STUDY OF THE CHEMICAL COMPOSITION OF LIQUID WASTE FROM THE PRODUCTION OF SODA ASH.

Abdieva F.I.
Nabiev A.A.
National University of Uzbekistan named after Mirzo Ulugbek,

Relevance. Soda ash is one of the most important products of the chemical industry, which is used in glass production -50%, in the chemical industry -25%, in the metallurgical industry -15%, in the pulp and paper industry and other industries -10%. Currently, there are mainly four methods for producing soda in industry: ammonia (Solvay method), from natural soda-containing raw materials, from nephelines, and by carbonization of sodium hydroxide. Despite rapid growth in the 1970s the production of soda ash from natural soda-containing raw materials, one of the main methods for obtaining soda ash is still the Solvay method[1]. The raw materials needed to produce soda by the ammonia method are inexpensive, widespread and easily obtained. The reactions are carried out at low temperatures and close to atmospheric pressure. The method is well studied, technological processes are debugged and stable. The resulting soda ash is of high quality at a relatively low cost. Having a number of major advantages, the production of soda ash by the ammonia method has serious disadvantages. This is a significant consumption of energy resources and large specific capital investment required to create production. But the main disadvantage of the Solvay method is the formation of a large amount of liquid waste, the so-called distillation liquid, which indicates an insufficiently efficient use of the original natural raw materials. Approximately 9–10 m3 of distiller liquid falls on 1 ton of soda ash produced [2]. At present, the problem of disposal of waste from the production of soda ash using the ammonia method is quite acute in all countries that produce soda using this method. The technologies used for the processing, disposal and use of distillate liquid only partially solve the problem, due to the large amount of waste generated. As a result, waste is mainly accumulated in sludge ponds (settlement ponds) and (or) discharged into water bodies located near existing production facilities. The accumulation of distiller liquid in the sludge reservoirs gives rise to the problem of absorbing new land plots for sections of the sludge reservoir, not only with an increase in production capacity, but even to maintain existing loads. The main task of improving the environmental safety of soda ash production is the development of a new method for distilling liquid disposal. Thus, the scientific and technical task of recycling the main waste from the production of soda ash with increasing production volumes is very relevant. Of great scientific and practical interest is the use of distillation liquid from wastewater from soda plants from processed waste into calcium and magnesium salts by converting them into carbonate and phosphate salts for the production of other types of products for poultry, fisheries and livestock. The design capacity of the Kungrad soda plant for the production of soda ash is 100,000 tons. finished products per year. In the Kungrad soda plant, soda ash is produced according to the Solvay method. The production capacity is 100 thousand tons/year of soda ash. A distinctive feature of the soda technology at the Kungrad soda plant from the traditional Solvay method is the burning of limestone not with coke, but with natural gas to produce furnace gas with a content of 26% CO2 (instead of 40% according to the Solvay method) with further concentration of carbon dioxide up to 40% according to the Solvay method) with further concentration of carbon dioxide up to 40% by the adsorption method at the PSA unit.

Purpose of the study. Study of the chemical composition of liquid waste from the production of soda ash.

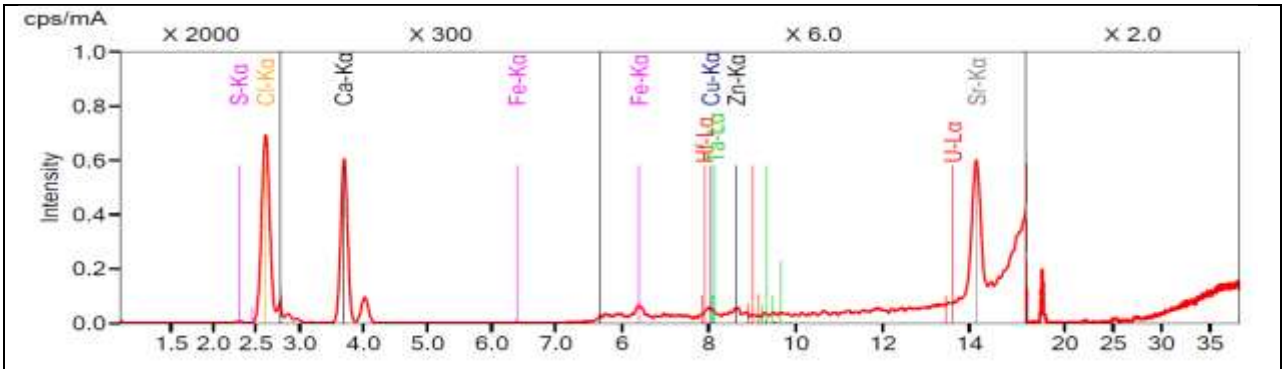
Materials and methods. For the study, a high-performance energy-dispersive X-ray fluorescence spectrometer was used - Japan, Rigaku NEX CG EDXRF using centrifuges and a sediment of the distiller liquid of the Kungrad soda plant, the soil of Kungirad soaked in the distiller liquid. At present, the treatment of distilled liquid with ammonia in the production of soda is a serious problem in all countries. Therefore, in order to treat distillery liquid, its chemical composition was first studied.

Results.

