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Measurements of variable chlorophyll fluorescence have revolutionised global research of photosynthetic bacteria, algae and plants and in turn assessment of the status of aquatic ecosystems, a success that has partly been facilitated by the widespread commercialisation of a suite of

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chlorophyll fluorometers designed for almost every application in lakes, rivers and oceans.

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Page 14/66

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Chlorophyll? a fluorescence induction is a
rapid technique for measuring

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photosynthetic electron transport in plants. To assess chlorophyll fluorescence as a bioindicator of effects of polycyclic aromatic hydrocarbon mixtures, chlorophyll fluorescence parameters and plant growth responses to exposure to the wood preservative creosote were examined in the aquatic plants Lemna

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When pulse amplitude modulated chlorophyll a (Chl a) fluorescence imaging (i-PAM) was employed, the maximum quantum yield of PS II ($F(v)/F(m)$) significantly declined with increasing

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phenol concentrations with resultant EC??
of 1.91 μ M and coefficients of variation
(CVs) generated for the EC?? values of
less than 4.7%.

**Phenol toxicity to the aquatic
macrophyte *Lemna paucicostata***

Chlorophyll a is a measure of the amount

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of algae growing in a waterbody. It can be used to classify the trophic condition of a waterbody. Although algae are a natural part of freshwater ecosystems, too much algae can cause aesthetic problems such as green scums and bad odors, and can result in decreased levels of dissolved oxygen.

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Indicators: Chlorophyll a | National Aquatic Resource ...

Chlorophyll B is mainly found in land plants, aquatic plants and green algae 1. In most of these organisms, the ratio of chlorophyll A to chlorophyll B is 3:1 21. Due to the presence of this molecule, some organizations will group the green algae

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into the Plant Kingdom. Chlorophyll C is
found in red algae, brown algae, and
dinoflagellates 15.
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Algae, Phytoplankton and Chlorophyll - Environmental ...

Aloe vera L. is one of the most important
medicinal plants in the world. In order to

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determine the effects of light intensity and water deficit stress on chlorophyll (Chl) fluorescence and pigments of *A. vera*, a split-plot in time experiment was laid out in a randomized complete block design with four replications in a research greenhouse.

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Effects of water stress and light intensity on chlorophyll ...

Fingerprints of excitation spectra of chlorophyll (Chl) fluorescence can be used to differentiate 'spectral groups' of microalgae in vivo and in situ in, for example, vertical profiles within a few seconds. The investigated spectral groups

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of algae (green group, Chlorophyta; blue, Cyanobacteria; brown, Heterokontophyta, Haptophyta, Dinophyta; mixed, Cryptophyta) are each characterised by a

...

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Measurements of variable chlorophyll fluorescence have revolutionised global research of photosynthetic bacteria, algae and plants and in turn assessment of the status of aquatic ecosystems, a success that has partly been facilitated by the widespread commercialisation of a suite of chlorophyll fluorometers designed for

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almost every application in lakes, rivers and oceans. Numerous publications have been produced as researchers and assessors have simultaneously sought to optimise protocols and practices for key organisms or water bodies; however, such parallel efforts have led to difficulties in reconciling processes and patterns across

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the aquatic sciences. This book follows on from the first international conference on “chlorophyll fluorescence in the aquatic sciences” (AQUAFLUO 2007): to bridge the gaps between the concept, measurement and application of chlorophyll fluorescence through the synthesis and integration of current

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knowledge from leading researchers and assessors as well as instrument manufacturers.

Measurements of variable chlorophyll fluorescence have revolutionised global research of photosynthetic bacteria, algae and plants and in turn assessment of the

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status of aquatic ecosystems, a success that has partly been facilitated by the widespread commercialisation of a suite of chlorophyll fluorometers designed for almost every application in lakes, rivers and oceans. Numerous publications have been produced as researchers and assessors have simultaneously sought to

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optimise protocols and practices for key organisms or water bodies; however, such parallel efforts have led to difficulties in reconciling processes and patterns across the aquatic sciences. This book follows on from the first international conference on “chlorophyll fluorescence in the aquatic sciences” (AQUAFLUO 2007): to bridge

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the gaps between the concept,
measurement and application of
chlorophyll fluorescence through the
synthesis and integration of current
knowledge from leading researchers and
assessors as well as instrument
manufacturers.

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The technique of chlorophyll fluorescence has a relatively short history, beginning with the observations by Kautsky (Kautsky and Hirsch, 1931). Since that time there have been several reviews devoted to the subject, with most of them

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highly theoretical (Bohlar-Nordenkamp and Oquist, 1993; Dau, 1994; Schreiber et al. , 1994). There have also been many books devoted to generalized spectrophotometric and microscopic fluorescence techniques. However, to the best of our knowledge there has not been a book completely devoted to the practical

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Applications and uses of chlorophyll
fluorescence in plant biology. As
techniques mature, applications multiply
and so do their potential advantages. The
chlorophyll fluorescence technique is
maturing as can be seen in the increasing
numbers of publications that are devoted
to its use. Therefore, we considered that

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now was a good time to compile the existing knowledge for the applied use of this technique and provide a single volume to which a novice or experienced user could refer. Highly trained experts in the field of photobiology have primarily used the chlorophyll fluorescence technique in the past. In that work, understanding the

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mechanisms and controls of the photosynthetic processes was the main focus of activity and discussion. Much of the equipment used was highly specialized and expensive, or in some cases one-of-a-kind lab designed units. However, the development of several reliable commercially available chlorophyll

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fluorescence monitoring instruments has changed the potential user base for the technique.

