

# What are acid rains?

Science



What are acid rains? “ Acid rain is another side-effect of civilization. As soon as acid rain was discovered and understood, it was attributed to human action.” (Jurgen Stock, Arthur R. Upgren, p. 4)

Acid rain can be called any atmospheric precipitate (rain, snow, smog, rain with snows, etc) which has the following characteristics: the increased level of acids (mainly sulphuric acid); and the hydrogenous index of pH is less than average index of rain water (average pH for rain water is 5.6), mainly it is rain with  $\text{pH} < 4.5$  (What is Acid Rain?, p. 1)

$\text{SO}_2$  and  $\text{NO}_x$  are transformed in the atmosphere of Earth into acid-creating particles. These particles enter the reaction with water in atmosphere, which is turned into the acid solution that lowers the pH index of rain water. First the definition of acid rain was used in 1872 by English researcher Angus Smyth. He focused attention at Victorian smog in Manchester.

And although scientists of those times refused from theory about acid rains existence, not nobody have a doubt that acid rains are one of the reasons of destruction of life in reservoirs, woods, crops and flora.

Besides, acid rains destroy buildings and monuments of culture as well as they destroy conduits, automobiles, they decrease the fertility of earth and can lead to dripping of toxic metals into water-bearing levels of earth.

Effects of acid rains can be seen in the United States, Germany, Czech Republic, Yugoslavia, Slovakia, the Netherlands, Australia, etc. Acid rain has dangerous influence to reservoirs – lakes, rivers, seas, ponds and gulfs – it increases the acid index till the level, when flora and fauna, which exists in those reservoirs, cannot live and dies. For example, water plants better live

in the water with pH index 7-9. 2. When the acid level is increased, water plants start to die and animals, which used those plants as a food, don't have what to eat.

When the pH index reaches level 6, the freshwater shrimps die. When the pH index reaches level 5. 5, ground bacteria, which decompose organic substances and leaves, die, and organic garbage starts to accumulate at the bottom. Then after dies plankton – a tiny animal, which is the base of food chain in the reservoir and which eats the substances, appeared in the process of decomposition of organic substances by ground bacteria. When the pH index reaches level 4. 5, all fish dies, as well as majority of frogs and insects.

Acid rain brings harm not only to water flora and fauna. It also destroys flora overland. Scientists consider that although the mechanism is not studied till nowadays, the compound mixture of polluting substances, including acid rains, ozone and heavy metals will lead to degradation of forests.

Acid rains influence not only separate things or live creatures, they influence the whole combination. In the nature and environment there are so-called communities of plants and animals; between them constant interchange exists. Those communities, which usually can be called ecological system, usually consist of four groups: inorganic objects, organic objects, consumers and destroyers.

Influence of acid rains first of all can be seen on condition of sweet waters and forests (Effects of acid rain, p. 1). Usually, influences for communities can be indirect (i. e. the danger is caused not by acid rains, but processes,

which appear under their influence – for example, deliverance of aluminium). In definite objects (for example, soil, water, silt, etc) concentration of heavy metals can be increased because of acid influence – changing of pH influences their dissolubility.

Trough the drinking water and animal food, for example, fish or meat, toxic metals can enter the human organism. In case the structure of soil, its “biology and chemistry” is changed under influence of acidity, it can lead to death of plants (for example, separate trees). Usually those indirect influences are not local and can influence the situation even if they are located several hundreds kilometers from the source of pollution.

Acid rains also influence directly or indirectly (mainly the leaves) the forests and fields through soil and root system. In contrast to waters, the soil is able to “smooth” acidity of environment (it means, to some extent it is able to oppress the increase of acidity). Nevertheless, this process cannot continue endlessly and acid rains can cause destruction of forests.

So, taking into account all afore said, we come to conclusion that acid rains influence the environment, which can cause great danger to a human being, arousing unchangeable processes, which can affect the life of human.

#### Works Cited:

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