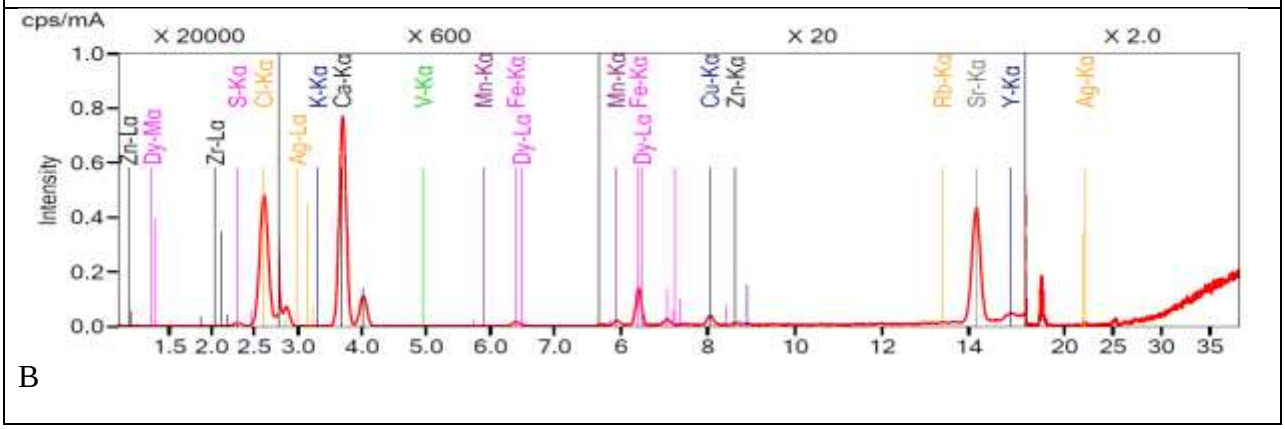
Tab.1.Elemental analysis

№	Component	Chemical composition %							
		Cl	SO_3	K_2O	CaO	MnO	Fe_2O_3	CuO	ZnO
1.	Centrifugate (filtrate) still liquid mg/cm2	90300	4260	-	55600	-	36,6	6,48	6,01
2.	Precipitate of distillation liquid	36,8	4,40	0,0317	32,5	0,0182	0,0969	0,0084	0,0013
3.	Soil soaked in distillation liquid	2,03	0,830	0,0327	59,5	0,0149	0,154	0,0020	0,0019

№	Component	Chemical composition %							
		Rb_2O	SrO	Ag_2O	SiO_2	TiO_2	MgO	V_2O_5	
1.	Centrifugate (filtrate) still liquid mg/cm2	-	19,3	0,0013	-	-	-	-	
2.	Precipitate of distillation liquid	0,0005	0,0168	0,0012	-	-	-	0,0019	
3.	Soil soaked in distillation liquid	-	0,0155	-	0,686	0,0139	0,944	0,0029	



A



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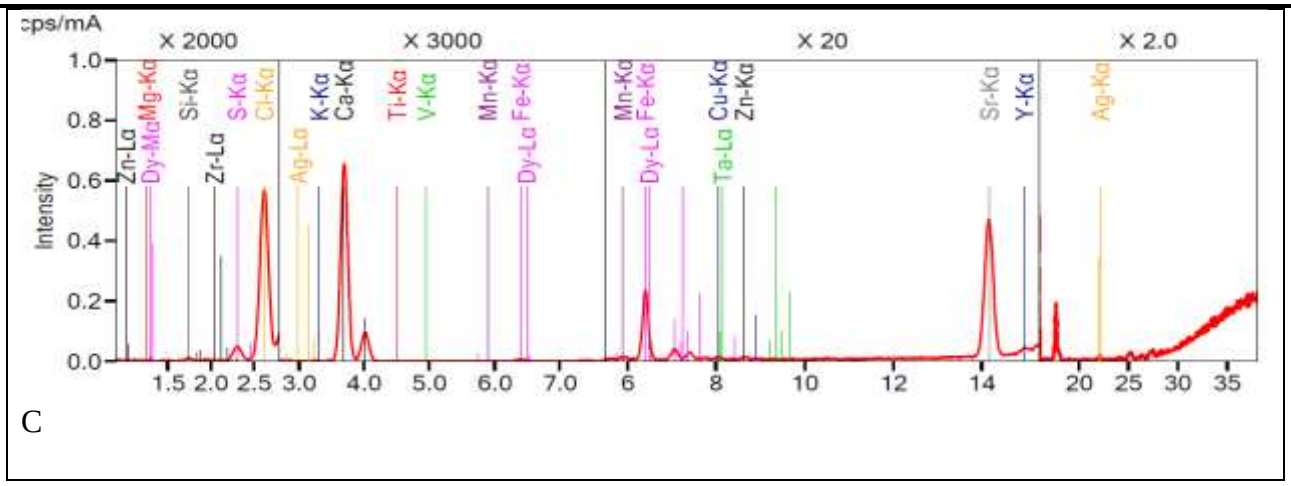

C

Figure 1. Elemental analysis: A-centrifugate of still liquid; B - precipitate of distillation liquid; C- Soil soaked in distillation liquid;

Conclusion. The results of the study of the elemental analysis of the disteller liquid are presented. The results show that there is a significant amount of calcium in the composition of the waste distillation liquid. The use of distillation liquid from wastewater from soda plants from recyclable waste into calcium salts by converting into carbonate and phosphate salts for the production of other types of products for poultry, fisheries and livestock.

Literature

1. Materials of the conference "WORLD SODA ASH": Abstracts. dokl.- Riviera: 2007.- 272 p.
2. Tkach G. A., Shaporev V. P., Titov V. M. Production of soda using low-waste technology.–Kharkov: HGPU, 1998.– 429 p.