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Contribution of Trees for Oral Hygiene in East Africa

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ABSTRACT

The contribution of trees as tooth brush to maintain oral hygiene of local communities is discussed. Species commonly used in Eritrea and East Africa, as well as how the toothbrush (miswak) is utilized are presented. The potential benefits of tooth brush trees as a source of supplementary income is mentioned along with concerns for endangered species.

KEYWORDS: Endangered species, Eritrea, miswak, oral hygiene, *Salvadora persica* , Tooth brush.

INTRODUCTION

A visitor to the towns of Eritrea[(1)] may be intrigued to see a piece of woody twig sticking out of the mouth of the townsfolk. Such twig is very likely to be the traditional tooth brush, commonly known as "mewetz" in Tigrigna and "miswak [(2)] " in Arabic. Such regular use of the traditional tooth brush is said to have helped make Eritreans, especially the lowlanders, renowned for their shiny white teeth. The use of miswak is also appreciated as the age old Tigrigna proverb says, "*Mewetz is for the eyes while* Tahses *is for the teeth*". The meaning being, any sort of mewetz, i.e. miswak, is nice to see (being a sign of personal hygiene) while the best for teeth is Tahses (*Dodonia angustifolia*).

Further a field, Almas (2002) and Hyson (2003) report, that miswak (chewing sticks[(3)]) were in use from as early as some 7000 years ago by the Babylonians; and later on throughout the Greek, Roman and Islamic empires. It is also believed to be the precursor to the modern day toothbrush and was used in Europe about 300 years ago (Lewis and Lewis, 1977).Today, miswak is being used in Africa, South America, Asia, the Middle East including Saudi Arabia, and throughout the Islamic countries (e.g. Yarde and Robinson, 1996; Hattab, 1997, Darout *et al.*, 2005).

This paper will try to communicate the importance of miswak for oral hygiene; how it is employed and the species used. Brief mention will also be made on its benefit to the local

community, both health-wise and as a source of supplementary income. Concerns of miswak harvesting on endangered species is also discussed.

WHAT IS MISWAK

Preparation

The toothbrush is generally obtained from any slim woody part of the tree. Mostly it is harvested from branches although harvest from woody roots is also known. Long twig sections of 50 or 100 cm are cut and transported to the market before being cut to retail sizes. The thickness of miswak is dependent on the type of tree and the part of branch harvested while the length is more dependent on the retailer. Examples of retail sizes for the most common miswak species are given as follows. For the native olive tree (*Olea europea subsp. africana*) the miswak is usually about 7-10 mm thick and 7-10 cm long; for Tahses (*Dodonia angustifolia*) it ranges from 4-6 mm thick and 6-8 cm long; while for Aday (*Salvadora persica*) roots it could be 10 mm thick and as long as 20 cm.

The commercial miswak brushes are easily available from street vendors in any towns. They are usually displayed on cloths laid out in the street and usually carried in plastic bags. The price varies depending on the type of species and sometimes on size. *Olea europea subsp. africana* costs US $ 7 cents apiece; the *Dodonia angustifolia* US $ 3.5 cents and *Salvadora persica* US $ 3.5 cents. In addition there is a triangularly patterned miswak known as “Lemon” or “Dambutch” (species not identified) which is imported from neighbouring countries and sells for US $ 14 cents a piece in the streets of Asmara. More recently, some online stores overseas have taken to selling miswak to the web e.g.. *http://shop.store.yahoo.com/talkislam/* and http://*www.thepeelucompany.com*.

After purchase, the brush may be directly used or in some cases soaked in water for a few hours to soften the fibers. Before use the top 5-10 mm of bark is pared away with a sharp knife and then one chews the bristles. The teeth can then be cleaned by drawing the miswak from the edge of the gums up or down to the cutting edge of the teeth.

Species used

In the Middle East, the most common source of chewing sticks is the Arak *Salvadora persica* tree. In West Africa the lime tree *citrus aurantafolia* and the orange tree *citrus sinensis* are known to be used. The roots of Senna (*Cassia vinnea*) were used by African-Americans and those of African laburnum (*Cassia sieberianba*) were used in Sierra Leone. Neem (*Azadirachta indica*) is widely used in the Indian subcontinent (Almas *et al.*, 2002).

In Eritrea, many species of trees are used for miswak, both indigenous and exotics. However use of the exotics is more frequent in towns and cities where they are more prevalent. The selection of

species used usually depends on personal preference and availability of such species in the neighbourhood. However, the most common selection criteria is power of cleaning. Some of the usually used species in Eritrea, Ethiopia and Kenya are given in Table 1.

Table 1. Species used for miswak in Eritrea, Ethiopia and Kenya.

Species	**Country**	**Species**	**Country**
Albizia coriaria	Kenya	*Euclea schimperi*	Eritrea
Acacia nilotica	Eritrea, Ethiopia, Kenya	*Olea europea subsp. africana*	Eritrea, Ethiopia, Kenya
Balanites aegyptiaca	Kenya	*Rhus abyssinica*	Eritrea
Berchemia discolor	Kenya	*Rhus natalensis*	Eritrea, Ethiopia
Boscia coriacea	Kenya	*Rhus retinorrohoae*	Eritrea
Cadaba farinosa	Eritrea	*Rhamnus staddo*	Eritrea
Cordia sinensis	Kenya	*Salvadora persica*	Eritrea, Ethiopia
Cupressus lusitanica	Kenya	*Sterospermum kunthianum*	Eritrea
Dobera glabra	Eritrea, Ethiopia	*Salix subserrata,*	Ethiopia
Dodonia angustifolia	Eritrea	*Vernonia amygdalina*	Ethiopia, Kenya

References: Eritrea, Ministry of Agriculture (1995); Ethiopia (Azene *et al.*, 1993); Kenya (ICRAF, 1992).

