

Environmental Pollution in the Southern Coastline of Adjara (Georgia) and its Impact on Quality of Cattle Milk

Guguli Dumbadze, Nino Lomtadze
Batumi Shota Rustaveli State University
Dumbadze.guguli@bsu.edu.ge

Introduction. Environmental pollution is a global ecological problem for today. Georgia is no exception. Among the many other contaminants, the environment here poses a serious threat to military wastes left by the former soviet Army, including toxic substances, explosive materials, heavy metals and other harmful compounds. Fields contaminated by military activities are the battlefields and polygons, military factories and warehouses, places of dislocation. These territories are contaminated with explosive organic compounds containing nitro-groups, oil hydrocarbons in the mineral oils, lead and other heavy metals. There are a number of military polygons abandoned by the Russians in Georgia. Among them is Gonio's former military polygon.

Gonio polygon is located in the South of Adjara, on the left side of the river Chorokhi. It stretches over 315 hectares in the surrounding area of the Black Sea.

Polygon was used for military exercises until 2003. Since 2004, population has been using it as a pasture for the cattle. In the past years, the "collection" of the so-called "excavation" of the scraps of the scrap metal, which resulted in the explosion of mine and anti-tank cartridges, caused number of human casualties.

For the future, the Georgian government intends to build a tourist complex in this place, for which the mine-cleaning process is under way for the last two years. Near Gonio former military polygon, there is a Batumi landfill, which is another important pollution agent of the environment. There are settlements (Kakhaberi, Airport, Adlia, Akhalsopeli, Avgia, Gonio), where most of the population has cattle. Because of the excessive settlement and land shortage, there is no pasture. As a result, the cattle are exposed to the territory of the former polygon and Batumi landfill for pasture.

Consequently, the safety of milk and milk products of nutritious products in these territories is doubtful.

According to the world statistics, more than 2 million people die annually from contaminated food. Food contaminated with bacteria, viruses or chemical substances causes more than 200 diseases, started with diarrhea and ending meningitis or malignant tumors.

Based on this, the study of the soils, herbaceous plants and dairy products of the coastal Adjara South Coast in terms of pollutant toxic substances of food safety and population health is acutely relevant and important.

The purpose of the research was to study soils of Black Sea coastline on the southern coast of Adjara in Gonio, former military polygon and Batumi landfill sites for polluting toxic substances and the probability of getting hazardous substances out there in the widespread herbaceous plants and milk.

Soil samples were obtained using standard foam method (ГОСТ 17.4.3.01-83), in the soil, the bulk content of the soil was determined by atomic absorption spectrophotometer (283 nm) animal feeding herbaceous plants and milk in heavy metals As, Cu (Ectracic-photometric method using lead diethylhydrocortinata), Zn (ГОСТ 2693-86), Cd (ГОСТ 26933-86), Pb (ГОСТ 26931-86).

Results. The study has shown that the pollution by lead is significantly higher in the 1-5 cm layer of soil and it exceeded of the maximum permissible concentrations (MPC), it significantly reduced in the depth in soils of Gonio former military polygon.

Therefore, the bulk dissemination of the soil in the depths of the soil or its rainwater is insignificant.

Lead concentration of the soil sample from the control plots was 1.8 mg/kg, while the sample from Gonio former military polygon (close to the explosion area) revealed 8.4 mg/kg. In the soil, the maximum permissible concentrations (MPC) of lead is 3-6 mg/kg.

Lead concentration also exceeds of MPC in two other soil samples taken in the depth of the former polygon (6.3 and 6.8) .

Conclusion. In the Gonio former military polygon, lead concentration in soil samples is 1,13-1,4 times higher of the MPC (3-6 mg/kg), and in the landfill area, it is equal to the Maximum Permeable Concentration (5,8 mg/kg). The similar result is (5,9 mg/kg) in the polygon area near the highway.

The high content of the lead was found in the vegetable cover. The herbaceous herbs taken in the depths of Gonio former military polygon contain 4,5 times more lead (57 mg/kg) than the plant samples taken in the control zone (1,3 mg/kg), but this indicator is far behind MPC (5,0 mg/kg).

The diagnosis of milk samples of the population living in the vicinity of the study site found that the bulk content in all samples, except the controlled variant (0,04 mg/kg), is 2 times greater than the limit (0,1 mg/kg) 0,27 mg/kg.

In all samples, milk contain metals –Pb, As, Cu, Zn, Cd is within the MPC.

Milk and milk products of the population living around the research area are risky and dangerous for human health.

Key words: Pollution, Adjara, Cattle Milk, Heavy metals.