



Die reaksie van die diatoom gemeenskapstruktuur op endosulfiene blootstelling: 'n Mesocosm benadering

Author:
Steven Osmond

Correspondence to:
Erna Bruwer

Email:
erna.bruwer@uj.ac.za

Postal address:
PO Box 524, Auckland Park
2006, South Africa

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The response of the community structured diatome on endosulfan exposure: a Mesocosm approach. Diatoms in South Africa are well studied, with a substantial species database available for use in identification of species. Biomonitoring and water quality analysis using such algae is a useful tool in aquatic health research. Diatom community assemblages and species prevalence shed light on various elements as they are used as indicators for pH, nutrients, salinity and organics. Due to their fast responses to toxicants as well as importance as primary producers they have become a key component of most aquatic health assessments. In this study, epilithic diatoms collected from the Vaal River were exposed to the organochlorine pesticide endosulfan by means of controlled application using mesocosms. Exposure concentrations were calculated using the LC50 value and determining 10%, 25% and 50% of the LC50 value. Endosulfan was added as a once-off application to simulate agricultural spray drift. The mesocosms were run for a 96 hour exposure period before diatoms were sampled using standard methodologies. A higher density of biofilm was observed macroscopically in the control and first exposure. Sixteen species of diatoms were identified in the control experiment, whilst only 13 were identified in the highest exposure concentration. Taxonomic identification showed that species such as *Cymbella Agardh*, *Gomphonema parvulum*, *Cocconeis pediculus* and *Melosira varians* were not significantly affected by the pesticide. Other species like *Cyclotella meneghiana*, *Aulacoseira granulata varians angustissima* and *Asterionella formosa* were more sensitive as they were not found in the third exposure.

Baie studies is al voltooi op diatome in Suid-Afrika, met 'n aansienlike groot spesie databasis vir die doel van identifisering van spesies. Tydens biomonitoring en water analises word hierdie alge as 'n betroubare maatstaf gebruik vir die ondersoek van vars water gesondheid. Diatoom gemeenskap samestelling en spesie oorwig het meer lig op die sekere elemente geplaas omrede diatome gebruik kan word as indikatore vir pH, nutriente, sout gehalte en organiese stowwe. As gevolg van die diatome se vinnige reaksie tot toksiese stowwe en die feit dat diatome primere produseerders is, het hulle as 'n sleutel komponent ontstaan van meeste akwatiese gesondheids evaluering studies. In die huidige studie word epilithic diatome versamel uit die Vaal Rivier, wat dan bloedgestel word aan organochlorine pestisiedes, endosulfien deur 'n gekontroleerde bloedstellings metode, mesocosms. Blootstellings konsentrasies was bereken deur gebruik te maak van die LC50 waarde en dan sodoende 10%, 25% en 50% van die LC50 waarde te bepaal. Endosulfien word eenmalig bygevoeg om landbougif sprei stof te simuleer. Die mesocosm het geloop vir 'n bloedstellings periode van 96 uur voordat die diatome versamel is volgens die standaard prosedure. 'n Hoër digtheid van biofilm was makroskopies sigbaar in die kontrole en die eerste blootstellings tank. Sestien spesies van diatome was geïdentifiseer in die kontrole eksperiment, terwyl slegs 13 spesies geïdentifiseer kon word in die hoogste bloedstelling konsentrasie eksperiment. Taksonomiese identifikasie wys dat spesies soos: *Cymbella Agardh*, *Gomphonema parvulum*, *Cocconeis pediculus* and *Melosira varians* was nie beduidend geïntreë deur die pestisiedes nie. Ander spesies soos *Cyclotella meneghiana*, *Aulacoseira granulata varians angustissima* and *Asterionella formosa* was meer sensitief om rede hul afwesigheid in die derde blootstellings eksperiment. Polysaccharied tubules help met die beskerming van sommige van die meer geharde spesies wat aan die substraat vasklou en kolonies vorm, terwyl dit onder bespreking is dat onbeskermdes spesies meer vatbaar kan wees tot verlaagde proteïen sintese, verlaagde fotosintese, geïnduseerde lipied sintese, koolhidraat versteuring en die verlies van beweging, alles as gevolg van pestisiedes, net soos in die geval van verskeie onkruidodders.