

Questions made while bbe Webinar „AlgaeTorch“ (26.02.14)

Q: The measurement are made in the field, in vivo only. It's only quantitative approach by mass of chlorophyll. In North Africa (Algeria) we have a lot of problems in dams with algal proliferation as microcystin. And we have to evaluate their abundance because the water used after treatment as drink water. Can we use this torch for this?

A: *The measurement with the AlgaeTorch is a real in vivo fluorescence measurement without any sample preparation. With the presence of cyanobacteria the probability rises drastically that cyanotoxins are also inside of the water. The AlgaeTorch cannot determine microcystins and other cyanotoxins, but will give you a rapid survey where it becomes necessary to make a more detailed analysis*

Q: The cost of the equipment and the taxes levied make the procurement of equipment difficult to be purchased by institutions in developing countries. Is there any mechanism through which taxes can be waived fully and the equipment cost discounted for institutions in developing countries?

A: *You might check with the tax authorities if scientific equipment import is subjected to lower duties. Bbe can provide a declaration about purpose and application of the AlgaeTorch on request.*

Q: Have results from the algae torch been compared to cell counts using microscopy and a taxonomist? Did you perform a study to compare the results obtained in the field to results obtained with classical microscopic methods?

A: *Not from the AlgaeTorch itself but from other bbe fluorometers. As they are all adjusted to a reference fluorometer in the bbe workshop, the figures are transferable. A number of customers performed such studies. Surely there is a high variability as a mixture can contain big or small cells from the same class. Then the relationship is even sometimes very poor. For cultured algae the relation number of cells to chlorophyll is good once accurately determined.*

Q: How do you see the algae torch being used in monitoring eg. Water framework Directive? Do you think taxonomists are still required?

A: *Article 8 WFD DIRECTIVE 2006/7/EC Cyanobacterial risks*
1. When the bathing water profile indicates a potential for cyanobacterial proliferation, appropriate monitoring shall be carried out to enable timely identification of health risks.
2. When cyanobacterial proliferation occurs and a health risk has been identified or presumed, adequate management measures shall be taken immediately to prevent exposure, including information to the public.

Nevertheless the taxonomists are required because of a better identification. The AlgaeTorch detects cyanobacteria but cannot identify algae or cyanobacteria on the level of genus or species. The AlgaeTorch is helpful to reduce working time.

Q: How was the relation 1ug/L / 1.000.000 cells obtained? Is that applicable to each species or Cyanobacteria?

A: You find some comparisons in the scientific literature. The conversion factor is only an average value – it can be also 2.000.000 or 500.000 cells/ μ g chlorophyll-a. Someone should use those values careful- but they may serve as an indication about the range.

Q: Have you compared the results of in vivo fluorometry with the results of the classical chl extraction method?

A: Yes, we have. Sometimes both are in good conformity but sometimes different. However we always found a high correlation. At the moment we are faced with results of extraction method which is half of the fluorometry. There are several reasons for deviations. bbe's in vivo fluorescence measurement is adapted to results obtained with HPLC pigment analysis.

Q: I heard that the sunshine can modify the results. Is it true? I mean we will measure different concentration during the sunshine and cloudy from the same water body. Is it true?

A: This can happen – especially at the surface of a water body. The fluorescence emission changes when bright sunlight activates the electron transport and further physiological pathways. The influence goes from a few centimeters in waters with humic substances and turbidity to 2m in the open sea under bright sunlight conditions. This effect can only be circumvented completely by dark adaption of the algae prior measurement when bright sunlight is effective. Naturally it is often difficult to meet ideal conditions in the field and no one will do such a work only at night. Sometimes it is helpful to shade the place (with boat, body...). Unfortunately all field in vivo fluorometers have to suffer from the effect. Alternatively the bbe AlgaeLabAnalyser uses a cuvette to make a dark adaption. The AlgaeOnlineAnalyser stops the flow for dark incubation.

Q: Is possible to re-calibrate the AlgaeTorch after the measurements were done and then adjust this calibration to the previous measurements?

A: No, that's impossible in the AlgaeTorch. The raw fluorescence values are directly used for calculation. However with a new calibration it is possible to refit the previous values in a spreadsheet like Excel.

Q: is it possible to quantify dry algae on a roof for example? / Is it possible to use algae torch to evaluate algae on a roof (wet surface)?

A: In a project experiments were performed with the BenthosTorch to determine cyanobacteria on roofs. The results are not yet published. One can say: in principle- yes, but quantity determination is difficult. The intensity of fluorescence emission depends on the moisture content of the cyanobacteria. There is further work needed. The AlgaeTorch is not designed for such measurements.

Q: how much is the minimum threshold of chlorophyll a measurement using AT?

A: 0,1 μ g chlorophyll-a /l

Q: How the AlgaeTorch can measure when we have large colonies (compact)? WE actually have some under evaluation of the amount. Is it necessary to destroy the colonies for an accuracy measurement?

A: Compact colonies can affect the exact quantification. Depending on the size of the colony they either cannot be excited as part of inner cells or the emitted light may become absorbed by neighbor centers. A sonification may help but this is not applicable in the field. Clearly this is a weakness of the measurement if we have big colony formations. Usually the existence of colonies can be detected already by visual inspection.

Q: Is it possible to drive the AlgaeTorch online by internet connection?

A: Not yet, but solutions are in sight. The used technique depends on the desired application. If someone is considering such an application bbe is interested to find a concept.

Q: I have tried the torch and found it very useful. Is the data easily downloaded to Windows spreadsheet format?

A: This can be easily performed with the bbe++ software which is delivered for free with the AlgaeTorch. Data are exported to Excel.

