



# A fish called Tilapia

*Nearly after two decades of steady adoption of commercially viable farming techniques, Tilapia is making inroads into the seafood market as a preferential substitute for the traditional white meat fishes.*

\*Networking Seafood Business.

## The Beginning

Seafood industry is one among the ancient businesses around the world. But of late certain burning issues in over-fishing has put a premium on commercial fishing operations while the debate on environmental and ecological hazards of the industry and some of the contentious fishing methods have triggered an unprecedented backlash in the global market.

In spite of strict guidelines and regulations put into place to check these menaces, the industry has felt a strong need to explore other environment-friendly aquaculture possibilities.

And the concept of cultivable fish was born. Salmon, cod, haddock and many other species were found to be suitable for cultivation in aquaculture environment.

This concept of seafood farming grew considerably and the industry was put back on its tracks. But not before other concerning factors loomed large before the industry - the cost involved in seafood farming and the consequent environmentally degradable fallouts it produced.

Say for instance, sea farming of fishes like salmon and cod demands open-sea cages and use large amount of supplementary feed that is mainly produced from fish. And most cultivable fishes require a higher level of dissolved oxygen for their survival.

To address these issues and the evading solutions the industry employed extensive research into environment-friendly aquaculture possibilities. The subsequent studies conducted, glimmered a ray of hope in Tilapia aquaculture.

## Un pescado llamado Tilapia

**Después de cerca de dos décadas de la adopción de técnicas de granja comercialmente viables, la tilapia está incursionando en el mercado de pescados y mariscos como un sustituto preferencial de los tradicionales pescados de carne blanca.**

### Los comienzos

La industria de Pescados y Mariscos se encuentra entre los negocios más antiguos en el mundo. Sin embargo últimamente el tema de la sobrepesca ha afectado a las operaciones de la Pesca Comercial, mientras que el debate de peligros ecológicos y medioambientales de la industria y de algunas formas de pesca contenciosas han lanzado un contragolpe sin precedente al mercado global.

En respuesta a las estrictas normas y regulaciones puestas en marcha para monitorear estas amenazas, la industria ha sentido una fuerte necesidad de explorar otras posibilidades como la acuicultura amigable al medio ambiente.

Existen varias especies que son cultivadas satisfactoriamente en un medio ambiente acuícola como el salmón, el bacalao, la merluza y muchas otras.

The research unveiled new prospects of a much-neglected fish called Tilapia and its environment-friendly farming capabilities. Unlike other sea-farmed fishes, Tilapia is comparatively environment friendly as it can convert natural food organisms to flesh and its farms use land based enclosed systems.

**The US import of Tilapia is expected to grow by 20% a year even as total edible seafood import grew by 3 to 8% over las 10 years.**

### Historical Background

In 1940's Tilapia was introduced in many Asian countries from its native south central Africa. The decade between 1960 and 1970 saw Tilapia culture redirected towards the production of food for local consumption and for the inflation of rural activities related to agriculture and animal husbandry.

The farming became soon unprofitable due to its excessive breeding and related overcrowding and stunted growth. However, husbandry techniques developed in last two decades including all male culture, hybridization, and grow out systems yielding uniform large size fishes, revived the industry.

### The Species

There are four major species of Tilapia used in aquaculture. Species most often cultured are Nile Tilapia, Red Tilapia, Mozambique Tilapia and their hybrids.

The species of the Genus *Oreochromis* are maternal mouth brooders and exhibit parental care. Under fast growing conditions they attain maturity in three months at a weight of 60 to 100 gm.

### Why Tilapia?

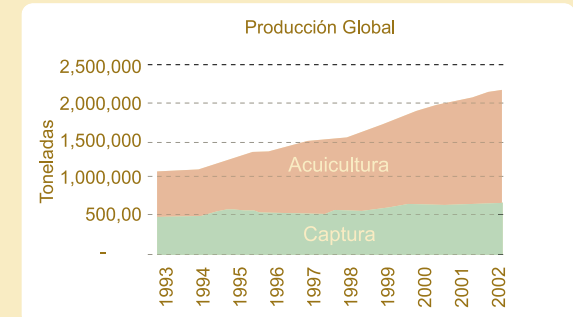
Tilapia is more resistant to viral, bacteriological and fungal diseases than other aquaculture species and tolerates wide range of salinity. They prefer water temperatures between 29° and 31°C. Growth rates decline rapidly at temperatures below 20°C. Inability of tilapia to tolerate low temperatures is a serious constraint for commercial culture in temperate regions.

