

Short communication

EVALUATION OF GERMINATION PRETREATMENT AND COMPOSITION OF SOME NUTRIENTS IN *ERIOSEMA CORDIFOLIUM*: AN OVERLOOKED WILD EDIBLE PLANT IN ETHIOPIA

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ABSTRACT: *Eriosema cordifolium* (Hochst. ex A. Rich.) is a wild edible plant that belongs to the Fabaceae family. Its tuber is harvested from the wild for local use as food and consumed raw as a snack especially by children. However, no study was yet undertaken on its seed germination and nutritive values which are among the requirements useful for its conservation and utilization. The aim of this preliminary study is thus to investigate the germination pretreatment and nutritive value of *E. cordifolium*. The germination requirement was studied using four different methods: using sand substrata and keeping in the oven at 33°C, soaking in cold water for 24 hrs, soaking in hot water (70°C) for 15 minutes and applying mechanical scarification. For nutrition analysis, dried tubers were ground into powder and crude fat, mineral ash and moisture content were analyzed in replicates following standard methods. The germination tests showed that mechanical scarification is the most promising method which resulted in 65% of seed germination. The result of the nutritional analysis showed an average crude fat content of 0.55%, ash content of 6.05% and 16.59% moisture content. The findings reported here could lay the basis for further research on the species.

Keywords: *Eriosema cordifolium*, Germination, Pretreatment, Nutrition.

INTRODUCTION

Wild edible plants are plant species that are neither cultivated nor domesticated but are used as a source of food from their wild natural habitat (Beluhan and Ranogajec, 2010). They have significant importance in supplementing staple foods and filling food gaps. As a result, their loss could cause food insecurity and imbalance. The genus *Eriosema* is pantropical and comprises about 150 species distributed mainly in Africa (110 species) and America (38) (Schrire, 2005). As reviewed by Selepe (2011) the genus *Eriosema* have several ethnomedicinal uses and have been used in treatments of

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ailments such as diarrhea, orchitis and hydrophobia. The isolated flavinoides and derivatives also have several pharmacological properties which include antimicrobial, cytotoxicity, antioxidant, antiviral, erectile-dysfunction, vasodilatory and hypoglycemic (Awouafack et al., 2015).

Eriosema cordifolium (Hochst. ex A. Rich.) which belongs to the Fabaceae family and known by its common name *Qurqufo* in Afaan Oromo, is an overlooked wild edible plant in Ethiopia. It grows within altitudinal ranges of 1700 – 2500 m a.s.l. and was reported from Northwest Ethiopia, Shewa, North Hararge, Tigray, Gonder, Wollega, Kefa and Sidamo areas of Ethiopia (Westphal, 1974; Edwards et al., 2019). It is a trailing, perennial herb; with a single branched, slender, flexuous stem around 7-15 cm long and commonly grows in habitats such as grassland, pathways, woodland, roadsides, and grassy savanna on stony ground. It propagates from conspicuous seeds which are produced in pods. The tuber (underground stem) of *E. cordifolium* is harvested from the wild for local use as a food and consumed raw as a snack food especially by children (Boke et al., 2015; Edwards et al., 2019).

Factors such as habitat degradation and loss that affect forest resources are threats to wild edible plants hence appropriate conservation thereof is of paramount importance (Lulekal et al., 2011). However, the current state of knowledge concerning the ecological distribution, seed germination requirements and nutritive values of many wild edible plants, including *E. cordifolium* is scarce. Therefore, this pilot study was aimed to understand the germination requirements and composition of some nutrients in *E. cordifolium* native and overlooked wild edible plant species.

MATERIALS AND METHODS

The study species and sample preparation

Samples of tubers and pods of *E. cordifolium* were collected from *Gara sofa* cliff which is located nearby Bishoftu town at the altitude of 2300 m a.s.l. during September 2020 (Figure 1).

