Bioprospecting Potential of *Acacia Senegal L.*

for Access and Benefit Sharing

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1. Introduction

Ethiopia has issued proclamation on Access to Genetic Resources and Community Knowledge, and Community Rights Proclamation No. (482/2006) and Regulation No. (169/2009). Based on these legal frameworks, the country has been implementing the access and benefit sharing objective of the CBD. The Proclamation includes a range of issues such as ownership, user rights, and conditions for access, benefit sharing, types of benefits, powers and responsibilities among the others. The law bears the necessity of Prior Informed Consent (PIC) to access genetic resources or community knowledge. Following PIC, the Ethiopian Biodiversity Institute including the local communities, negotiate on Mutually Agreed Terms (MAT) with the User of the genetic resource.

Therefore, this call is intended to encourage any bioprospecting company or an individual interested to work on *Acacia Senegal* L. from Ethiopia.

2. Plant description

Acacia Senegal L. is commonly known as 'Girar' (Amharic) and Sabansa-Dima (Oromifa). The plant is also known by several English names such as Gum arabic tree, Gum acacia, Senegal gum, Sudan gum Arabic. *Acacia Senegal* L. has also several synonyms: *Senegalia senegal* (L.) Britton, *Acacia circummarginata* Chiov., *Acacia cufodontii* Chiov., *Acacia glaucophylla* sensu Brenan, *Acacia kinionge* sensu Brenan, *Acacia oxyosprion* Chiov., *Acacia rupestris* Boiss., *Acacia senegal* (L.) Willd. subsp. modesta (Wall.) Roberty, *Acacia senegal* (L.) Willd. subsp. senegalensis Roberty, *Acacia somalensis* sensu Brenan, *Acacia sp.* F. White, *Acacia spinosa* Marloth & Engl., *Acacia thomasii* sensu Brenan, *Acacia volkii* Suess., *Mimosa senegal* L.

Acacia senegal is a tree commonly called Gum arabic. It is one of the oldest and best-known among all natural gums. The gum arabic tree is a low branching, small, and spiny tree, which grows up to 7-15 m in height with a girth of about 1.3 m (Kew Gardens, 2016). The tree is deciduous, dropping its leaves during the dry season. Under dry conditions, the taproot develops to a great depth allowing the tree to become larger than usual. The trunk is about 30 cm in diameter and is covered by a greyish-white bark that becomes dark, scaly and thin in old trees (Kew Gardens, 2016). The yellowish-white and fragrant flowers are borne on cylindrical spikes.

The fruits are straight, hairy, flat, dehiscent papery pods. They are green and pubescent when young, and they become a shiny bronze with maturity (Kew Gardens, 2016).

3. Ecology and Distribution

Acacia senegal is a legume gum tree from the dry tropics and subtropics. It is widely spread in the dry savannas of tropical Africa commonly in tropical areas of Western and Central Africa, and in Eastern Africa (Kew Gardens, 2016). It grows in areas with rainfall as low as 100-150mm per annum, and annual mean temperatures between 16.2°C and 27.8°C. It cannot survive frost but is particularly tolerant of drought. It is harvested mostly from the Ethiopian arid land area (Seema and Arun, 2015).

4. Uses of *Acacia Senegal*

4.1. Ecological significance

It is a multipurpose tree which is ecologically known to increase soil fertility by its active root nodules which are able to fix atmospheric nitrogen. It is also used in the reduction of desertification. It is used in afforestation programs in the Sudan and Sahel regions (Usman *et al.*, 2010).

4.2. Gum Arabic harvesting

Gum Arabic is valued for the production of gum Arabic. Gum Arabic harvesting is one of the most important uses of *Acacia Senegal.* Gum Arabic, an exudate from the bark, is usually tapped for Gum Arabic harvesting during the dry season (Orwa *et al.*, 2009). Several thousand tons of gum arabic is internationally traded every year, mainly in Europe and the USA (Kew Gardens, 2016). *Acacia senegal* contains the finest quality of gum Arabic (Ocheri *et al.*, 2017).

4.3. Food processing

Gum Arabic is the only acacia gum evaluated as a safe food additive. Gum arabic has been an important food ‘additive’ since ancient times; and it has been used as as flavour fixative, an emulsifier and stabilizer of dairy products. Its supplementation with diet has been shown to increase faecal nitrogen excretion and lower serum urea nitrogen concentration in patients with chronic renal failure (Matsumoto *et al*., 2006). The consumption of gum arabic plays an effective role in preventing weight gain and modulating adipose tissue dysfunction in Type II diabetic patients (Babiker *et al*., 2018).

4.4. Pharmaceutics

Acacia senegal possesses phytoconstituents like flavone, catechin, polyphenols, tannins, chalcones, alkaloids and flavonoids which are commonly known for their medicinal value (Majekodunmi *et al.*, 2006). Gum Arabic is used extensively in pharmaceutical preparations, inks, pottery, pigments, water colors, wax polishes and liquid gum (Usman *et al*., 2010).

4.5. Industrial products

It is used as inks, pigments and polishes in dressing fabrics, giving luster to silk and crepe. It is used for thickening colors and mordant in calico printing (Fakoya *et al.*, 2002; Kew Gardens, 2016).

4.6. Animal fodder

Gum Arabic is also a source of fodder to livestock such as goat, sheep and cattle in the semi-arid regions due to the palatability of its leaves (Usman *et al*., 2010).

4.7. Other uses

Acacia senegal seeds are traditionally used for human nutrition (Ram *et al*., 2014). The wood is valued as firewood, and can be used to produce charcoal. The wood is also used to make utensils, poles and fence-posts. The bark and the roots provide fibre and make strong ropes and fishing nets. The leaves and pods are browsed by livestock. The flowers provide valuable nectar to bees for honey production (Orwa *et al*., 2009).

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