They can tolerate lower levels of dissolved oxygen (DO) concentrations less than 0.5 mg/l, which is apparently below the tolerance levels for most cultivable fishes. Tilapia consumes a wide variety of food including plankton, green leaves, benthic organisms, aquatic invertebrates, larval fish, and detritus and decomposing organic matter.

Tilapias have very low fecundity but mature fast and are prolific in breeding thus causing overcrowding and stunted growth in mixed culture practices. Cage culture prevents overcrowding, as the females cannot recover the eggs for oral incubation.

### Tabla de producción global

El concepto del cultivo de pescados y mariscos creció considerablemente dándole un respiro a la industria, no sin antes considerar factores como el de los costos de la acuicultura con los consecuentes desperdicios medioambientales que produce.



Por ejemplo, el cultivo marino de peces como salmón y bacalao requiere de jaulas en mar abierto y el uso de grandes cantidades de alimento suplementario, principalmente derivado de pescado. Además, la mayoría de los peces cultivables requiere de un nivel más alto de oxígeno disuelto para su supervivencia.

Para atacar estos temas y sus soluciones, la industria realizó investigaciones extensivas en el campo de la acuicultura amigable al medio ambiente.

Los estudios subsecuentes arrojaron un rayo de esperanza en la acuicultura de la tilapia.

Contrario a otros peces de maricultura, la tilapia es amigable al ambiente ya que convierte el alimento de organismos naturales en carne y sus granjas utilizan sistemas terrestres cerrados. Existen cuatro especies principales de tilapia usadas en acuicultura, La Tilapia del Nilo, La Tilapia Roja, La Tilapia de Mozambique y sus híbridos.

### ¿Por qué Tilapia?

Las tilapias son más resistentes que otras especies a enfermedades virales, bacteriológicas y micóticas, además toleran un amplio rango de salinidad. Prefieren temperaturas del agua entre 29 y 31°C.

### Principales países productores de Tilapias

Los mayores productores de tilapia son los países localizados en Asia, y algunos países Latinoamericanos emergentes. China, Filipinas, Taiwán, Indonesia y Tailandia produjeron alrededor de 1,100 toneladas métricas en el 2001, constituyendo alrededor del 76% de la producción acuícola total de tilapia.

El cultivo de tilapia en Latinoamérica es relativamente nuevo, y la producción acuícola de Brasil, Costa Rica, México y Colombia en conjunto, creció de 18,000 toneladas en 1993 a 80,000 en el 2001.

De acuerdo con el libro "World Tilapia Farming 2002" de Cesar C. Alceste y Darryl E. Jory, la tilapia se está convirtiendo en competencia para las especies pesqueras tradicionales de carne blanca.

### La Evolución del comercio

La producción global de tilapia se duplicó durante los últimos 10 años, principalmente por el crecimiento de las actividades acuícolas. De acuerdo a las estadísticas de FAO, el comercio global creció cuatro veces en cantidad y alrededor de 6.5 veces en valor.

Estados Unidos importa alrededor del 96% de la oferta mundial y el proveedor más importante es Taiwán. No obstante, el mercado actual puede ser mucho más grande, ya que los únicos países que reportan separadamente las exportaciones e importaciones de tilapia son China, Taiwán y EE.UU.



**Europe saw a step decline in cod supplies and a price increase and this has benefited Tilapia's import to a great extent. But promotion remains a main area of neglect.**

All male culture prevents spawning and also gives better yield as the males grows faster. All male fingerlings are produced using sex reversal techniques or by manually separating sexes. Males in general demonstrate a growth rate 40% faster than that of females.

It takes about 8-10 months to bring tilapia to a marketable size, compared to 2-3 years for salmon. The ideal market size is 400 to 500g (8 to 10 months) for whole fish and 700 to 1000g (11 to 14 months old) for production of processed fillets.

