WATER QUALITY IN AQUACULTURE

CONDUCTİVİTY

Conductivity, or specific conductance, is a measure of the ability of water to conduct an electric current.

It is sensitive to variations in dissolved solids, mostly mineral salts.

The degree to which these dissociate into ions, the amount of electrical charge on each ion, ion mobility and the temperature of the solution all have an influence on conductivity.

CONDUCTİVİTY

Conductivity is expressed as microsiemens per centimetre (µS cm^{-1}) and, for a given water body, is related to the concentrations of total dissolved solids and major ions.

The conductivity of most freshwaters ranges from 10 to 1,000 µS cm^{-1} but may exceed 1,000 µS cm^{-1}, especially in polluted waters, or those receiving large quantities of land run-off.

It is usually measured *in situ* with a conductivity meter.

pH

The pH is an important variable in water quality assessment as it influences many biological and chemical processes within a water body and all processes associated with water supply and treatment.

The pH is a measure of the acid balance of a solution and is defined as the negative of the logarithm to the base 10 of the hydrogen ion concentration.

The pH scale runs from 0 to 14, with pH 7 representing a neutral condition.

In unpolluted waters, pH is principally controlled by the balance between the carbon dioxide, carbonate and bicarbonate ions as well as other natural compounds such as humic and fulvic acids.

The natural acid-base balance of a water body can be affected by industrial effluents and atmospheric deposition of acid-forming substances like acid rains.

Changes in pH can indicate the presence of certain effluents, particularly when continuously measured and recorded, together with the conductivity of a water body.

Eutrophication is the natural aging process characterised by the instant increase of nutrients (mainly P and N) in water. The pH of most natural waters is between 6.0 and 8.5, although lower values can occur in dilute waters high in organic content, and higher values in eutrophic waters, groundwater brines and salt lakes.

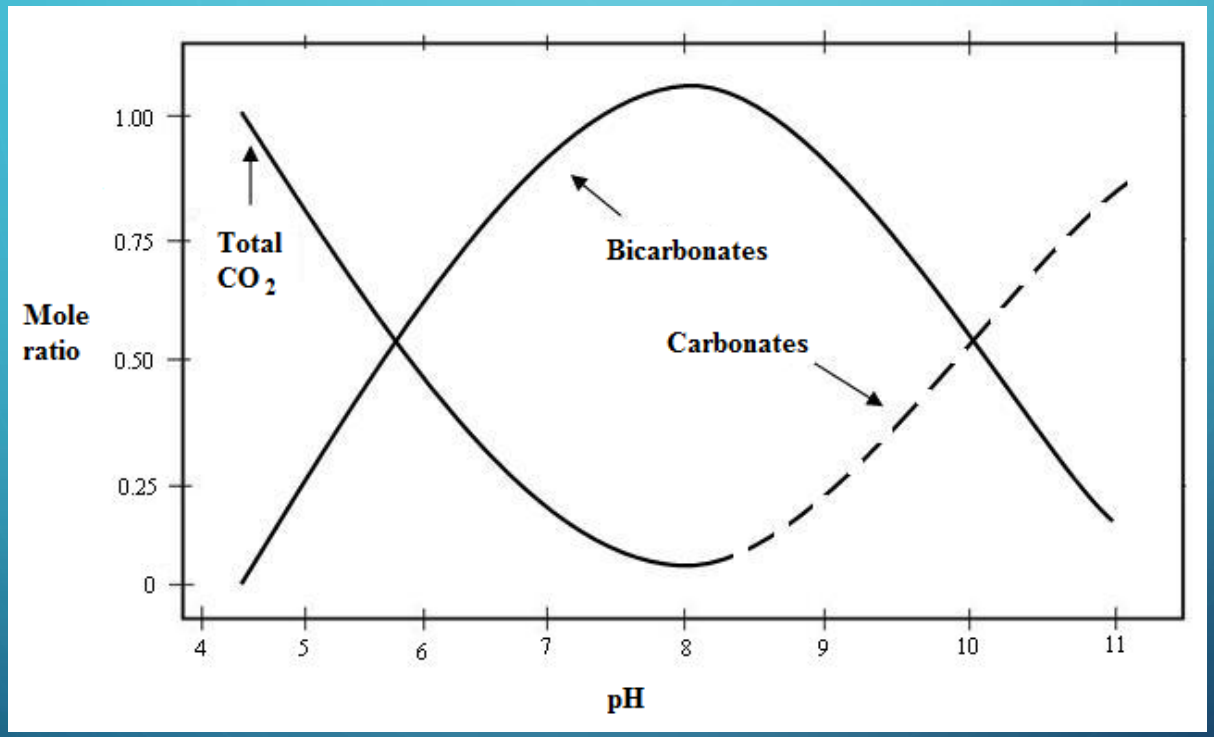

Figure 3. Distribution of ions related with pH in water.

ACIDITY AND ALKALINITY

Acidity and alkalinity are the base- and acid-neutralising capacities of water and are usually expressed as mmol l^{-1}.

The acidity of water is controlled by strong mineral acids, weak acids such as carbonic, humic and fulvic, and hydrolising salts of metals as well as by strong acids.

It is determined by titration with a strong base, up to pH 4 (free acidity) or to pH 8.3 (total acidity) with a pH meter.

The alkalinity of water is controlled by the sum of the titratable bases. It is mostly taken as an indication of the concentration of carbonate, bicarbonate and hydroxide, but may include contributions from borate, phosphates, silicates and other basic compounds.

In natural freshwater systems alkalinity is less than 5 mg l^{-1} for soft waters whereas is higher than 500 mg l^{-1} for hard waters.

ALKALINITY

Total alkalinity (mg/L $CaCO_3$)	Approximate water pH value
0	5,6
1	6,6
5	7,3
10	7,6
50	8,3

Table1. The relationship between total alkalinity and pH (Boyd and Tucker 1998).(Lineer correlation)