

# Bioprospecting Potential of *Cucurbita pepo* for Access and Benefit Sharing



*Cucurbita pepo*

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## **1. Introduction**

Ethiopia is lucky to be gifted with rich biodiversity and traditional knowledge that could pioneer successful bioprospecting. However, like any other developing countries, Ethiopia lacks technical expertise and monetary resources to explore them significantly. The only option for Ethiopia is to collaborate with the developed nations or domestic investors and interested one in pharmaceutical, cosmetics and other companies alike and jointly explore them strategically and wisely.

The National Competent Authority, the Ethiopian Biodiversity Institute (EBI), through the Access Benefit Sharing Directorate, plays a practical role in the implementation of the Nagoya Protocol on Access and Benefit Sharing of Genetic Resources and Associated Community Knowledge. Based on Proclamation No 482/2006 and Regulation 169/2009 (Access to Genetic Resources and Community Knowledge and Community Rights), Ethiopia has been implementing the access and benefit sharing objective of the CBD. Both the Proclamation and Regulation include a range of issues such as ownership, user rights, conditions for access, benefit sharing, types of benefits, powers and responsibilities among others.

Therefore, the objective of this information is to encourage any bioprospecting company or an individual interested to work on the genetic resource, *Cucurbita pepo* L. for medicinal and industrial activities in the production of commercial edible oils.

## **2. Description of the Plant**

*Cucurbita pepo* L. is known by common name ‘Duba’, ‘Dubba’ (in Amharic) and Pumpkin (in English). Pumpkin (*Cucurbita pepo* L.) belongs to the Cucurbitaceae family, consisting of 90 genera and approximately 700 species, wherein the genus *Cucurbita* stands out as one of the most important. It is a herbaceous, monoecious, annual plant. It is a medium-sized plant grown for its fruits and edible seeds (Adepoju and Adebanjo, 2011; Aliu *et al.*, 2012).

It is a vigorous trailing annual herb, with stems growing up to 5 m long. It has broadly triangular, large leaves and large, bright yellow flowers. Its flowers are yellow with fused petals and are

easily distinguishable as male and female (Lerner, 2000 cited in Brew *et al.*, 2006). The male blossom is on a long slender stalk or pedicel, while the female blossom has a swollen embryonic ovary attached to its base. It flowers from April to December and honeybees collect pollen and nectar from its flowers frequently (Cotner *et al.*, 2003 cited in Brew *et al.*, 2006; Fichtl and Admasu Adi, 1994; Ermias Dagne, 2009).

### **3. Distribution of *Cucurbita pepo* L.**

Pumpkin is native to the USA and Mexico. Nowadays it is cultivated throughout the world for its edible fruits. In Ethiopia, it occurs almost in all regions of the country due to its adaptation to diverse agro-ecological conditions. It is found at altitudes of 800 and 2500 m. *Cucurbita pepo* usually grows both in maize fields and vegetable gardens as well as in other more intensive agricultural systems (Aliu *et al.*, 2012; Fichtl and Admasu Adi, 1994).

### **4. Ethno-medicinal uses**

In traditional medicine, the seeds of *Cucurbita pepo* L are used for immobilization and expulsion of intestinal worms and parasites, prostate gland disorders, irritable bladder and kidney inflammation in different regions of the world (Adepoju *et al.*, 2011).

Umadevi *et al.* (2011) indicated that the seeds and pulp of *Cucurbita pepo* are used for medicinal purposes by irritating the intestinal tract of parasites and worms. It is also used to treat urinary tract problems and gastritis and to remove tapeworms and roundworms from the intestine.

### **5. Chemical composition and physicochemical properties**

The chemical composition and physicochemical properties of pumpkin seeds and fatty acids of their oil has been determined in various studies (Achi *et al.*, 2005 cited in Aliu *et al.*, 2012; Ardabili *et al.*, 2011; Leffingwell *et al.*, 2015; Oloyede *et al.*, 2012). Pumpkin seeds are valued for high proportions of proteins, essential amino acids, fatty acids and microelements. They are rich in oil and protein. With a high yield of oil and physicochemical characteristics similar to those of the other commercial edible oils, the pumpkin seed oil can be considered as a new and valuable source of edible oil (Ardabili *et al.*, 2011; Lazos, 1986 cited in Oloyede *et al.*, 2012)

## 6. Pharmacological activities

Pumpkin extracts of different parts of the plant have shown various curative effects due to their biologically active components. In the therapy of small urinary disorders, prostate gland and the urinary bladder diseases, pumpkin seeds have shown positive results (Đorđević *et al.*, 2016).

Pumpkin seed protein isolates were reported to have *in vitro* anti-oxidative activity of (Nkosi *et al.*, 2005, 2006 cited in Adepoju and Adebajo, 2011). The antioxidant capacities of the female flower extracts were significantly higher than the male flower extracts (Tarhan *et al.*, 2007 cited in Adepoju and Adebajo, 2011). Umadevi *et al.* (2011) reported significant antioxidant and antidepressant activity of *Cucurbita pepo* seed extracts. Therefore, *Cucurbita pepo* may serve as a potential resource for natural psychotherapeutic agent against depression.

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