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# Assessment of Nutrient Composition and Antioxidant Activity of Some Popular Underutilized Edible Crops of Nagaland, India

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## Abstract

In Nagaland ~70% of population lives in rural areas and depends on forest products for livelihood. Being part of the biodiversity hotspot, state is rich in biodiversity. The present study was an attempt made to understand the nutritional properties of 22 popular underutilized edible plants (UEP) Kohima, Phek, Tuensang districts. Results revealed moisture content of 22 studied plants ranged between 4.8 to 88.15 g/100g, while protein content varied between 0.00269 - 0.773 g/100g with highest in *Terminalia chebula* (0.773 g/100g) fruit while lowest protein content was in *Setaria italica* (0.00269 g/100g). Total carbohydrate content was between 0.198 - 5.212 g/100g with highest in *Setaria italica* (5.212 g/100g) and lowest in *Juglans regia* (0.198 g/100g). Of the 22 samples, maximum antioxidant activity was in *Terminalia chebula* fruits (37.49 µg/ml) followed by *Clerodendrum glandulosum* (65.29 µg/ml) leaves, *Phyllanthus emblica* (79.08 µg/ml) fruits against Trolox (96.89 µg/ml). Highest total phenol content (TPC) was recorded in *Terminalia chebula* (53.11 mg GAE/g) and *Rhus chinensis* (43.99 mg GAE/g) while in other 20 crops the values varied from 0.09 - 8.44 mg GAE/g. Total flavonoid content (TFC) varied between 0.004 - 43.67 mg QE/g with *clerodendrum glandulosum* (43.67 mg QE/g) and *Terminalia chebula* (27.78 mg QE/g) were found to be highest among the 22 plant samples. Findings suggest that these underutilized edible plants should be popularized as they can contribute to nutritional support to different region of the state for health improvement and cultivated them commercially to help and develop various value added local product to improve the livelihood status of the rural population and also add to the economy of the state and region.

## Keywords

Antioxidant Activity, Food Security, Nagaland, Nutrient, Rural Health,



## 1. Introduction

Underutilized edible plants are under exploited of its potential for contributing to food security (nutritional/medicinal), income generation and environmental services [1]; they are locally abundant instead of globally, lack scientific knowledge concerning their physiological, agronomic and ecological properties and have a limited current use relative to their economic potential. They have the potential to fight against poverty and starvation faced by many developing countries and can help promote crop diversification to encounter such problems and also improve the rural economy [2] [3]. Though they are not significant in terms of global production and consumption systems but are rich in macronutrients and micronutrients and comparatively they require relatively low inputs thereby contributing to rural sustainable agricultural production and combating the "hidden hunger" caused by micronutrients deficiencies [2] [3] [4] [5]. They have the capability to deliver many health benefits apart from fulfilling physiological needs and had been conferred the status of functional foods [6].

A diet rich in higher antioxidant activities with free radical scavenging molecules (flavonoids, anthocyanins, carotenoids, and dietary glutathione), vitamins and endogenous metabolites can protect the human body against cellular oxidation reactions, cardiovascular events, cancer, and other age-related degenerative diseases [7] [8] [9]. Fruits, nuts and vegetables play a significant role in human nutrition especially as source of vitamins, minerals and dietary fiber [10]. They offer advantages over dietary supplements because of low cost and wide availability; as such they remain an important source of nutrients in many parts of the world. Nuts are good source of essential fatty acid, fiber, vitamin E and mineral [11]. Some components of fruits and vegetables are strong antioxidants and function to modify the metabolic activation and detoxification/disposition of carcinogens or even influence processes that alter the course of the tumor cell [12]. A high dietary intake of fruits and vegetables is strongly associated with a reduced risk of developing some chronic diseases, such as various types of cancer, cardiovascular disease, type II diabetes and other degenerative or age-related diseases, which causes death in many developed countries was established by clinical trial and epidemiological studies [8]. With the advantages of medical science, people live longer and are faced with diseases that come along with age and illnesses such as cancer and diabetes mellitus [13]. The antioxidants from plant origin are beneficial compared to synthetic ones as they do not have any side effect/genotoxic effect [14] [15], further natural antioxidants are advantageous due to cost effectiveness and easy accessibility in the form of vegetables and fruits [16]. Data on epidemiological and *in vitro* studies strongly suggest that foods containing phytochemicals with anti-oxidation potential have strong protective effects against