



TECHNOLOGY OF PRODUCING TECHNICAL SALT (NaCl) FROM WASTE OF GARLYK POTASSIUM MINING AND PROCESSING PLANT

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Establishing waste-free industries in Turkmenistan, as well as waste processing, is considered one of the main areas in ensuring environmental safety [1]. According to the "State Program for Integrated Development of Chemical Science and Technology in Turkmenistan for 2021 - 2025", the products of chemical science and new chemical technologies in the country are ecologically clean, energy-saving, substitute goods imported from abroad and competitive in the world market. It is planned to carry out continuous work on the development of innovative production technologies [2].

Potassium chloride is one of the main products of the Garlyk potassium mining and processing plant, which is one of the main enterprises of the chemical industry in the country. For the production of chlorinated lime, sylvinitic ore serves as a raw material, which is mined by the mining method. The annual capacity of the underground complex of the enterprise is 7.8 million tons of sylvinitic ore. The main mineral composition of the ore is sylvinitic, halite, water-insoluble and slightly soluble minerals [3]. The mined raw materials are processed and enriched in the beneficiation unit. After passing the technological systems, ready potassium fertilizers are accumulated in the storage of the complex.

Table 1. Annual production capacity of Garlyk potassium mining and processing plant

No	Name of manufacturing facility	The name of the product	Volume of the produced product (thousand tons/year)
1.	Base set	Sylvinitic	7800
2.	Sylvinitic Mining Factory	Granular potassium chloride	600
		Particulate potassium chloride	800

A large amount of waste remains during the production process in the Garlyk potassium mining and processing plant [4]. The remaining waste is stored above ground near the plant in a specially designed salt collection facility (figure 1).

The amount of waste here is increasing year by year. As a result, in the future, ecological problems such as air, soil, surface and underground water pollution, reduction of biological diversity, disturbance of the balance of ecological systems will appear in the region [5].

Therefore, scientific research and experimental works are being conducted at the Oguz Han Engineering and Technologies University of Turkmenistan on the processing of halite waste and obtaining new products from it. Halite waste processing is very important not only in Turkmenistan, but also in the region to ensure ecological security.

On the basis of the experiments, the technology of extracting sodium chloride (technical salt) from halite waste was developed. The technology is low step, where no additional

reagents are used. For the production process, waste from Garlyk potassium mining and processing plant, distilled water and muffle furnace are used. As we mentioned above, the residue of the Garlyk potassium mining and processing plant is the residue from the potash fertilizer production of that complex. It contains a large amount of sodium chloride.



Figure 1. Industrial waste from the Garlyk potassium mining and processing plant

Wastes from the Garlyk potassium mining and processing plant is weighed on an analytical balance and dissolved in distilled water in a magnetic stirrer at a temperature of 100° C for 30 minutes. The solution is then filtered 4 times. The filtered melt was heated in a muffle furnace at 150°C for 2 hours. After heating in muffle furnace, water is evaporated to obtain 84.5% technical salt. The amount of technical salt obtained exceeds 80% of the residual waste (figure 2).



Figure 2. The industrial waste of the Garlyk potassium mining and processing plant

The obtained technical salt can be used in various sectors of the economy: in paint production, baking soda production, chlorine-alkali production, paper production, melting of snow on roads in winter, and in agriculture.

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