Genetic Resources Access and Benefit Sharing Directorate

Bioprospecting Potential of *Rumex abyssinicus*

***Rumex abyssinicus* Jacq**

Family: Polygonaceae

Reviewed by: Tesfaye Bekele

August, 2016

Addis Ababa, Ethiopia

1. Introduction

1.1. Plant description

Rumex abyssinicus is perennial herb, up to 3 m tall, with thick, fleshy rhizome. A common and tolerated weed in fields and plantations. The tender shoots are edible. The rhizomes are used to refine butter and give it a rich yellow color. They are also used medicinally and extracts are drunk to control mild forms of diabetes. Its local Amharic name is 'Mekmako' (NDA, 2009). This plant species will remain locally an important vegetable from the wild. Its nutritive and medicinal properties deserve better investigation; plants have been used in treating different diseases. In addition to this decoction of leaf or root powder taken as vermifuge. Root powder paste with lime juice applied for Tinea nigra, T. versicolor. If eaten in large quantities, could produce toxic effect because of their oxalate contents (Jaya and Elias Ali, 2010).

2. Ecology and distribution

Rumex abyssinicus is a common weed in fields and plantations. It also occurs along paths and water, in secondary scrub, grassland and margins of rain forest; It is widespread throughout the country at altitudes between 1200 and 3300 m altitude (Edwards *et al*., 2000).

3. Importance

3.1. Medicinal value

According to (Mekonnen *et al.*, 2010) reported their finding 80 % methanol extract of the rhizomes of Rumex *abyssinicus* had been reported to possess secondary metabolites, including, among others, tannins, saponins, flavonoids, steroids and anthraquinones. Flavonoids and tannins have been shown to be important for wound healing due to their antioxidant, anti-inflammatory and antibacterial activities.

Rumex abyssinicus is used to treat malaria, gonorrhea, poisoning, hepatitis, constipation, sciatic neuralgia, hypertension, migraine, rheumatism, breast cancer, stomach distention, earache, liver diseases, hemorrhoids, typhus, rabies and wound (Mekonnen *et al*., 2010; Teklehaymanot *et al*., 2007).

3.1.1. Hypertension, Inflammatory and Pain Treatment

The crude leaf extract of *Rumex nervosus* and roots of *Rumex abyssinicus* exhibited anti-inflammatory and antimicrobial activities (Getie *et al.*, 2003). It is traditionally used for hypertension, inflammatory and painful conditions in Ethiopia and also shows diuretic and analgesic activities (Mekonnen *et al*., 2010). In addition to this, *Rumex abyssinicus* had demonstrated a chemopreventive potential at post-initiation stage. It has been traditionally used for management of hypertension, inflammatory and painful conditions. It contains a number of anthraquinones that showed COX-2 inhibitory (non-steroidal anti-inflammatory drug that directly targets cyclooxygenase-2, an enzyme responsible for inflammation and pain), and antitumor activity against different cancer cell lines (Biniyam Girma *et al.,* 2015).

3.1.2. Anti-microbial

Rumex abyssinicus roots were used for diuretic, analgesic, anti-microbial and anti-inflammatory activities. It has also contains promising bioactive compounds that might be useful in the control of helminth infections by interrupting the worms' life cycle and preventing their growth (Basha *et al.,* 2011). The roots have been shown to possess antibacterial activity against *Streptococcus pyogenes* and anti-inflammatory activity agent the synthesis of prostaglandin. The plant has strong antiviral activity against Coxsackie virus and influenza A virus. In *vitro* it demonstrated proliferation of murine macrophage cells, suggesting that it may have a role in improving the immune system of the body (Diallo *et al.*, 1990).

3.1.3. For wound healing

Eshetu Mulisa *et al.* (2015) reported that *Rumex abyssinicus* has a potential application as a wound healing agent. Higher hydroxyproline content in the extract and standard treated group might be related to enhancement of the proliferation and migration of fibroblasts and collagen deposition. Better efficacy of the crude extract in wound healing was further evidenced by the breaking strength in incision wounds. It mainly depends on the increase in collagen concentration and stabilization of the fibers. It also applied externally; the plant is used fresh or dried to treat wounds, sores and parts affected by scabies (Bussmann, *et al.*, 2011).

