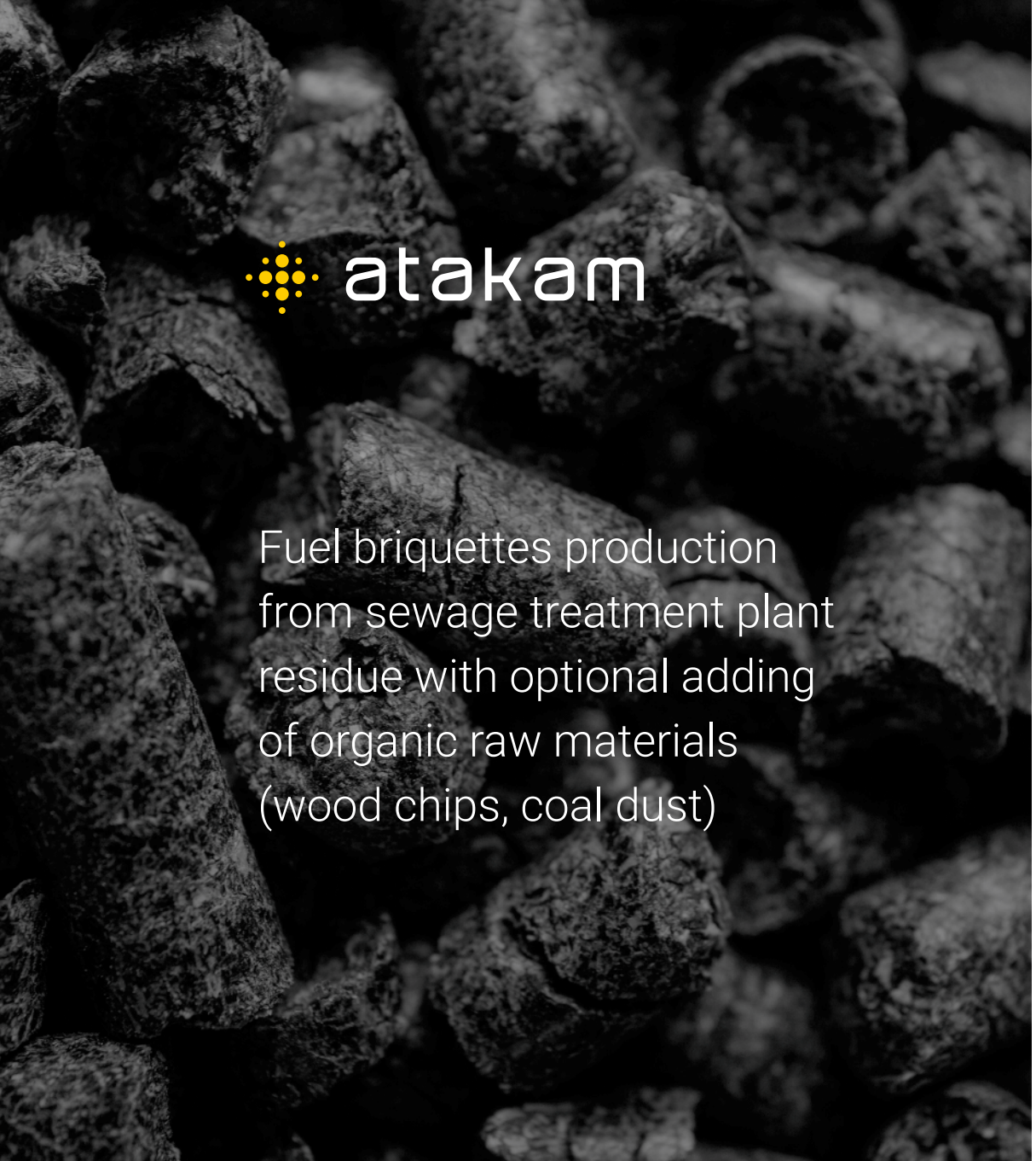

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Fuel briquettes production from sewage treatment plant residue with optional adding of organic raw materials (wood chips, coal dust)

We have developed and tested a method that allows to get raw materials with further manufacturing of fuel briquettes or organic fertilizers, as well as significantly reduce the cost of sewage treatment, reduce production area, dramatically reduce environmentally hazardous emissions.

Today, the sediment after mechanical processing goes to the treatment of activated sludge (by a consortium of bacteria), and then discharged as gel on aeration fields. Organic residue (carbon) oxidize by air oxygen to carbon dioxide and water. Water goes to the filtration, and carbon dioxide goes to the atmosphere. Carbon dioxide is a "greenhouse" gas and thus the fields of aeration is a powerful source of greenhouse effect.

The process of decomposition of the active sludge gel takes up to 3-4 years. All this time, huge areas of treatment facilities - concrete aeration fields - flooded with thousands of tons of recyclable substances. This requires large expenditures on maintenance, dredging, clearing of basins and so on.

