

Accidental contamination of a German town's drinking water with sodium hydroxide

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Case report of a very serious drinking water incident putting up to 50,000 inhabitants of a small town near Bonn in North Rhine-Westphalia, Germany at risk. A concentrated solution of highly alkaline water by sodium hydroxide was accidentally washed into the town's drinking water at a pumping station and increased the pH-value of the water to 12. Residents who came into contact with the contaminated water immediately had a toxic reaction. The incident was detected by complaints from customers and after that was stopped within several hours. The pipes were flushed and the customers were warned not to use the water till the all clear. After this immediate management there was an investigation and the cause of the incident was detected as an accidental release of accumulated sodium hydroxide (NaOH) solution. The lack of a network alarm system and the automatic cut-off mechanism as deficiencies in the design of the station were rectified by the water company after the incident.

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Effects of hydroxylated resveratrol and its analogues on oxidative stress in cancer cells – their antioxidant, pro-oxidant and cytotoxic activity

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Resveratrol and its higher hydroxylated analogues (HHRA) have been reported to possess a variety of biological properties including antioxidant as well as pro-oxidant activity. The antioxidant properties are assumed to enable these compounds to protect cells from oxidative damage, however pro-oxidant activity are held likely to be responsible for their cytotoxic or pro-apoptotic effects. In our studies the effects of resveratrol and HHRA were investigated in various cancer cell lines including breast and cervix cancer derived cells as well as T cell leukemia Jurkat cells. In our experiments several markers of oxidative stress and apoptosis-linked events were evaluated. Taken together, results of our experiments suggested that HHRA possessing ortho-hydroxy groups are stronger cytotoxic agents than compounds without such a structure. Although these compounds were unstable in our experimental systems, they exert strong cytotoxic effect, which may be connected with induction of oxidative stress in cancer cells. The effects of oxidative stress could be shown in our experiments e.g. by accelerated oxygen consumption, increased MDA level or decreased level of GSH. These events suggest formation of short-living, prooxidative, highly cytotoxic metabolites in cells incubated with HHRA possessing ortho-hydroxy groups. These effects were less intense when HHRA without ortho-hydroxy groups were used. It was suggested therefore that HHRA may be grouped, into molecules that can either form quinoid systems upon two electron oxidation (QFS) or are unable to form such a structure (NQFS). These compounds may be classified as quinone forming QFS, may be used as anticancer agents while, NQFS represented in this study, presented e.g. by resveratrol may be used mainly as antioxidants.

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