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# METHODS FOR SEPARATING HOUSEHOLD WASTE BY COMBUSTIBLE COMPOSITION AND THEIR USE AS ENERGY FUEL

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**Annotation**
The article presents methods for the disposal of household waste and methods for obtaining a cheap energy source by separating them by composition and burning the separated combustible elements.

**Keywords**: waste, garbage, environment, incineration, tape cutting, waste sorting, cheap source.

Today, the problem of waste is becoming one of the most pressing environmental problems on a global scale. The analysis shows that the amount of household waste has been increasing year by year in recent years. Especially since the second half of the 20th century, the increase in household waste has a very negative impact on environmental sustainability.

It is not difficult to imagine the negative impact of waste, given that today in Uzbekistan, about 2 billion tons of industrial, construction and household waste are stored at landfills and waste storage facilities, and they occupy an area of 12,000 hectares. These figures show that the negative impact of household waste is significant.

It should be noted that 80% of these wastes are organic substances, and as a result of their processing, a large amount of energy and energy carriers can be obtained. Recycling significantly saves energy and raw materials: according to statistics, 34% of rubber-cable products, 43% of glass products, 54% of paper and cardboard are recycled in Japan. [2]

China's experience is even more amazing - they receive 33% of metal products such as aluminum, iron, copper, and 34% of wool, silk, leather goods from the processing of various waste. This type of waste causes great problems, especially in large cities, occupies large areas due to the storage of household waste and increases the negative impact on the environment and human health.

Every year, hundreds of thousands of tons of household waste accumulate in the city dumps of even an average city, decomposing, they poison the air, soil, groundwater and thus turn into a serious danger to the environment and humans. Worldwide,

recycling and disposal of household waste is becoming an increasingly urgent problem. It is known that every year in our country Uzbekistan accumulates about 35 million m3 of municipal solid waste.

This amount of solid waste is increasing every year, and their elimination and disposal is currently becoming a complex environmental, technical and economic problem of urban utilities, this problem is especially acute in cities with a high population density. The increase in urban household waste not only affects the environment and ecology, but also causes great harm to people due to the spreading smell.

A lot of work is being done to reduce the impact of household waste on nature and humanity, these include the following.

1. Storage of waste at landfills
2. Complex sorting with utilization of selected components.
3. Isothermal composting
4.Incineration

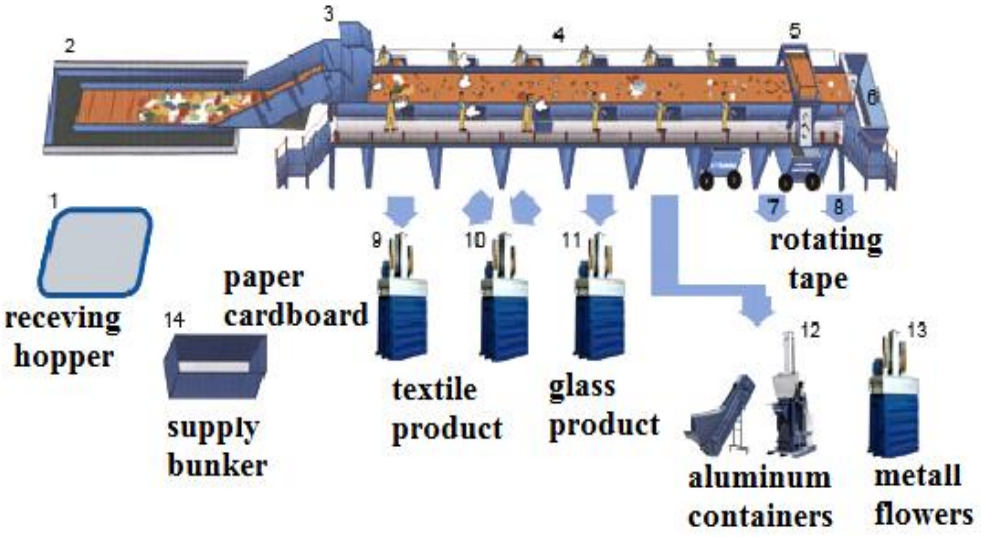
All these methods have their pros and cons, the goal of all these methods is the same, to neutralize municipal solid waste, to utilize the neutralization products as much as possible, to eliminate existing and prevent the formation of new municipal waste dumps, to allow secondary products of waste disposal to cause any harm to the environment. [4]

There are also devices for sorting household waste by human labor. Although this method is an effective method for sorting waste according to its composition, it is also considered harmful to human health.

Picture-1: Workflow of the household waste sorter.

All these methods have their pros and cons, the goal of all these methods is the same, to neutralize municipal solid waste, to utilize the neutralization products as much as possible, to eliminate existing and prevent the formation of new municipal waste dumps, to allow secondary products of waste disposal to cause any harm to the environment. As a result of our scientific research, we recommend the best household waste disposal method that combines two of these methods.

