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Study of Organic Carbon-Containing Additives to Water Used in Fire Fighting, in Terms of Their Environmental Friendliness

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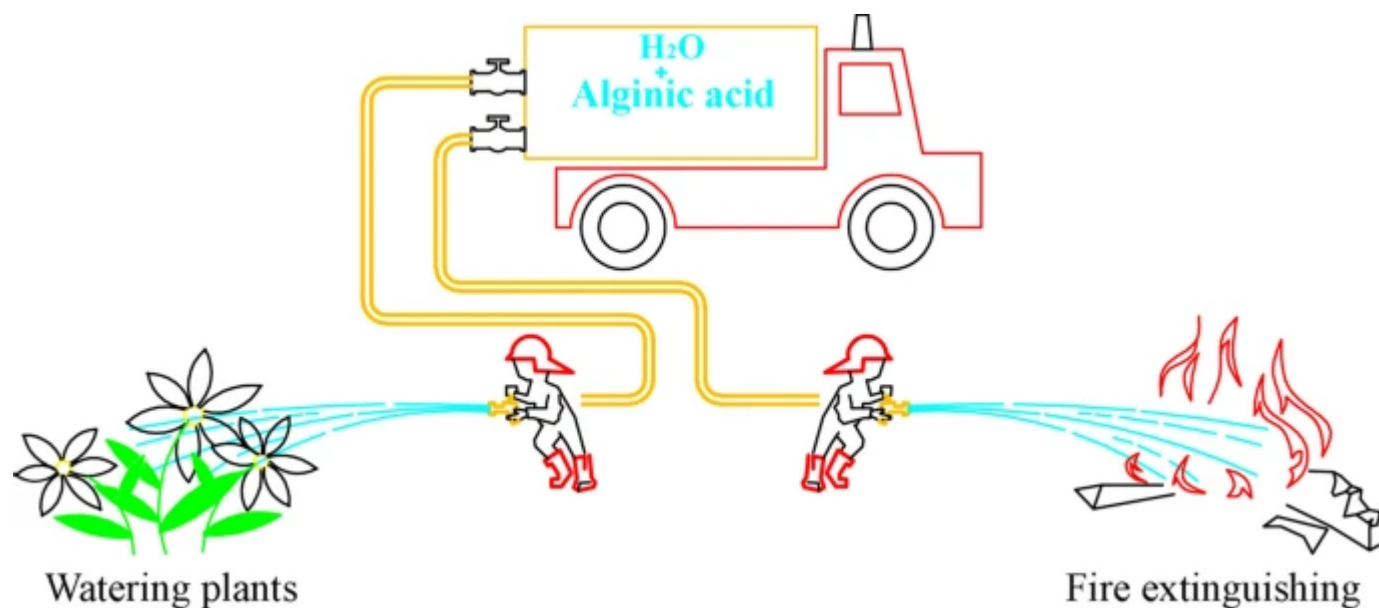
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Abstract

In the article, a state analysis of the organic carbon-containing additives use in fire fighting has been carried out. Negative environmental effects when using fluorine-containing short- and long-chain surfactants, which can act as both a fire extinguishing agent and its decomposition product, have been noted. As an important direction for further evolution in the field of fire extinguishing agents, the use of oxysilanes and gel systems based on liquid glass as environmentally friendly compounds has been noted. The prospects and environmental friendliness of the use of acoustic effects in extinguishing fires have been noted. The addition of small amounts of inorganic and

organic compounds is regarded as an inexpensive and effective method to increase the fire fighting properties of water. In this work, the ecological characteristics of a number of organic compounds used in fire fighting as thickeners of aqueous solutions and the reduction of their surface tension were studied. Alginic acid has been shown to be the most environmentally friendly water additive among the investigated organic carbon-containing compounds used in fire fighting.

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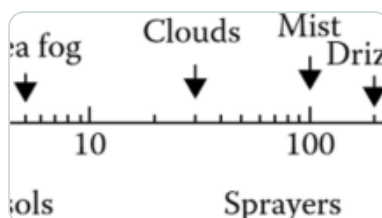
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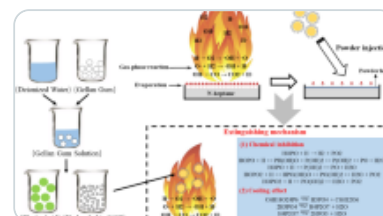
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Abbreviations

AFFF: Aqueous film forming foam

BCF: Bioconcentration factor

CAS: The chemical abstracts service

CLP: The classification, labelling and packaging

ECHA: The European Chemicals Agency

EC_x: The effect concentration at which x% effect (mortality, inhibition of growth, reproduction, etc.) is observed compared to the control group.

LC: Lethal concentration

LD: Lethal dose

NOEC: No observed effect concentration

OECD: Organisation for Economic Co-operation and Development

PFAS: Per- and polyfluoroalkyl substances

PNEC: Predicted no-effect concentration

WFEA: Water fire extinguishing agents

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