

Study of biocarbons derived from residue after supercritical extraction of carrot seeds from adsorption of gaseous NO₂

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INTRODUCTION

Human health is closely related to his environment. Air polluted is considered one of the major factors leading to many diseases such as cardiovascular and respiratory disease and lung cancer for the people. Besides, air pollution adversely affects the animals and deteriorates the plant environment. The sources of pollution vary from small unit of cigarettes and natural sources such as volcanic activities to large volume of emission from motor engines of automobiles and industrial activities. That is why the search for new and more effective technologies for the environment purification is a continuous challenge. Recently, increasingly often carbon materials are used as effective adsorbents of pollutants from gas phases. Porous materials have shown an enormous potential in a wide variety of applications due to their high specific surface area and porosity. Activated carbons are efficient adsorbents for gases and vapors.

The main aim of the study reported was to obtain effective biocarbons from the residue after supercritical extraction of carrot seeds and their comprehensive characterization by determination of textural parameters and content of surface oxygen functional groups. The biocarbons were tested as potential adsorbents for the removal of gas pollutants represented by nitrogen dioxide.

physical activation (P) physical activation (P) carbonization 500°C, 60 min carbonization 500°C, 60 min activation CO₂, 800°C, 60 min activation CO₂, 800°C, 30 min

EXPERIMENTAL



Pm

Ст

463

789

**dry-ash-free basis; ** determined by difference*

79.8

80.9

9.1

5.5

Pm

Ст

Acid – base properties of the biocarbons

0.4

2.3

4.8

6.8

0.4

0.5

14.6

9.5

O N



NO, breakthrough capacities of the biocarbons

0.41

0.48

3.51

3.52

0.43

0.56

Sample	NO ₂ [mg/g]	
	dry conditions	wet conditions
Рс	28.9	40.1
Сс	55.0	92.4
Pm	32.6	48.9
Ст	42.1	85.3

CONCLUSION

The results obtained in our study have proved that after optimization of production procedure residue after supercritical extraction of carrot seeds can be cheap, easily accessible and promising precursor for carbonaceous adsorbents. The efficiency of removing impurities from the gaseous phase depends on methods of activation and variant of heating.



