

Tesfaye Abebe Desta 2013: Evaluation of Diversity among Potato (*Solanum tuberosum* L.) Cultivars in Ethiopia based on Morphological Characteristics and SSR Markers. Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Faculty of Agriculture. Thesis Advisor: Miss Shermarl Wongchaochant, Ph.D. 201 pages.

Evaluation of the processing quality, starch chemical composition and pasting properties, mineral concentration, phenotypic and genetic diversity of 25 potato varieties in Ethiopia were carried out with the main objectives of determining their variability and proper production areas to maximize potato's versatile utility in Ethiopia.

The dry matter and starch content evaluation had shown the presence of highly significant ($P < 0.01$) differences among varieties and values ranged from 17.82% to 26.70% and 9.75% to 17.85%, respectively. Specific gravity and starch yield ranged from 1.058 to 1.102 and 2.21 to 6.91 t.ha⁻¹, respectively. Nutritional concentration study identified highly significant ($P < 0.01$) variability among varieties. Accordingly, protein and fiber content and iron, zinc, and phosphorus concentrations ranged from 3.77% to 7.36%, 1.18% to 2.20%, 17.13 to 164.83, 7.07 to 20.21 and 143.68 to 357.76 mg.kg⁻¹, respectively. Chemical and pasting properties analysis of starches also showed highly significant ($P < 0.01$) variability among varieties, locations and their interaction. Amylose and amylopectin content ranged from 20.86% to 30.58% and 69.42% to 79.14%, respectively.

The morphological diversity analysis study showed significant ($P < 0.01$) genetic variability among varieties and grouped them into three main clusters and one singleton. Contrarily, the microsatellite analysis carried out using 11 SSRs primers revealed their narrow variability over these genome loci.

Student's signature

Thesis Advisor's signature