‘Progress’ going in the wrong direction: diseased New GE pufferfish

Fish with a genetic disorder approved for consumption in Japan

23 November 2021 / ‘Progress’ is going in the wrong direction in Japan: diseased CRISPR/Cas gene edited pufferfish could soon be marketed as food. The gene editing tool was used to knock out the function of genes controlling the appetite of the fish. Consequently, the fish suffer from a metabolic disorder. Their feed uptake is increased and they gain more weight compared to the natural species.

The leptin receptor gene in the fish was genetically altered. Disruption of this gene is associated with weight gain and diabetes in mammals. It was also found in several fish species that the animals can suffer from other health issues affecting, for instance, embryonic development, kidneys, regulation of blood glucose and behaviour. Until now, the fish with the artificial genetic defect have been used as disease models to explore complex metabolic disorders.

Currently, however, there are plans to rear the genetically engineered (GE) fish inheriting the gene defect in aquacultures and market them as food. Patents have already been filed on the fish. Several stakeholders are hoping to push up their profits from the increased weight gain in the fish. The Japanese authorities have already given green light.

The pufferfish are not the only controversial product derived from New GE intended for the food market in Japan: the authorities there have already approved tomatoes, which are said to reduce blood pressure via consumption, and red sea bream that are gene-edited to increase muscle growth. With approvals for these three products, Japan is now the world leader in the global marketing of plants and animals derived from New GE. However, none of these organisms were subjected to detailed risk assessment by the authorities.

GE organisms are not strictly regulated in Japan: if no additional genes are inserted, but the function of natural genes is blocked by New GE, it is assumed that this will pose no health or environmental risks. However, this assumption is not backed by science: the blocked gene is involved in many metabolic functions and the process of New GE is complex, which means there can be many unintended side effects. For example, the composition of the fish tissue can be altered and the susceptibility of the fish to diseases and infections may be increased. In addition to the risks, further questions need to be asked about health and animal welfare.

Testbiotech believes that the developments in Japan exemplify the problems associated with the insufficient regulation of New GE organisms meant for food production. Testbiotech is warning that most of the recent legislative initiatives of the EU Commission could take the EU in a similar direction. According to current EU Commission plans, CRISPR/Cas gene scissor applications could be extensively deregulated. This would pave the way for ‘progress’ to take the wrong direction in the EU – with serious consequences for humans, animals and the environment.

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