IMPROVING EFFICIENCY OF USING ANGREN BROWN COAL

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Abstract: In the presented work, it is proved that it is possible to increase the efficiency of lignite use at Angren coal deposit by complex processing. At the same time, humic acids were extracted from coal mining wastes, which can be used in various industrial and agricultural spheres. The issue of the use of humic substances obtained at the processing of lignite of Angren deposit in agriculture was considered, and it is an energy-saving technology of indirect manifestation. As a result, there was substantiated the reduction of primary energy resources and electricity costs for the production of agricultural products unit.

Keywords: lignite, humic acid, accumulative properties, protector properties, adaptogenic preparation, biostimulant, rheological properties, mineral fertilizers.

Introduction

It is well known that the use of brown coal as a fuel (meaning direct combustion) leads, on the one hand, to very significant pollution of the environment, and on the other hand, to the direct loss of a significant number of valuable components contained in them. In the opinion of specialists [1], the most rational way to use lignite at present is their complex processing to produce environmentally friendly and more energy-consuming secondary products, fuel and non-fuel purposes. Complex processing of coals in these directions is one of the most urgent tasks of the XXI century in the field of fuel and energy supply. The successful implementation of this task has become possible since, in recent years, progressive high-tech technologies have been created that allow for the processing of coal with a minimum environmental impact on the environment and sufficiently high economic efficiency.

Research Object and Methods

Resources of Uzbekistan's coal reserves are more than 3 billion tons, which are concentrated in Angren lignite, Boysun and Shargun coal deposits. The largest of them is the Angren lignite deposit, with commercial reserves estimated at 1853 million tons.

Wear and tear in production equipment and facilities, increased thickness of overlapping rocks and reduced coal bed thickness resulted in a sharp decline in coal production from 5.9 million tonnes in 1992 to 1.9 million tonnes in 2003. At present, significant investments have been made in the coal mining industry of the Republic, and coal production is being increased to 12 million tonnes.

One of the directions of rational use of coals is their complex processing as a result of which organic and mineral components entering into them are most completely extracted. On this basis, some kinds of production of various quality and appointments

are made. Especially it concerns lignite, which is an especially valuable raw material for complex processing [2].

Angren lignite belongs to the B2 grade and is highly ashy and low-calorie in composition. At the same time, lignite is a unique natural formation, in which the processes of transformation of organic matter over millions of years have formed a specific organic matter, which makes up a significant 20-40%, namely humic acids. By their nature, humic acids are highly oxidized, little or practically non-combustible organomineral substances. That is, brown coals are mainly not energy carriers and sources of humic acids. So from one ton of lignite (for processing more efficient use of production waste - coal breeze, oxidized coal dust, substandard coal) can be obtained from 200 to 400 kg of humic acids, depending on the technology used for processing.

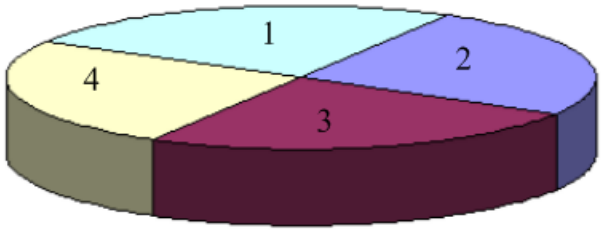
Nowadays, the market for concentrated humic preparations offers is actively developing. Thus, in the western market, humic preparations are an exchange product. In recent years, the volume of their wholesale sales has increased by an order of magnitude, while the price of them has been steadily declining due to the increase in output, over the past 10 years, more than by order of magnitude, and has stabilized in the area of 2000 USD per ton.

The reason for the increased interest in humic substances in the world is the presence of various specific properties, which open the possibility of their wide practical use in many sectors of the economy [3]. The greatest attention now attracts the possibility of creating based on humic substances in the following preparations:

- biostimulants for agriculture (both for crop and livestock production);
- sorption and ion-exchange materials, which are of practical interest as metal sorbents from waste water, for decontamination of radioactive waters, for extraction of metals from poor ores, possibly the preparation of a very wide range of new highly active inexpensive ionites;
- complex humic fertilizers and materials for land reclamation;
- reagents for the regulation of rheological properties of water suspensions and solutions (for good drilling, production of construction ceramics, preparation of water-cooled fuel - WUT, binders for solid fuel briquetting);
- dyes for wood, cardboard and industrial paper.

The solid residue of coal after extraction of gummified substances - raw materials for semi-coking, gasification, revival, energy. This residue is classified as "clean coal" because harmful impurities such as sulphur and mineral impurities have been removed from the raw coal. The advantages of "clean coal" are the reduction of SO2 and particulate emissions during combustion as well as an increase in calorific value compared to the original raw coal.

Over the last years, scientists have identified general biochemical and ecological functions of humic substances and their impact on plant development. Figure 1 shows the most important functions of the impact on plants.



Pic.1 General biochemical and ecological functions of humic substances.
1 Accumulative - the ability of humic substances to accumulate long-term stocks of all food elements, carbohydrates, amino acids in different environments;
2 Transport - the ability of humic substances to form complex organomineral compounds with metals and trace elements, which actively migrate to plants;
3 Regulatory - ability of humic substances to form soil coloring, regulate mineral nutrition, cation exchange, buffering and redox processes in the soil;
4 Protective - the ability of humic substances to sorb toxic substances and radionuclides and thus prevent them from entering the plants.

The combination of all these functions ensures higher yields and improves the quality of agricultural products [3]. It is especially important to emphasize the positive effect of humic preparations under adverse environmental conditions: sharp temperature changes, lack of moisture, soil salinity, accumulation of toxic chemicals and the presence of radionuclides. We can say that they are adabtogenic drugs. It is also important to note that these positive effects are manifested against the background of 20-30% decrease in the application of mineral fertilizers.

Conclusion

Thus, complex processing of lignite of Angren deposit with obtaining humic preparations allows us to obtain 200-400 kg of humic acids from each ton of lignite. In general, complex processing of brown coal to produce humic products is an energy-saving technology of indirect manifestation, because the use of humic preparations reduces the cost of primary energy resources and electricity to produce a unit of agricultural products.

References

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