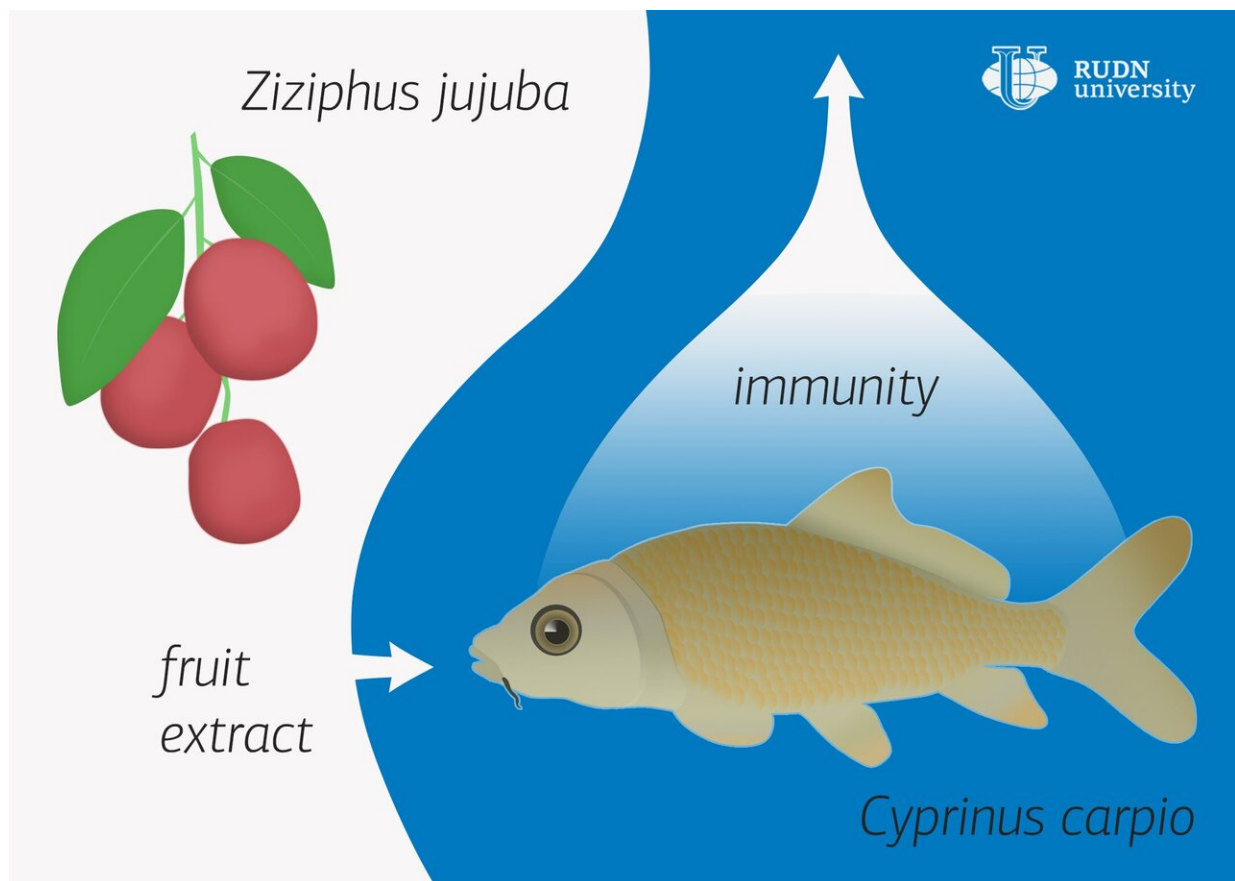


Chinese date extract improves the immune system of fish

February 10 2020



Credit: RUDN University

A RUDN University biologist reports that the extract of the fruit of the Chinese date boosts immunity in carp. The addition of date juice to the

diet increases the reaction of the immune system of fish to extraneous compounds. The results are published in the journal *Fish and Shellfish Immunology*.

In fisheries, antibiotics are usually used to prevent infections. However, their use leads to the emergence of strains of resistant [bacteria](#). This is a [potential threat](#) not only to [fish](#), but also to humans, as antibiotic-resistant bacteria are transmitted from person to person. Researchers are looking for alternative drugs suitable for use in ichthyology.

Biologist Morteza Yousefi of RUDN University and his colleagues investigated the properties of Zizyphus (*Zizyphus jujube*), known as the Chinese date, and found that it can be used as an antimicrobial agent for fish.

Morteza Yousefi tested the immunostimulatory properties of this plant on carp (*Cyprinus carpio*). The biologists gave the fish a solution of ethanol and distilled water with Zizyphus fruit juice in a concentration of 0.25%, 0.5%, and 1%. Then they took samples from the fish mucosa and monitored how immune parameters change: the number of antibodies, the activity of proteases, and the expression of cytokines, which, in particular, trigger phagocytosis, the destruction of bacteria.

Analysis of the data showed that carp, which were given a solution with a concentration of 0.5% increased the number of antibodies. The more antibodies in the blood, the more antigens they can eliminate.

Additionally, ichthyologists have found a connection between the extract of dates in the diet of fish and the presence of cytokines. The experiment showed that the 0.25% concentration of the solution does not change the immune reactions, but the 0.5% and 1% solution increased the expression of cytokine-related genes and the activity of protease enzymes that are involved in the destruction of killed pathogenic

bacteria and in triggering the processes of apoptosis.

The experiment showed that the juice of the Chinese date can increase the immunity of carp, which means that it can be used as an antibacterial agent in fisheries working on the principle of "green aquaculture". The discovery of immune stimulation of the carp juice of Ziziphus fruit in the future will allow fishermen to reduce the damage from infections, without provoking the emergence of antibiotic-resistant strains of bacteria.

More information: Seyed Hossein Hoseinifar et al. Can dietary jujube (*Ziziphus jujuba* Mill.) fruit extract alter cutaneous mucosal immunity, immune related genes expression in skin and growth performance of common carp (*Cyprinus carpio*)?, *Fish & Shellfish Immunology* (2019). [DOI: 10.1016/j.fsi.2019.09.016](https://doi.org/10.1016/j.fsi.2019.09.016)

Provided by RUDN University

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