The seed samples were exposed to sunlight until well dried. They were cleaned following the seed processing procedure and pure seeds were kept in plastic bags and transported to the seed germination

laboratory of the Ethiopian Biodiversity Institute (EBI) to undertake germination tests. Similarly, the dried tubers were also stored in plastic bags and transported to EBI's nutrition laboratory for nutritional composition analysis.



Figure 1. *E. cordifolium*, the plant (a) and its seeds (b); (photo taken by Debissa Lemessa in nearby Bishoftu town).

Germination pretreatment and nutrition analysis

The germination pretreatment was undertaken using four different methods: (1) using sand substrata and keeping in the oven at 33°C, (2) soaking in cold water for 24 hrs, (3) soaking in hot water (70°C) for 15 minutes and (4) applying mechanical scarification using scissors. For treatment methods 2 to 4, seeds were spread on moistened blotting paper in petri dishes after the seed treatments. The petri dishes containing seeds were kept in a growth chamber at room temperature (~25°C). Seed germination was monitored daily and germinated seeds were recorded for one month from October to early November 2020.

For nutrition analysis samples of tubers were chopped into small pieces to facilitate drying and were kept in an incubator at 30°C for two weeks and dried tubers were ground into powder. Data were recorded for crude fat, mineral ash and moisture contents. Each analysis was conducted in replicates. All analyses were carried out following the official methods of analysis of the Association of Official Analytical Chemists (AOAC, 2000).

RESULTS AND DISCUSSION

Germination

The germination tests showed that mechanical scarification is the most promising method when compared with other methods giving 65% of seed germination (Figure 2). This result corroborates with previous studies which stated that the seeds of *Eriosema* species may benefit from scarification before sowing (Fern, 2014). A germination rate of 70% has also been reported for seeds of other species in the genus *Eriosema* (SCS, 1979).

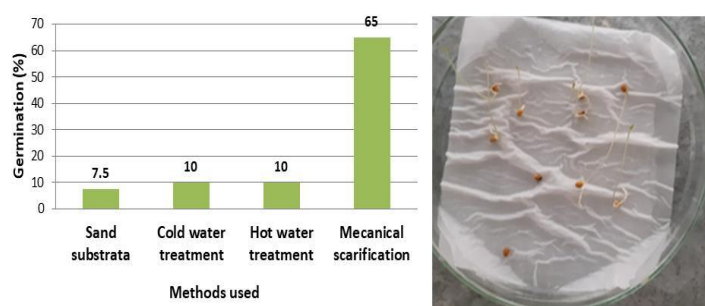


Figure 2. Germination per cent of *E. cordifolium* using different methods (left) and germination after mild scarification with scissors (right).

Nutrient composition

The result of the nutrition analysis showed that *E. cordifolium* has an average crude fat content of 0.55%, mineral ash content of 6.05% and 16.59% of moisture content (Table 1). When compared with the nutrient composition of domesticated crops with edible tubers, taro and yam (Akalu and Geletu, 2019), *E. cordifolium* showed lower crude fat content and high total ash content.

Table 1. Composition of mineral ash, crude fat and moisture in *E. cordifolium*

Replication	% Mineral ash	% Crude fat	% Moisture
1	6.09	0.56	16.79
2	6.06	0.55	16.56
3	6.01		16.42
Mean	6.05	0.55	16.59

According to Fern (2014), the root of *E. cordifolium* is commonly used as a vegetable in Africa. A study on the presence of chemicals that may cause health risk showed that *E. cordifolium* is free from heavy metals including cadmium, lead and copper which cause risks to health (Boke et al., 2015). These studies suggest that the species could be a potential source of food and useful minerals.

In this short communication, we have addressed seed germination requirements and composition of some nutrients in *E. cordifolium*. The results showed that seed germination was better after scarification and the species higher mineral ash content. The findings in this preliminary study could be subjected to limitations since it was carried out using samples from a single location. However, it could serve as a starting point for further research by taking multiple samples from different growing ranges to know more about the species and its potential values.

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