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The Flying Ash Taken by Wet Process from C.E.T. Holboca Iassy – Major Pollution Source

Ileana Ioniuc[a,]*, Livia Ingrid Diaconu[b], Cristina Grigorescu[c], Alexoaie Monica Mihaela[a]

[a]*UMF Gr T Popa Iasi Clinica II Pediatrie*
[b]*"Gheorghe Asachi" Technical University of Iaşi, Faculty of Civil Engineering and Building Services, Bd. Prof. dr. doc. Dimitrie Mangeron 1, 700050 Iaşi, Romania*
[c]*UMF Gr T Popa Iasi*

Abstract

The study is underlining the negative effects and is proposing some solutions of reintroduction into the economic circuit of this type of material aiming to reduce the depositing dumps volume. In the study were analyzed that some affections that are observed on children and adults due to the presence in the inhaled air of the power plants ashes from dumps. Also ashes chemical and mineralogical composition and some specific properties of dusty materials were presented.

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Keywords: flying ash; pollution; affections; radioactivity; silicates.

1. Introduction

The power plants that are using solid combustible are leading to a material that is resulting from combustion generally called power plant flying ash. To realize the combustion in stokers it is grinded in ball mills to an advanced finesse, the powdery material is transported in air flow in the stokers, and then a fine granular material is obtained.

* Corresponding author. Tel.: +40722224228
E-mail address: ileanaioniuc@yahoo.com

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The collecting and transport of the ash from combustion can be performed by dry procedure (flying ash) in small proportions and in water flow (wet procedure). The collected ash by wet procedure is drained in tanks and then is stored in opened dumps. The air flows are entraining the fine particles on very large surfaces.

The dump ash represents a pollution source with unfavourable effects on the ambient environment and important consequences on human health.

The great amount of dump ash is recycled in small percents, so in any utilization field is favourable.

The released ash particles from the power plants have as injurious effect on the human health, so the utilization of the collecting by wet procedure method is decreasing their releasing in the atmosphere.

Concerning the decrease of the high pollution degree in city of Iassy area would be involved the specialists in civil and environmental engineering and the medical personnel to highlight the increasing incidence of the respiratory diseases and the utilization necessity of some collecting methods as less injurious.

2. Implications of the power plant ash on human health

Pollutants released into the atmosphere from the thermocentrals have a major impact on the health of the general population. WHO and European Environment Agency emphasizes, year over year, the harmful effects on the entire human body: ocular, skin, lung allergic diseases, increase risk of developing certain malignancies or neurological diseases, the occurrence of cerebral or cardiac infarction, and last, but not least, harmful effects in children normal lung development. Also, the pollutants involved in allergic disease at the paediatrics ages, act on immature lungs and immune system, respiratory epithelium being more vulnerable and unable to repair properly.

The prevalence of allergic disorders has considerably increased over past decades and in attempt to explain this trend have been issued several hypotheses, the most important of them being the appearance of new risk factors, no concern in the past, nutritional or environmental (air pollution) [1]. Romania is considered to be the sixth industrial polluter of the EU, the energy sector contributing to major degradation of the environment, generating approximately 90% of polluting emissions: significant amounts of particulate substances, sulphur, nitrogen, silica oxides, ozone and high volumes of waste water discharged to ground level.

Pollutants destroy the physical barrier function of the bronchial respiratory epithelium, facilitating the allergens penetration, the interaction between air pollutants and the epithelium being a complex phenomenon, mostly genetically conditioned. Increased pollen allergies, especially in the urban areas it seems to based also on the exposure to atmosphere dispersed particles, attaching of pollutants on the pollen particles modifying the allergic potential [2].

Air pollutants are substances with harmful effects on living organism with implication from intrauterine life. Exposure of pregnant women has different consequences depending on the stage of development of the fetus and can lead to spontaneous abortion, delay in intrauterine growth, premature birth and low birth weight, congenital malformation or certain injuries of the central nervous system responsible to cognitive and physical impairments. After birth, all types of pollutants may affect the respiratory tract health, especially if the exposure occurs in infancy when the growth processes are at the maximal level [3].

Pollutants are generally non allergenic inside them, but may facilitate the entry of air allergens by destructions at the respiratory mucosa and through modifications of mucociliar clearance and may trigger or amplify chemical mediators synthesis, promoting an Th2 inflammatory conditions or may be risk factors for epigenetic reset.

WHO recently stated that the effects of particulates matters on human health occurs at levels with which is currently facing the largest part of urban and rural population, the inhalation of this matters being responsible for more than 50000 death annually, principally through pulmonary or cardiovascular diseases, contributing as a risk factor in lung cancers. In the occurrence of toxic and allergic phenomena in which these substances are incriminated, an essential role is the dimension of the particles: those between 5-10 μm are eliminated by the mucocilar clearance, but those with a diameter less than 2.5 μm can absorb toxic products of combustion, metals, allergens and are retained on the lung parenchyma and may determine alveolar inflammation, coagulability modification and release of free radicals. (4) In general the ashes granulary of Holboca thermocentral is characterised by a advanced degree of fineness, 12% of particles having a diameter below 12 μm.

From the point of view of chemical composition, at the level of this ash, predominant is the silica, aluminium oxides and less sulphur, calcium or ferrous oxides.