Combining these two methods of complex separation and loading of separated products and incineration of household waste, we recommended a device for generating electricity by separating household waste and burning separated products. Of course, the separation of household waste by composition has always been a problem; in most developing countries there are ways to separate household waste from human labor, which has a harmful effect on human health. The device we recommend does not use human interaction at all. The device consists of 6 product separators and 8 bins for receiving individual products. [3]



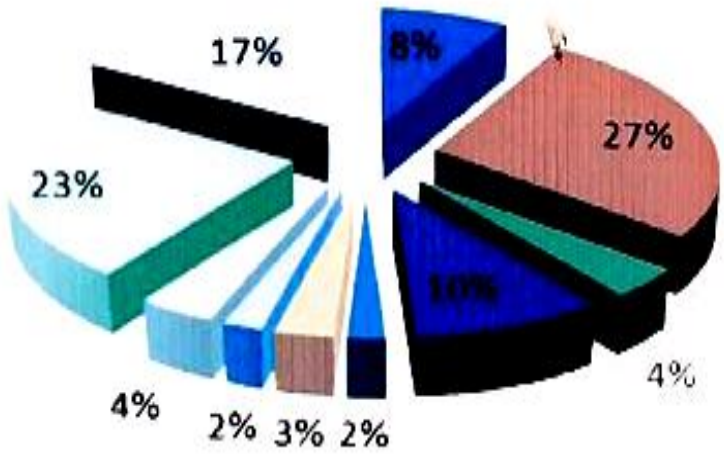

Picture-2: Scheme of the household waste separator

The purpose and function of the device is to reduce the impact of waste disposal on the environment and the use of labor, which is built as a source of cheap energy. The device works by cutting the tape, that is, the tape moving along the augers is cut in a certain range of sizes, and the small and large diameter of the tape augers makes its movement wavy.

Moving belts continue to fall due to the weight of the product, relying on the force of inertia during the wave motion. In the tag part, the bins are filled to receive several different types of products. As a result of products falling into the hoppers, flammable elements remain on the belt, for example, the lightest paper bag. The amount of fuel

is saved by burning individual combustible elements as fuel in small hot water boilers. All household waste disposal devices in the world use labor force or vacuum traction. The main belt runs on a wheel installed at the bottom of the conveyor, in turn, the size of the wheels is made large and small, the main reason for its large and small size is that as a result of the inertia force acting as a laminar flow, from the belt falls onto the cut part, in depending on the type and weight of the product under the action of inertia.[4]

In special containers installed at the bottom of the main conveyor, the product (metal, glass, rubber, food, polymer, paper-board), formed by the separation of waste by composition, is separated. The remaining lightweight paperboard, the polymer that remains in the last part of the belt, is separated into a cheap energy source by burning combustible elements.




Scheme- 3: Schematic distribution of household waste in percent

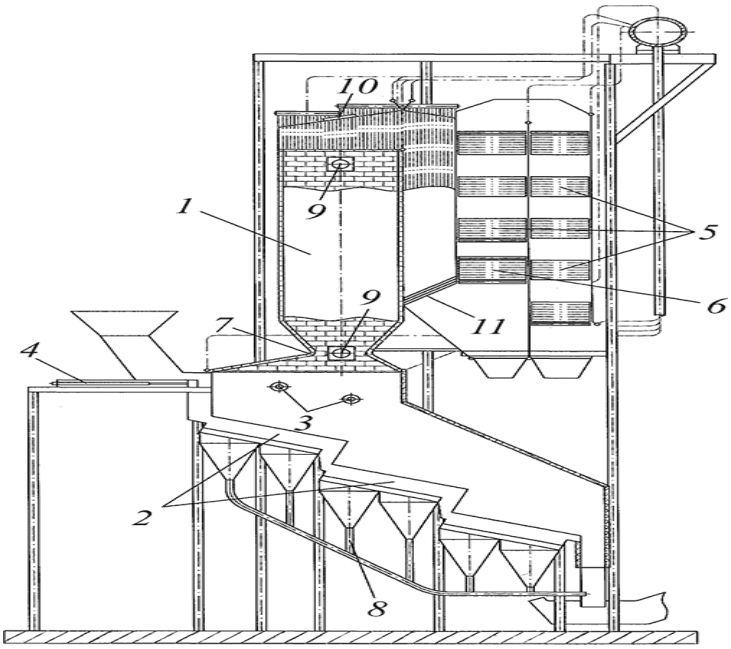
1: 8% paper, 2: 10% wood chips, 3: 3% flat debris, 4:4% glass, 5: 27% building debris, 6:2% rubber, 7: 2% glass, 8:17% plastic . . 9-23% construction waste, 10:4% medical waste

As can be seen from Scheme 1, household waste contains a large amount of combustible elements, and it is possible to use them as energy fuel in special electric power plants such as TES, TETS.

So, since the process of waste incineration is carried out at a relatively low temperature (850-1000°), the formation of nitrogen oxides occurs in much smaller quantities than at TES or in boiler houses when burning only fossil fuel, which burns at a temperature of 1350-1550°.

The low sulfur content in SDV (02-03%) leads to the formation of a small amount of $SO_2$. Considering the variable quality of household waste during the seasons (for

example, humidity reaches 60-65%, and ash content up to 21-23%), due to which the calorific value ranges from 800 to 1700 kkl/kg.[4]




Picture -4: Energy-technological boiler RKSM-25/1.4-10:

1 - Combustion chamber; 2 - tilting-repulsing grating; 3 - gas burners; 4 - feeder; 5 - economizer; 6 – super heater; 7 - secondary air nozzles; 8 - dip removal system; 9 - hatch; 10 - explosive valve; 11 – festoon

By separating household waste by composition and burning it as an energy fuel, they receive cheap energy, and in addition, they protect the environment from various toxic odors emitted by environmental waste. [5]

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