3.2. Other Uses

Rumex abyssinicus has a yellow and a red dye that can be obtained from the rhizome and it is used for colouring wickerwork, and to impart a red colour to the feet and hands of women. The crushed plants are used to clean cooking pots that have been blackened over the fire, and to remove grease. Leaves of various *Rumex* species are very good at removing dirty oil from the skin by simply crushing the leaves to release the sap and rub them over the dirty area (Bussmann *et al.*, 2011). In other words, extract results showed that the curing system using 10% mekmeko powder with 15% common salt is efficient in preserving the raw goatskins. The quality of the experimental crust leathers produced from the optimized preservation system is comparable with the control leathers. The generation of the pollution load during leather processing was determined by analyzing biochemical oxygen demand, chemical oxygen demand, total dissolved solids, and chlorides from soaking liquor. Most importantly, 55% total dissolved solids and 70% chloride reduction in the soaking liquor was achieved by using the plant-based method of preservation. The less-salt preservation system based on mekmeko is a cleaner alternative for the conventional salt-based preservation method reported by (Shegaw Ahmed *et al.*, 2011).

Generally, *Rumex abyssinicus* is the potential genetic resources for bioprospecting (because of its active parts rhizome, roots and leaves) and locally popular traditional medicine plant.

4. References

1. Biniyam Girma, Getnet Yimer and Eyasu Makonnen (2015). Effect of Rumex abyssinicus on preneoplastic lesions in dimethylhydrazine induced colon carcinogenesis in rats. *Complementary and Alternative Medicine* **15:365**.
2. Diallo, D; Hveem, B; Mahmoud, MA; Betge, G; Paulsen, BS; and Maiga, A. An ethnobotanical survey of herbal drugs of Gourma district, Mali. *Pharm Biol*, **37:**80-91.
3. Edwards, S., Mesfin Tadesse, Sebsebe Demissew and Hedberg I. (2000) (Eds.). Flora of Ethiopia and Eritrea, Volume 2 Part 1. Addis Ababa University and Uppsala University, Uppsala
4. Eshetu Mulisa, Kaleab Asres and Ephrem Engidawork (2015). Evaluation of wound healing and anti-inflammatory activity of the rhizomes of *Rumex abyssinicus* J. (Polygonaceae) in mice. Complementary and *Alternative* Medicine 15:341.
5. Getie, M; Gebre-Mariam, T; Rietz, R; Höhne, C; Huschaka, C; and Schmditke, M. (2003). Evaluation of the antimicrobial and anti-inflammatory activities of the medicinal plants *Dodonaea viscosa*, *Rumex nervosus* and Rumex abyssinicus. *Fitoterapia*, **74**:139–143.
6. Mekonnen T, Urga Kelbesa, Engidawork Ephrem (2010). Evaluation of the diuretic and analgesic activities of the rhizomes of Rumex abyssinicus J. in mice. *J Ethnopharmacol*; **127**:433–9.
7. Natural Database for Africa (NDA, 2009). Natural Data Base for Africa.
8. Bussmann, RW; Swartzinsky, P; Aserat Worede and Evangelista, P. (2011). Plant use in Odo-Bulu and Demaro, Bale region, Ethiopia. *Journal of Ethnobiology and Ethnomedicine.*
9. Raju, N.J., and Elias Ali (2010). Evaluation of Anthelmintic Activities of *Rumex Abyssinicus* Jacq and *Rumex Nervosus* Vahl. (Polygonaceae). *International Journal of Pharmaceutical Sciences Review and Research*; 5(2): 43-48
10. Basha, S.N; Rekha, R.; Sirak Saleh and Samuel Yemane (2011**).** Evaluation of *In vitro* anthelmintic activities of *Brassica nigra, Ocimum basilicum* and *Rumex abyssinicus. Pharmacognosy Journal*. 3(2).
11. Shegaw Ahmed, Balaraman Madhan, Berhanu Assefa, Brindha Velappan and Alagumuthu Tamil Selvi (2011). *Rumex abyssinicus* (mekmeko) Ethiopian plant material for preservation

of goatskins: Approach for cleaner leather manufacture. *Journal of Cleaner Production;* **133**:1043–1052.

12. Teklehaymanot, T, Giday, M, Medhin, G, Mekonnen Yalemtshay (2007). Knowledge and use of medicinal plants by people around Debre Libanos monastery in Ethiopia. J *Ethnopharmacol*, **111**:271–283.