



## A New Approach of Aquaculture by Emphasis on Magnetic Fields

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### Abstract

Testing protocols and experiments were developed to evaluate the potential effects of magnetic fields in aquatic environment. Also, they are effective on larvae hatching and larvae reactions. Magnetic fields induced changes in signaling pathways by intracellular calcium levels alterations. So, it could be effective on gene expression, enzymes and hormones.

Magnetic fields can have considerable effects on different biological parameters. They could be increasing sperm motility and fertilization rate. So it could improve of hatchery procedures for artificial spawning. The eggs volume in samples exposed to the magnetic field was significantly greater than control. Analysis of some spermatozoa variables in perch *Perca fluviatilis* and burbot *Lota lota* showed that spermatozoa exposed to a magnetic field remained motile for a longer time. Embryogenesis could be influenced by magnetic fields. Also, in comparison of control and treatment groups, it increased the weight and length of *Salmo trout* larvae. Magnetic field affected on migration behavior and orientation in aquatics.



Magnetoreception is the ability of organisms to perceive magnetic fields in the surrounding environment and changes in its properties such as field direction, intensity and gradient. Many fishes possess the ability to detect and respond to magnetic fields and the study of the structure and function of a magnetosense in fishes has coincident with the discovery of the electric sense, primarily in elasmobranchs and some teleost. In general, Magnetic fields might have effects on behavior responses and some of the vital process like reproduction in fish that it could be used in aquaculture industry.

**Keywords:** Magnetic field, Aquaculture, Magnetoreception, Embryogenesis, Spermatozoa