

## Abstract

Acacia senegal is a multipurpose drought-tolerant tree or shrub legume and is commonly used in agroforestry systems in sub-Saharan Africa for gum arabic production and soil fertility improvement. Despite its wide distribution in Kenya, there has not been exhaustive evaluation on the effects of the extant varieties (kerensis, leiorhachis and senegal) on soil properties under their canopies for sustainable utilization of the species. Three sites in the drylands of Kenya representing the three varieties were selected for assessment. Soil samples were collected under tree canopies at a depth of 0 to 25 cm and were compared with the soils from the open canopies. There were significant differences in soil physicochemical properties among the three varieties ( $P < 0.01$ ). Soil nutrients under the canopies were higher than in the open canopies mainly due to effects of litter accumulation. The three varieties have beneficial effects on soil nutrient status in their natural ecosystems and would most likely improve crop productivity in agroforestry systems as well as enhance herbage productivity in the rangelands. The varieties growing under different soil types may have an effect on their gum Arabic production and quality.