1 Adding the special flocculant to accelerate the process of decomposition of the gel.

2 After 3 weeks, the gel breaks down into water and a solid precipitate falls out.

3A Production of fuel briquettes

3B Production of organic fertilizers

The proposed method allows to reduce the utilization time of sewage sludge from 3 years to **3 weeks**.

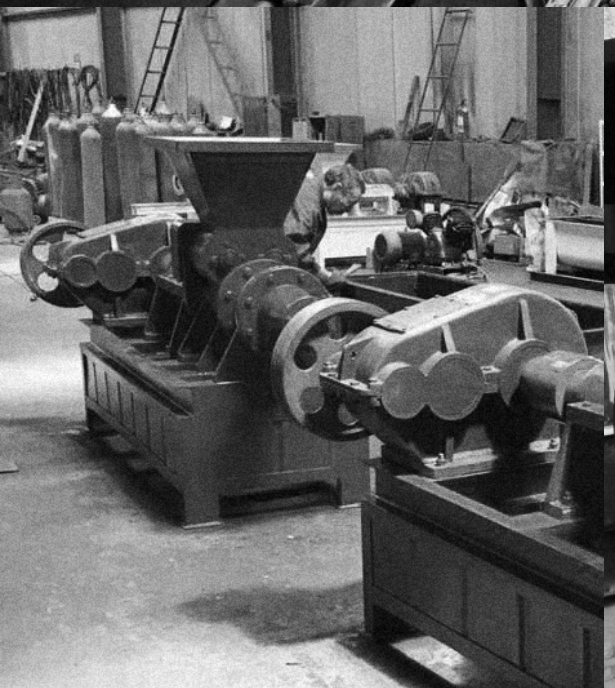
The proposed method allows to reduce the utilization time of sewage sludge (activated sludge) from 3 years to 3 weeks. We have developed special flocculant to speed up the process of gel decomposition. As a result, gel breaks into water and solid precipitate. Water flows to the filtration. The sediment contains from 70% to 85% of carbon in the form of organic compounds and from 15% to 30% as inorganic. It will create a peat-like mass. After a simple further processing we can use it as raw material for production of fuel briquettes or production of organic fertilizer. It becomes available due to the fact, that organic compounds in the gel have no time to react with the oxygen of the air and are stored in the sediment, thus being carbon-reach raw material.

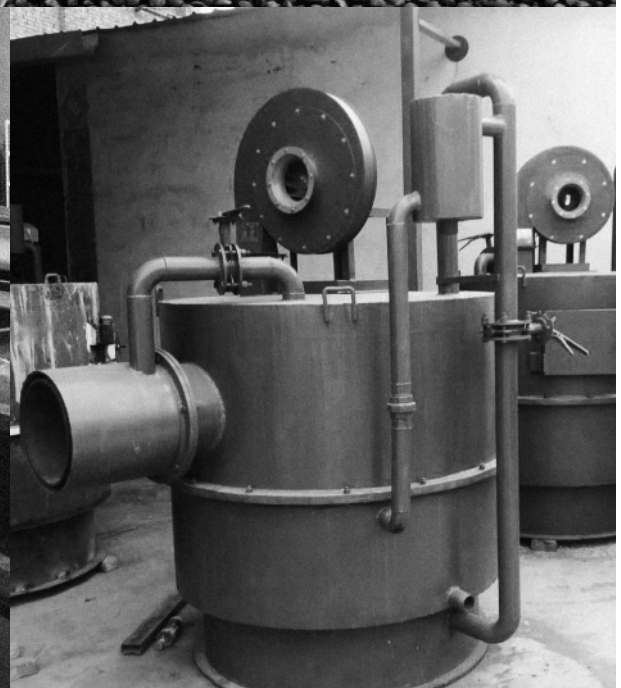
Our technology does not assume in any way to disrupt existing technology and does not require special equipment. Recycling of raw material occurs on commercially available standard equipment. This technology is suitable for disposal of livestock of pig farms that is a very big problem today all over the world.

Other fuel pellets:	Wood pellets	Peat pellets	Lignite
Calorific value Kcal/kg	4100	4200	3100

The results of the analysis of pellets from the siege of the Chernihiv (Ukraine) Sewage Treatment Plant	Pellets	Add wood chips	Add coal powder
Calorific value 1, MJ/kg	16,76	18,39	19,20
Calorific value 2, kcal/kg	4004	4396	4589
Humidity, %	7,97	7,07	7,37
Dry residue, %	92,03	92,93	92,63
Organic components, %	70,75	76,86	66,62
Inorganic (Ash), %	29,25	23,14	33,38

X-ray fluorescence analysis of inorganic components, %	Pellets	Add wood chips	Add coal powder
AL_2O_3	8.165	8.572	12.871
CAO	19.198	21.755	15.590
FE_2O_3	4.232	4.474	6.295
K_2O	3.282	3.074	2.770
MNO_2	0.120	0.133	0.140
P_2O_5	7.939	8.223	4.380
SO_2	2.004	2.834	2.665
SIO_2	54.191	50.024	54.292
SRO	0.079	0.081	0.076
TIO_2	0.675	0.716	0.781
ZNO	0.116	0.113	0.141





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