-2500m. *Nigella sativa* is widely cultivated in Amhara Region, Northern Gondar, Oromia. It is highly cultivated at Kaffa and Keficho Zones and districts of the Southern Nations, Nationalities People's Region (Ermias Assefa *et al.,* 2015). It is also particularly growing at Western Arsi (Kofele and Dodola districts) and Arsi Zone (Shirka, Tena and Silitana districts).

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