Med. čas. 2026; 60(1): 47-48.
LETTER TO THE EDITOR
doi: 10.5937/mckg60-63392
COBISS . SR - ID 194838025
UDK. 615.89:28 615.852

DOES ZAMZAM WATER HAVE ONCOLYTIC EFFECTS?

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DA LI ZAMZAM VODA IMA ONKOLITIČKE EFEKTE?

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Zamzam water (ZW) is a naturally alkaline (average pH 8) water with unique physical and chemical properties that are different from any other waters. Its alkaline pH and rich mineral profile contribute to its antioxidant, anti-inflammatory and anti-apoptotic properties, immune modulation, glycemic control, wound healing, and dental caries, nephropathy and cancer prevention (1-3). The studies have explored its mineral content, isotopic signature, radiological features, and biological effects, revealing intriguing insights into its health-promoting capabilities (3). Herein, we discuss the effects of ZW on cancer patients and human cancer cells to draw attention to the possibility of oncolytic effects of ZW.

In Islamic tradition, ZW is revered for its nutritional and spiritual properties; however, from a clinical perspective, its high mineral content and alkalinity are the primary focuses of current research. ZW is for whatever it is drunk for (4). ZW was dug up by Jibril, at the time of the prophet Ibrahim (Alayhi As-Salam), who lived in the XXII-XX centuries before Christ. It has been consumed by many different nations and societies for centuries. Today, ZW is widely used as a type of traditional and complementary medicine by pediatric and adult cancer patients for healing; however, there is no clinical study on the effects of ZW on cancer patients according to the best of our knowledge.

There are a limited number of studies in the literature regarding the oncolytic effects of ZW on human cancer cells. Omar et al. (5) reported that ZW reduced the cell viability of human lung cancer cell line. Cell death occurred via necrosis among cells and cell cycle arrest occurred in the G0/G1 phases for cells treated with ZW (6). ZW reduced the growth of human breast cancer cell line (6,7). The cell death occurred through the apoptosis pathway. The treated breast cancer cells were arrested in the G2/M phase and decreased in the G1 phase (6). ZW also reduced cell viability of human colon cancer cells by inducing apoptosis (8). Siraj et al. (9) reported that ZW protected cancer cells from chemotherapy-induced apoptosis via mitogen-activated protein kinase-dependent pathway. ZW also reduced clastogenic and cytotoxic effects of gamma irradiation (10). On the other hand, ZW caused downregulation genes in human uterine fibrochondrosarcoma cell line, which affect growth, integrin, insulin like growth factor, nuclear factor of kappa, and interleukin (11).

The tumor microenvironment seems to play a crucial role in the survival and proliferation of tumor cells (12). Due to a mismatch between glucose fermentation and perfusion, the extracellular pH of the tumor microenvironment is profoundly acidic (13). Acid pH has been shown to stimulate tumor cell invasion and metastasis in vitro and in cells in vivo (14). Oral bicarbonate selectively increased the pH of tumors and reduced the formation of spontaneous metastases in mouse models of metastatic breast cancer (14). Gillies et al. (13) showed that oral buffers such as bicarbonate, imidazoles, Tris, and lysine explicitly increased tumor pH without changing systemic pH balance. These rarely affect growth of large primary or metastatic tumors but do inhibit small cancers thus preventing carcinogenesis or spontaneous metastases (13).

Alkaliptosis, a pH-dependent form of regulated cell death, has been recently identified as a new strategy for cancer therapy. Alkaliptosis is defined by the lethal rise in intracellular pH, regulated by the interplay of ion channels and transporters in intracellular and extracellular pathways (15). Recently, Helix BioPharma developed a target for tumor acidosis, L-DOS47, which can serve as an alternative to sodium bicarbonate. It has been well tolerated in phase I/IIa trials (16).

Aside from its alkaline property, ZW contains some chemical compounds as well as more than 35 elements, including essential trace elements such as iron, zinc, copper, chromium, cobalt, manganese and molybdenum (1,17). Based on the literature data, we think that the oncolytic effect of ZW is primarily related to its alkaline property. However, in the alkaline environment of ZW, the interactions of numerous minerals among themselves and/or with chemical compounds can display an oncolytic effect, and the elements in ZW can exhibit an anticancer effect by influencing enzymatic reactions as co-factors.

In conclusion, limited studies have shown that ZW reduced the cell viability of human cancer cells. Although ZW has been widely used by cancer patients for healing no clinical study has been reported on its effects on cancer patients. We think that ZW may have positive effects on

Primljen/Received: 10.12.2025.
Prihvaćen/Accepted: 03.02.2026.

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doi: 10.5937/mckg60-63392
COBISS . SR - ID 194838025
UDK. 615.89:28 615.852

physical, mental, social, spiritual or religious health of pediatric and adult cancer patients. On the other hand, ZW may have oncolytic effects in humans due to its alkaline property and the many minerals it contains. Furthermore, ZW may positively affect the pharmacokinetic properties of chemotherapeutic drugs and may also reduce the side effects of the drugs. We suggest that comprehensive studies should be conducted to determine the effects of ZW on human cancer cells and patients with cancer. These studies will fill the gap in the literature.

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NOTE

The author declares no conflict of interests and source of funding.