

Good example of aquatic biotechnology article review

[Science](#), [Genetics](#)



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Introduction

Plausibly, one of the biggest problems facing the 21st century humanity is food insecurity. This has been occasioned by a rather unpredicted population increase across the world which is mounting too much pressure on the natural resources for food. Aquatic food has been one of the greatest sources of food for humankind. According to statistical predictions, the demand for products is set to rise by up to 70% in the coming 30 years. However, the reliability of aquatic life for food has been challenged by the increased aquatic pollution and the subsequent decline of aquatic life. This is a problem tied to the modern-day industrialization that has seen harmful chemicals contaminating aquatic life to fatal levels. On the other hand, human activities such as overfishing and encroachment of human settlements along the shores of big water bodies have significantly contributed to the pollution and disruption of aquatic life.

History of Aquaculture

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Aquaculture dates back over 4000 years ago as an alternative to seafood. Aquaculture since its inception has contributed to food security for humanity in entirety. ON the other hand, it has opened new scientific methods aimed at improving the reliability of aquatic life, not only for food but also for medical purposes (Dunham, 2011). The 20th and the 21st century have seen aquaculture growing tremendously in different parts of the world. For instance, Singapore is using coves to grow aquatic species such as Barramudi and prawns. Other concepts such as poly-culture are being used in other parts of the world (Craig, 1999). The beauty of this practice is that it raises aquatic species through controlled environments devoid of any pollution or disruption from human activities, leading to high aquatic yields. Scientific studies show that growth hormones are considerably hampered by cold water and as such through temperature regulation; the effectiveness of the growth hormones can be increased. Alternatively, application of growth hormones on aquatic species can yield even bigger fish (Palladino, 2004).

Aquaculture and biotechnology

One of the scientific concepts that have swept across aquaculture is biotechnology. Biotechnology primarily involves the application of techniques such as cell fusion and the use of recombinant DNA on organisms to alter the genetic make-up to desired attributes (Hew & Fletcher, 2001). Therefore, aquatic biotechnology is the application of these methods on aquatic life in a bid to foster development of desirable genetic traits. An integral phenomenon that aquatic biotechnology has managed to achieve is to reduce the period of maturity of aquatic species and to isolate beneficial compounds for health purposes. Additionally, through aquatic biotechnology,

science has managed to produce hybrid aquatic species that are comparatively larger than their natural aquatic members.

Public response to Aqua-biotechnology

However, the application of aquatic biotechnology has been welcomed by mixed reactions with a larger majority considering it as genetic modification. Genetically modified fish is relatively larger and grows faster than other fish. This was seen as a potential solution to the high demand for food but has received too much criticism, and conspiracy has surrounded the whole idea of aquatic biotechnology.

For instance, according to a video by the Voice of America (2010), "US Government Considering Genetically Modified Animal for Human Consumption", the Food and Drugs administration was ready to allow the commercial sale and consumption of a genetically modified salmon.

However, the idea was since then surrounded by too much debate and conspiracy as majority of the citizens and legislators believed that it would open door for other genetically modified organisms. The Salmon grows twice faster and larger than the usual salmon. As Ronald Stotish (head of AquaBounty Technologies) said, the salmon was fit for human consumption since its genetic engineering involved copying a second gene of the growth hormone on the fish. Simply, it was a salmon made from salmon genes.

Despite the enormous scientific evidence that pointed no health problem, the bigger public maintained that it was not fit for human consumption and should not be allowed to the public. The US law does not provide for labeling of genetic food and this got the public confused on how they will know the food they are served, say, in a restaurant in the GM-salmon (Film Trailers

Channel, 2009). Other organisms that have showed similar trends include crabs, prawns and the clout.

In the year 2001, through 81 EU-financed projects to establish the health effects of genetically modified plants it was concluded that the crops and their products did not show any signs of health complications. The study that was conducted using the standard risk measurement protocols further unearthed probable health benefits of genetically modified crops when proper technology is applied.

Ethical Implications of aqua-biotechnology

With the need to sustain the demands of an increasing population of beyond 6 billion and rapidly growing, the application of science and technology has been employed in research to facilitate this sustenance. As such, the focus has been to maintain the aquatic life as it is amidst an increasing population where demand is expected to rise by 70% in the next 30 years (Emerson, 1999). Surprisingly, only a few countries have been involved in the fish farming in an intensive mode. China that currently supplies the world population with aquatic products handles a big share of the demands at around 83%. Other nations such as Singapore and Bangladesh have substantial input on the supply chain (Emerson, 1999).