IMPORTANCE OF ORAL HEALTH AND HOW CONTRIBUTION OF MISWAK

Oral health is part of total health and essential to quality of life. The World Health Organization puts oral diseases among the top 5 causes of burden in 'lost healthy years' worldwide (WHO, 2004). The major cause of such oral diseases is due to dental caries which are mainly a result of poor hygiene. Moreover, systemic health may be affected as a result of problems in oral hygiene (Bone, 2005).

Toothbrush sticks can be used by the vast majority of people who cannot afford to buy the commercial western toothbrush and toothpaste. The toothbrush sticks are important for the oral and dental hygiene of the users and hence may be useful in decreasing dental caries. (e.g. Kassu, 1999)

A number of studies have been carried out to assess the efficiency and potential use of the miswak, some of which are mentioned as follows. Studies on the chemical contents *Salvadora persica* miswak have shown significant contents of antibacterial substances (e.g. Hattab, 1997; Kassu, 1999; Almas, 2002). A survey study by Ndungu (1990), on the efficacy of common miswak versus the western tooth brush, showed that for patients with moderate plaque deposits, the miswak is as efficacious as the toothbrush in plaque control. Gazi *et al.*, (1990) also corroborate by mentioning that a miswak, used five times a day, may offer a suitable alternative to a toothbrush for reducing plaque

and gingivitis. However both investigations agree that, miswak alone is not a complete alternative for patients with severe plaque deposits or for maintaining interproximal dental health.

PROS AND CONS OF USING MISWAK

In terms of oral health, the major advantages of miswak over that of western toothbrush are that it is cost effective for users, especially for those in developing countries. This is because firstly, the miswak can be used for longer time duration - several weeks at a time. It usually is replaced when it gets too dry or rather more likely when lost. Another merit, unlike its common English name "toothbrush stick", it is actually combined toothbrush and tooth paste. This further cuts down the cost, e.g. 75 ml tooth paste costs about US $ 2 in Asmara, several fold of the price of miswak (US $ 0.10). Another advantage is the ready availability of miswak in towns or villages. In addition, as it is dry and small size, it is easily carried around, hence enabling the user to prompt use after every meal or when killing time.

Miswak can also be a means of significant supplementary income generation (Blay, 2004). If a farmer has some trees or shrubs of the commonly used species in the locality, he/she can regularly prune it and sell the twigs for miswak in nearby towns. Furthermore, some miswak species like *Acacia nilotica* and *Albizia coriaria* could easily be integrated in agroforestry projects, which can result in an added benefit.

However there are some potential concerns on the use of miswak. These are mainly the effect of harvest on the plant and use of the miswak itself.

Up to now the miswak encountered have been commonly used in the past and their effects on teeth are known only by experience. However, local people report that species like *Balanites aegyptiaca* and *Salvadora persica* have some negative side effects such as teeth discolouring if used for an extended period of time. The rough miswak fibres may also have the undesirable effect of scratching the teeth enamel and worse bleeding the gums to allowing bacteria in (Sote, 1994). Another cause of concern is that of immoderate use (e.g. Bos, 1993), in particular as miswak is carried around and used in most places any time of day. This requires further study on the species in use and their effects on gums and teeth.

Another concern, which is likely to grow with growth in the miswak market, is that of unsustainable harvesting of miswak trees. Such harvest could result in poor growth of the trees and even death. This is especially of concern if the trees are those considered to be locally endangered. Examples of such trees in Eritrea are *Balanites aegyptiaca*, *Dobera glabra*, *Rhus abyssinica*, and *Rhus natalensis* (Environment Eritrea, 1995). This seems to be one of the main reasons for the Ministry of Agriculture's tendency to discourage miswak sellers in towns and cities.

CONCLUSION

The traditional tooth brush or the miswak is a major means of keeping oral hygiene and dental health in Eritrea. As such, the frequent use of miswak is widely considered a cultural symbol of personal hygiene. A number of species are used for such purpose, some of which are endangered. However, sustainable harvesting should enable effective utilization, without damage to the trees. At this junction, further study on the economics of the trade, choice of suitable species (and in some cases alternatives to endangered species) as well as effectiveness of specific species for dental hygiene is suggested. It is hoped that such a cultural heritage be given due attention to play a continued role for dental hygiene while providing useful supplementary economic benefits for the local community.

END NOTES

1-Eritrea is a small country located in the horn of Africa. It is bounded by Sudan, Ethiopia and Djibouti as well as the Red Sea.

2-I have opted to use term ‘miswak’ throughout this paper as it is the most frequently used name in literature.

3-The miswak I refer to in this paper is obtained from small whole branches of trees, unlike that of the West African e.g. Ghanian ‘chewing sticks’ which are normally split from large woody tree trunks.

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