Summary

In recent decades, the need for high-quality and high-quantity fish products has been steadily increasing worldwide (FAO 2023). Unfortunately, the fish stocks of the ocean cannot ensure this amount of demand. This gave a big opportunity for inland fish farming. Nowadays, many of our freshwater fish species, like sturgeons and catfish farmed intensively. In Hungary the second most farmed fish is the African catfish (*Clarias gariepinus*). As in the world, in Hungary also, the biggest expense on farms is the fish feed (50%) due to its relatively high amount of fishmeal (fish oil and protein). Fishmeal is essential for optimal growth and development but lowering the animal content and complete it with alternative macronutrient sources could have a positive economic effect on fish farms' economic situation. Supplementation of fishmeal can reduce growth and overall fitness of fish; however studies suggest that through adaptation the deteriorating effect can be solved (Refstie et al 1997). The iFishIENCi (Intelligent Fish Feeding through Integration of Enabling technologies and Circular principles) international program aimed in 2019 to create an African catfish lane which is adapted to less costly fish feed (with soya meal supplementation) in Kisbajcs. Four lanes of catfish were made. Three of them (PS1, PS2, PS3) were fed with experimental feed (lowered amount of fishmeal) and 1 line with control feed (high amount of fishmeal). This thesis evaluates 4 genes in 2 types of tissue to investigate whether the adaptation has an impact on growth-related genes expression or not.

4 months old *Clarias gariepinus* were brought from Kisbajcs to Fish Department of Hungarian University of Agriculture and Life Sciences. After 6 weeks of demonstration experiment where the 4 lanes were equally mixed in experimental and control feed tanks, brain and liver samples were taken. Real-Time qPCR was used to establish the relative gene expression differences between the fish and feed groups at the case of growth hormone (*gh*), growth hormone receptor (*ghr*), insuline-like growth factor-I (*igf-I*), and insuline-like growth factor-II (*igf-II*) genes.

In the brain, the *gh* and the *ghr* genes relative expression rate between the fish and feed groups did not show coherent results. In the case of liver only two genes (*igf-I* and *ghr*) showed unidirectional results. Both of their expression patterns suggest the conclusion of the control feed makes the fishes to produce more igf-I peptide and gh receptor.

These results raise the possibility that there may be real differences between the fish and feed groups. However, the correlations found cannot be considered authoritative, as further research is needed.

To get consistent results more genes and fishes should be involved in the future. Every gene expression should be evaluated, which affects the growth-related key genes (*gh, igf-I, msnt, etc*) behavior. Expression pattern conclusion should be compared to the fish weight measurement result.