Q: is the new, lighter titanium bodied on the market yet?

A: No titanium, but anodized aluminum. The weight is reduced to 1,3 kg total and much lighter than the steel head AlgaeTorch.

Q: How we can trust to the measured data by algae torch in a manager point of view?

A: For the AlgaeTorch a sensor performance attachment is available. With this application the AlgaeTorch can be checked periodically for valid adjustments and reproducibility. The data are then transferred to a databank (bbe++) where data are stored and available for QM reports. A detailed sheet informs about the performance test and is available on request.

Q: Among the data, do you have a set of raw fluorescence signals available?

A: No, that is not implemented. If needed the raw fluorescence signals can be recalculated with aid of an Excel sheet outside.

Q: What are the excitation wavelength you used?

A: 470 nm 525 nm, 610 nm for the algae fluorescence excitation

Q: any calibration possible at site?

A: The offset, blank may be calibrated at site. This can be useful for a superior analysis especially when the chlorophyll-a content is low.

Q: we are far away from your lab....

A: Then you should have a power supply close by – an electric generator or your car for recharging the AlgaeTorch. If you take samples for lab analysis the sample content may be changed in between and does not allow exact comparisons to the AlgaeTorch

Q: could you pls repeat the calibration possibility?

A: Cultured algae are used for calibration: chlorophytes, diatoms and cyanobacteria. The content is determined with a reference fluorometer. A three point calibration is performed in the range 0-200 µg chlorophyll a/L. It is recommended to recalibrate all 2 years. The new AlgaeTorch comes newly calibrated.

Q: that colored foil sounds interesting; please give more info about that.

A: see above

Q: The AlgaeTorch has an integrated turbidity measurement. What is the principle and up to what turbidity value the measurement with the AlgaeTorch can be performed?

A: The principle is the backward scattering of light at 700 nm, a wavelength where no chlorophyll fluorescence excitation interferes. The sensor (a photodiode) is the same as for the chlorophyll measurement and is located in the center of the measuring head surrounded by the LEDs. The range is 0-200 FTU (Formazin Turbidity Units)

Q: Chlorophyll measurement is affected by other fluorescent material (Yellow substance). Is there any correction for YS in the AlgaeTorch?

A: No correction for YS or Fluorescent Dissolved Organic Matter (FDOM). It is recommended to implement YS in the zero point calibration (offset). Therefore it is necessary to remove all algae from the "offset"-water und set the offset with the filtrate. As the FDOM passes the filter the value of FDOM will be automatically subtracted from chlorophyll fluorescence raw values.

Q: Can AlgaeTorch be used in an online mode? What are the requirements?

A: Yes, you need the AlgaeTorch, a cable – which can be up to 30 m a converter box, the PC with bbe++ software and the power supply. The software controls START and STOP of the measurement and receives the data online in a table.

Q: Can the AlgaeTorch measure further algae classes. Is it possible to imply customized algae classes?

A: No, this is reserved to superior bbe fluorometers. Here in the AlgaeTorch the measurement is limited to the measurement of total chlorophyll and chlorophyll from cyanobacteria. The AlgaeTorch is designed to determine cyanobacteria content quantitatively as chlorophyll.

Q: Can the AlgaeTorch be submersed deeper than 10m?

A: There are 2 versions available: one for the limit of 10 m- the AlgaeTorch 10, and one for the maximum depth of 100 m with a pressure sensor and a pressure- and water resistant socket. The maximum frequency of the measurement is about 15 seconds. With the bbe FluoroProbe a measurement of up to 3 measurements/s are possible. This makes the profiling easier and enables a gapless depth profile.

Q: How fast does the AlgaeTorch measure chlorophyll content?

A: A measurement needs about 15 seconds from the start of the measurement until the display of the results. Of course the time for the measurement can be extended. For long term deployment the AlgaeTorch can be transferred into a sleep mode.

Q: Can the AlgaeTorch detect Rhodophytes? Can bbe replace LED´s for an improved measurement of rhodophytes?

A: As most of the rhodophytes are algae forming a thallus or are macrophytes, the AlgaeTorch cannot determine rhodophytes chlorophyll quantitatively. The same stands for all other macrophytes. Although such algae give a signal it cannot be used for a reasonable calculation.

Q: YSI (Exo), Turner (Cyclops) and Chelsea (Tristar) also offer the measurement of chlorophyll and cyanobacteria. Is there a difference between the measurements?

*A: Clearly there are major differences. Let me take the measurement of cyanobacteria as an example: while bbe uses the measurement of chlorophyll (of cyanobacteria) as part of total chlorophyll, most fluorometers use the fluorescence of the phycocyanin pigment or phycoerythrine pigment beside the chlorophyll measurement. The displayed figures are not comparable. The manufacturers know this and express the cyanobacteria as number of cell or relative units /volume while chlorophyll is expressed as µg/volume. Here a calculation for chlorophyll concentration in cyanobacteria cannot take place, as there is no relationship behind for the different spectrofluorometric features and their interference in the signals. Each sensor works independently. The AlgaeTorch discriminates on the level of chlorophyll and deconvolutes cyanobacteria chlorophyll and algal chlorophyll on the basis of algal spectra.
It is a good idea to include turbidity measurement. Many manufacturers offer this as an option beside chlorophyll measurement. But only the AlgaeTorch automatically corrects the chlorophyll determination for turbid particles. And determines turbidity in FTU.
Another point we also stressed in the presentation. bbe uses real algae for calibration and recommends to recalibrate periodically for best performance over a long time. Bbe offer this service for recalibration in the bbe workshop.*

If you need more information regarding the functionality of the bbe AlgaeTorch or regarding other bbe instruments, please don't hesitate to contact us:

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