Nitrogen content of Lemna gibba medium was measured in order to examine changes in concentrations of three nitrogen forms, ammonia, nitrate and nitrite, induced by the presence of cadmium over 10 days. Cadmium concentration of 100 µg L-1 caused a complete inhibition (100 %) of growth and a 74.4 % decrease of ammonia production. However, control experiments using Lemna gibba plants sterilized by sodium hypochlorite and diluted alcohol solutions before culturing suggested that NH4+ present in experimental medium originated from microorganisms’ activity. Slight increase of nitrite was observed in response to cadmium. Significant increase of NO3- concentrations (159 ± 32 to 385 ± 23 mg L-1) was observed in the medium of plants exposed 10 days to 100 µg L-1 Cd2+. Decrease in cadmium content of the culture medium after 10 days of incubation indicated a strong relationship between cadmium uptake, toxicity, and inhibition of nitrate absorption. Changes in nitrate concentration are proposed as a marker of cadmium contamination in water.