#### Homes of Tilapia

Major Tilapia producing countries are located in Asia with Latin American countries fast emerging on the front. China, Philippines, Taiwan, Indonesia and Thailand together produced about 1,100 thousand metric tons of Tilapia in 2001, constituting about 76% of total aquaculture production of Tilapia.

Tilapia culture in Latin America is relatively new and the aquaculture production from Brazil, Costa Rica, Mexico and Columbia together grew from 18,000 in '93 to 80,000 metric tons in 2001.

And according to the literature, World Tilapia Farming 2002 by Cesar C. Alceste and Darryl E. Jory, Tilapia is becoming a competitor for traditional white fish species.

#### Evolution of Trade

The global production of the Tilapia doubled over last 10 years mainly due to growth in aquaculture activities. The global trade According to FAO statistics grew four fold in quantity and about 6.5 fold in value.

The U.S imported about 96% of the global supply to the international market. The major supplier to the international arena is Taiwan, according to the FAO statistics.

However, the actual trade may be much higher than the projected figures as the Taiwan Province of China and the U.S are the only countries, which have recorded Tilapia separately in their trade statistics.

#### The U.S Market

According to NMFS statistics Tilapia and its products stood 6<sup>th</sup> in total U.S edible seafood import quantity since 2001. The percentage composition of tilapia to total edible seafood import increased from 3.2% in 2001 to 4.3% in 2003. Tilapia rank second only to Atlantic salmon among cultured fish species. Percentage contribution of farmed Atlantic salmon products

seems to be stagnated at around 8% during the last three-year period.

#### Tilapia - Growing Imports

While the unit price of most of the seafood products imported to the U.S either stagnated or declined over the last three year period, the price of tilapia and its product increased by 18% almost equaling to prices of tuna.

The import of tilapia to the U.S increased from 27,800 metric tons (\$52.7 Million dollars) in 1998 to 90,200 metric tons (\$241.2 million dollars) in 2003. The corresponding values for 2002 were 67,000 metric tons and \$174 million dollars.

And in 2004, Up to August the U.S imported 71,200 metric tons worth U.S \$191.2 million dollars.

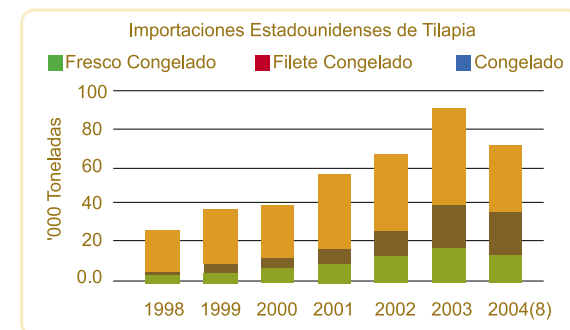
China ranked first in total tilapia products during 2002 overtaking Taipei China and in 2003 China constituted 50% of the import quantity to the U.S. Over 90% of the frozen tilapia products came from China and Taipei while 75% of the fresh tilapia fillets were from Ecuador and Costa Rica.

Since 1996 the U.S domestic production of Tilapia including both aquaculture and capture hovers around 20,000 metric tons. According to Agriculture Marketing Resource center (AMRC) Iowa state university almost all U.S production of Tilapia is marketed live.

The Fresh price in the U.S market has increased indicating strong demand for the products. Frozen products prices are stagnated at 2001 levels but declined in 2003.

#### The European Market

Apart from the U.S there is considerable interest for Tilapia in Europe as an inexpensive substitute for white fish fillet. Analysis of specie-wise



**Europa vió una baja en el suministro de bacalao y un aumento de precio, esto ha beneficiado de gran manera a la importación de tilapia. sin embargo su promoción continúa deficiente.**

export statistics of Taiwan has shown that the export to E.U has increased from 4,600 metric tons (\$5.8 million dollars) in 2000 to 7,900 metric tons (\$10.4 million dollars) in 2002. The export to the E.U during 2003 however declined to 5,900 metric tons (\$8.9 million dollars).

During 2003, Taiwan exported 57,500 metric tons of Tilapia of which 58% was to the U.S, 15% to the E.U and 1% to Japan.