However, as the needs continue rising, there has been an unprecedented need to have a higher level of supply. This has been visible even from previously reluctant states which have not traditionally adopted aquatic farming or fishing as a crucial source of food. Technology as priory discussed has played a big part in ensuring a continued supply of aquatic food without causing any concerns on depletion of aquatic life. Despite these strides,

there are many concerns that relate to the application of technology in the rearing or farming of aquatic plants and animals (Straughan, 1999). This does not just confine to the safety of these foods to the human population but extends beyond this point.

These concerns range from the sustainability of the environment to the newly introduced species, for instance, in genetic modification to the assurance of continued procreation of current species.

Sustainability of the environment

In the need to develop species that are fast growing and resistance to climatic and physiologic issues such as disease, the science world has utilized the current species and continually modified them to develop the desired species (Twine, 2010). The genetically modified salmon is a prime example. It is bigger in size and takes a shorter time to reach maturation as compared to the naturally growing salmon. The eco-system as we know it, it is set in such a way that species adapt and impact on it to ensure equilibrium (Straughan, 1999). These species, each has a characteristic or a set of them that suits it for the particular environment and one that helps in the maintenance of the ecosystem balance.

The introduction of new species without regard to their impact on the ecosystem equilibrium poses a pale picture of the morality of the research and technology used to make these species (Third World Network, 2014).

The extent of potential damage remains unknown. It is important that humans take this into consideration; otherwise a point may come when the ecosystem is completely unbalanced by competing forces and it would be virtually impossible to manage such a scenario.

Preserving the existing species

On the other hand, there is the aspect of appreciating the existence of current species. With the evolving technology, more focus is on improving the genetically modified species with little or no concern for the continued existence of these natural species. Despite humans' comparative advantage over other living things, it is important that the natural law is maintained, and this involves integrating existing species with the modified species (Twine, 2010). This safeguards the future since there is no certainty as to how long the technology of modifying species will remain safe while at the same time showing the valuable concern for the natural species. As such, we may come at a point where the genetic pool available is so limited that the world will be solely reliant on few producers.

Conclusion

While there are grave concerns about the future of aquatic farming and more so in relation to the introduction of new species, it cannot be ruled as a disaster in the making. Rather, it is a new found way of safeguarding what the environment in itself offers by extending our knowledge to ensure sustainability into the future. However, this requires a host of measures. These measures should be designed to accommodate the technologies available while also placing significant consideration to the safety of humans as the consumers and as the inhabitants of the ecosystem (Emerson, 1999). As Deborah Whitman (2000), asserts we cannot turn our backs away from the current global food crisis and the imminent severity of the problem. Humankind should not ignore the contribution of technology on food security. However, it is important to remain cautious about the genetically

modified foods and use relevant ethical and legislative measures to protect humanity from health risks. The testing of salmon and other genetically modified aquatic species shows that genetic modified aquatic species do not cause any health risk. This is a signal that the aquatic biotechnology is quite feasible and should be globally accepted as a way of addressing the ever-increasing demand for food.

References

Dunham, R. A. (2011). *Aquaculture and Fisheries Biotechnology and Genetics*. CABI.

Emerson, C. (1999). *Aquaculture Impacts on the Environment*. Retrieved from <http://www.csa.com/discoveryguides/aquacult/overview.php>

Film Trailers Channel. (2009). *Frankenfish Trailer HD* [Video file]. Retrieved from <https://www.youtube.com/watch?v=RrKTLEPeO38>

Hancock, A. (2007). *Genetically Modified Fish* [Video file]. Retrieved from <https://www.youtube.com/watch?v=pmw5EWxCKeo&feature=related>

Hew, C. L., & Fletcher, G. L. (2001). The role of aquatic biotechnology in aquaculture. *Aquaculture*, 197(1), 191-204.

LinkTV., & Earth Focus. (2011). *Genetically Modified Salmon - Coming Soon?* Retrieved from <https://www.youtube.com/watch?v=SDI1j2YR6Oo>

Palladino, M. A. (2004). *Introduction to Biotechnology*.

Straughan, R. (1999). *Ethics, morality and animal biotechnology*.

BIOTECHNOLOGY, 1, 4.

Third World Network. (2014). *The negative impacts of aquaculture*. Retrieved from <http://www.twinside.org.sg/title/pact-ch.htm>

Twine, R. (2010). *Animals as biotechnology: Ethics, sustainability and critical*

<https://assignbuster.com/good-example-of-aquatic-biotechnology-article-review/>

animal studies. Earthscan.

Voice of America. (2010). US Government Considering Genetically Modified Animal for Human Consumption [Video file]. Retrieved from <https://www.youtube.com/watch?v=deuan1jG84I&feature=related>

Whitman, D. B. (2000). Genetically modified foods: harmful or helpful?. CSA Discovery Guides. Np.