Chlorophyll fluorescence is a simple, rapid technique for measuring photosynthetic efficiency in plants and algae. Pulse-amplitude modulated chlorophyll

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fluorescence was examined in aquatic plants and natural assemblages of Lake Erie phytoplankton exposed to solar ultraviolet (UV) radiation. UV-exclusion studies were performed in which plastic films were used to screen sunlight to remove ultraviolet-B radiation (295-320 nm), or UVB plus ultraviolet-A radiation

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(320-400 nm) in outdoor aquatic
microcosms and ship exposure chambers.
UV had negligible impacts on
photosynthesis and growth in the aquatic
macrophyte *Myriophyllum spicatum* in
microcosms. However, photosynthetic
electron transport in natural assemblages
of Lake Erie phytoplankton was

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substantially diminished by short exposures to full sunlight. Phytoplankton exposed to full sunlight for 30 min lost 90 % of maximum photosystem II efficiency (F_v/F_m) and 75 % of the effective yield of photosystem II photochemistry ($\Phi F/F_m$). Diminished photosynthetic electron transport was primarily due to UVB

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wavelengths in sunlight. UVA and visible wavelengths also diminished photosynthetic electron transport to a lesser extent. Thus, this assay represents a general bioindicator of effects from environmental stress in freshwater plants and algae that is able to detect impacts due to current and increasing levels of UVB.

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The first two chapters of this book are devoted to provide a clear, understandable explanation of the theoretical basis for chlorophyll fluorescence analysis. The definitions and terminology that are specific to chlorophyll fluorescence analysis are included in this discussion,

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which leads to the bridging of chlorophyll fluorescence analysis to plant tissue condition status. Subsequent chapters focus on the monitoring of stress in the natural terrestrial and aquatic environments, assessing seedling quality in forestry, and postharvest quality in fruits and vegetables. A final chapter is

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devoted to a newly emerging use for the technique in plant breeding programs. It is the hope of the editors and authors that readers who have not used this technique will be encouraged to explore the possibilities in their area of study. For those who have used the technique previously, this book will offer some new

insights, which may encourage development and/or refinement of approaches. This work will contribute to advances in the understanding of plant-environment interactions and hence to improvements in the environmental quality, as well as in forestry and agri-food industries.

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Chlorophyll a Fluorescence: A Signature of Photosynthesis highlights chlorophyll (Chl) a fluorescence as a convenient, non-invasive, highly sensitive, rapid and quantitative probe of oxygenic photosynthesis. Thirty-one chapters, authored by 58 international experts,

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provide a solid foundation of the basic theory, as well as of the application of the rich information contained in the Chl a fluorescence signal as it relates to photosynthesis and plant productivity. Although the primary photochemical reactions of photosynthesis are highly efficient, a small fraction of absorbed

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photons escapes as Chl fluorescence, and this fraction varies with metabolic state, providing a basis for monitoring quantitatively various processes of photosynthesis. The book explains the mechanisms with which plants defend themselves against environmental stresses (excessive light, extreme temperatures,

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drought, hyper-osmolarity, heavy metals and UV). It also includes discussion on fluorescence imaging of leaves and cells and the remote sensing of Chl fluorescence from terrestrial, airborne, and satellite bases. The book is intended for use by graduate students, beginning researchers and advanced undergraduates

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in the areas of integrative plant biology, cellular and molecular biology, plant biology, biochemistry, biophysics, plant physiology, global ecology and agriculture.

A clorofila a é um composto-chave no processo de absorção e aproveitamento da

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energia luminosa na fotossíntese.

Monitorar a fluorescência da clorofila a para obter informações do aparato fotossintético de produção de energia é uma abordagem atraente porque a fluorescência é percebida externamente às células, podendo ser detectada sem destruir sua fonte. Estudos anteriores realizados

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pele Laboratório de Hidrobiologia (UFRJ)
e pelo Laboratório de Monitoramento
Ambiental Remoto (LabMAR) (PUC-Rio)
em águas marinhas indicaram a existência
de uma relação linear entre os valores
absolutos obtidos pelo Laboratório de
Hidrobiologia para a concentração da
clorofila a e os valores relativos obtidos

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pelo LabMAR para a sua fluorescência.

Este resultado motivou os dois laboratórios a obter valores absolutos para a concentração da clorofila a em águas marinhas, a partir da medida de sua fluorescência, com a maior confiabilidade possível para, então, relacioná-los aos valores relativos fornecidos pelo LIDAR-

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PUC. Neste sentido, a implantação de um programa de controle de qualidade no Laboratório de Hidrobiologia indicou que este laboratório encontra-se em condições de obter valores confiáveis para a concentração da clorofila a em amostras de águas marinhas através da fluorimetria. No entanto, uma avaliação rigorosa da

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relação entre a intensidade da fluorescência da clorofila a (normalizada pela intensidade da emissão do espalhamento Raman da água) e o respectivo valor confiável para a concentração da clorofila a se faz necessária.

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