INTRODUCTION

The use of sewage sludge as fertilizer in silvopastoral systems increased pasture production and tree growth. However, sewage sludge contains a relatively higher concentration of heavy metals (mainly Zn and Cu) than that normally found in soils which is regulated in Spain by the R.D. 1310/1990 and by the European Directive 86/278/EEC.

OBJECTIVE: to evaluate the effects of different dose of sewage sludge (100, 200 and 400 kg total N ha⁻¹) compared to control treatment (no fertilization) on the total and available Cu concentration in soil and the Cu levels of pasture in a silvopastoral system under Quercus rubra L.

MATERIALS AND METHODS

LOCALIZATION

EXPERIMENT DESING

TREATMENTS

(1) No fertilization (0N)
(2) 100 kg N ha⁻¹ of anaerobic sludge (100N) in 2002 and 2003
(3) 200 kg N ha⁻¹ of anaerobic sludge (200N) in 2002 and 2003
(4) 400 kg N ha⁻¹ of anaerobic sludge (400N) in 2002 and 2003


ANALYSIS IN THE LABORATORY: soil total and available Cu and pasture Cu concentration

STATISTICAL ANALYSIS: ANOVA and LSD

RESULTS

Soil total and available Cu ↑ in 2010 than in 2003. Soil total Cu < 50 mg kg⁻¹ (R.D.1310/1990)

In general, 400 N ↑ total and available Cu than the other treatments

CONCLUSIONS: the fertilization with sewage sludge increased the concentration of Cu in the soil and plants, mainly when high doses of sewage sludge were applied (400 kg total N ha⁻¹), but never exceeded the maximums set by Spanish regulations and did not cause harmful effects on plants and animals. Therefore, the use of high quality sewage sludge as fertilizer may improve the productivity of the herbaceous and tree components of silvopastoral systems without creating environmental hazards.