The increase in share of export quantity to E.U rose to 10% in 2001, 18% in 2002, but declined to 15% in 2003. However, the unit prices continued to rise since 2001. The unit price of tilapia products from Taiwan increased after a decline in 2001.

Both fresh and frozen fillets range from 100-200 gm are sold in France, Germany, the Netherlands and Belgium.

#### Hurdles and Hopes

Low yield and labour intensive nature of filleting makes it less profitable. Better processing practices and use of improved equipments are yet to be developed.

Use of steroids for sex reversal is a cause of concern and harmless approved agents are yet to be identified. The U.S Food and Drug Agency (FDA) do not approve sale of tilapia treated with steroids.

International Center for Living Aquatic Resources Management (ICLARM) based in Malaysia produced an improved strain of tilapia under the Genetic Improvement of Farmed Tilapia (GIFT) project. Compared with other farmed strains, the GIFT tilapia can grow 60 percent faster and has better survival rate and shorter farming periods.

The country's Bureau of Fisheries and Aquatic Resources (BFAR) developed the fish, named as GET Excel Tilapia, an acronym for Genetically Enhanced Tilapia with Excellent qualities.

This hybrid can grow ten percent faster and thirty eight percent larger than conventional tilapia and is resistant to common diseases even under Philippines current production techniques. The new species should facilitate four crops, instead of three using conventional species, enhancing output.

\*Networking Seafood Business is part of World Seafood Market  
This information was developed by Entys Technologies Private Limited, Chennai, India, an associate company of the US based Entys Inc., which specializes in niche product data management and document management practices serving a wide range of industries including aerospace and pharmaceuticals.

#### El mercado Norteamericano

De acuerdo a las estadísticas del NMFS (National Marine Fisheries Service), la tilapia y sus productos quedaron en 6° lugar en la importación total de pescados y mariscos comestibles en el 2001.

El porcentaje de tilapia con respecto al total de pescados y mariscos comestibles creció de un 3.2% en 2001 a un 4.3% en 2003. La tilapia se colocó en segundo lugar después del salmón, entre los peces cultivados. El porcentaje de la producción por acuicultura de salmón del Atlántico parece haberse estancado alrededor del 8% durante el pasado trienio.

#### Importaciones crecientes de Tilapia

Mientras que el precio unitario de la mayoría de los pescados y mariscos importados por los Estados Unidos o se estancaron o declinaron durante el último trienio, el precio de la tilapia y sus productos incrementó en un 18%, casi igualando los precios del atún.

La importación de tilapia en los Estados Unidos incrementó de 27,800 toneladas métricas (\$52.7 millones de dólares) en 1998 a 90,200 toneladas métricas (\$241.2 millones de dólares) en el 2003. Y hasta agosto del 2004 los EE.UU. importaron 71,200 toneladas métricas con un valor de \$191.2 millones de dólares.

Desde 1996 la producción doméstica norteamericana de tilapia, incluyendo la de acuicultura y pesca arroja alrededor de 20,000 toneladas. De acuerdo con el AMRC (Agriculture Marketing Resource Center de la Universidad del Estado de Iowa), casi toda esta producción se mercadea viva.

#### El mercado Europeo

Además de los EE.UU. existe un interés considerable por la tilapia en Europa, como un sustituto barato del filete de pescado blanco. Los análisis de las estadísticas

**Se espera que la importación Norteamericana de tilapia crezca en un 20% anual aún cuando la importación total de pescados y mariscos comestibles ha venido creciendo de un 3 a un 8% en los últimos 10 años.**

de exportación por especie de Taiwán, han demostrado que la exportación a la Unión Europea se ha incrementado de 4,600 toneladas métricas (\$5.8 millones de dólares) en el 2000 a 7,900 toneladas métricas (\$10.4 millones de dólares) en el 2002. Sin embargo, la exportación a la Unión Europea en el 2003 bajó a 5,900.9 miles de toneladas métricas (U.S.\$ 8.9 millones de dólares).

Los filetes frescos o congelados tienen un rango de 100 a 200 gramos y se venden en Francia, Alemania, Los Países Bajos y Bélgica.

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