

Indicators describing the impact of aquaculture on water quality

Name	Chlorophyll-a in water column
DPSIR class	Impact
ECASA sub-group	Water quality
ECASA code	CHLa
Proposed by participant	7 University of Haifa, Israel, and 14- University of Venice
Definition, computation,	A "relative" rank can be obtained by considering the ratio between the value of the measure at the impacted and reference site. The calculation of this ratio, implies the application of a control or multi-control sampling strategy (Danovaro et al., 2004; Chamberlain, 2002; Porrello et al., in press)
Data required	Chl-a concentration, expressed in $\mu g/l$. The sampling strategy should take into account the vertical and horizontal resolution of the data, as well as the systematic seasonal variations of this parameter.
Summary, scientific meaning, implementation	The measure of Chl-a in the waters can provide an indirect estimation of the phytoplankton biomass. A number of studies indicates that bivalve grazing may control phytoplankton biomass, exerting a top-down control, in a range of estuarine systems (for reviews, see Smaal and Prins, 1993; Dame, 1996). Even though evidences of such a control concern mainly sheltered water bodies, the results of a study conducted in the Northern Adriatic Sea (Martincic, 1998), showed that Chl-a concentrations in water column increase with the distance from an off-shore longline mussel farm.
Range of validity	
Species concerned (fishes/molluscs)	Molluscs culture:
Related type of aquaculture	Longlines (Aleffi et al., submitted; Martincic, 1998), rafts
Relevant environments for this indicator	Coastal waters, and lagoons:
Geographic scale	local
Direct relevance to objectives	A
Clarity in design.	A
Realistic collection or development costs	B
High quality and reliability	B
Appropriate spatial and temporal scale	B
Obvious significance	A

advantages
disadvantages
references

References:

- Aleffi, I.F., Bettoso, N., Solis-Weiss, V., Tamberlich, F., Predonzani, S., Fonda-Umani, S., submitted to ICES – Journal of Marine Science. Effects of suspended mussel culture on the macrozoobenthos in the Gulf of Trieste (Northern Adriatic Sea, Italy).
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- Martincic, B., 1998. Modello di Carrying capacity applicato alle mitilicoltura in sospensione. Ph-D Thesis in aquaculture, University of Florence, Pisa and Udine.
- Prins, T.C., Smaal, A.C., Dame, R.F., 1998. A review of the feedbacks between bivalve grazing and ecosystem processes. Aquatic Ecology 31, 349-359.
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- Solidoro, C., Pastres, R., Melaku Canu, D., Pellizzato, M., Rossi, R., 2000. Modelling the growth of *Tapes philippinarum* in Northern Adriatic lagoons. Mar. Ecol. Progr. Ser., 199. 137-148.

State of validation
Recommendations