

Nutrient removal with harvest of biomass of *Eucalyptus dunnii* maiden grown in short rotation coppice for bioenergy

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The continue increase in world population, coupled with the environmental problems caused by the use of fossil fuels, has led to the search of new sources of renewable energy. Among these, is the use of eucalyptus biomass grown on short rotation coppice for energy production, in which all the components of the tree are harvested. Based on this, some questions arise: Can we call renewable energy the one in which all the components of the tree are removed from the soil every four year? What are the consequences from the nutrient cycling point of view? Energy production will vary depending on the number of trees per hectare? Because of this, the objectives of the research are: a) Quantify the nutrient concentration in different tree components of 4 years old *E. dunnii*, b) Compare the magnitude of nutrient removals and energy yield in two initial planting densities, in two different sites. For each planting density, three trees per replication with average diameter and height were selected to cut. After that, logs and residues (leaves and branches) were weighted individually. One representative tree of each treatment was chosen to weight separately: logs and bark, leaves, coarse branches and fine branches to estimate the proportion of each component in the aerial biomass. According to the result obtained, there was no effect of the planting density on the biomass production per hectare, but owing to the higher proportion of wood in high planting density the production of energy was higher. Significant differences on nutrient concentrations in different tree components were observed, but were generally of similar magnitude between the two densities. The nutrient export made by forest biomass varies depending on the nutrient, tree component and the number of trees. Increasing planting density, shortening the cycle and essentially the extraction of the total biomass, compromises the sustainability of the system, particularly in low fertility soils, such as those used in the experiments, and representative of the soils used in commercial forestry.

Keywords: *Eucalyptus* sp., forest biomass, short rotation woody coppice, nutrients export

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