Effect of phytosterol supplementation on Acartia egg production (PhytosterolsZooplank project)

Website: https://www.bco-dmo.org/dataset/724158
Data Type: experimental
Version: 1
Version Date: 2018-01-19

Project
» Collaborative Research: Effects of Marine Algal Sterols on Zooplankton Growth and Reproduction (PhytosterolsZooplank)

Contributors	Affiliation	Role
Hassett, R. Patrick	Ohio University	Principal Investigator
Giner, Jose	State University of New York ESF (SUNY ESF)	Co-Principal Investigator
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Abstract
This dataset includes viable egg production of the copepod Acartia tonsa that were fed a diet supplemented with a variety of phytosterols at two food concentrations.

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Dataset Description

This dataset includes viable egg production of the copepod *Acartia tonsa* that were fed a diet supplemented with a variety of phytosterols at two food concentrations.

Statistical results of this experiment: Hassett_Sterol_stats2017-12-05.pdf

Acquisition Description

Phytosterols were synthesized by J. Giner. Rhodomonas cultures were labeled by dissolving sterols in 100% ethanol at a concentration of 2 mg/ml, and then adding the sterol solution at a concentration of 20 µl sterol solution per 100 ml stock culture (at stock density 1x106 cells/liter). The cultures were mixed on a LabGenius orbital shaker for 2 hr at 100 rpm to allow the sterols to bind to the algal surfaces. In vivo chlorophyll a was monitored with a Turner handheld fluorometer to ensure that all food was consumed before the subsequent feeding. This avoided the problem of algal growth diluting the phytosterol concentration over time.

Acartia tonsa were supplied by AlgaGen Inc, Florida. *A. tonsa* were acclimated for 5 d to a diet of Rhodomonas supplemented with phytosterols. After the acclimation period females were removed and placed in 50 ml Petri dishes. After 24 h females were again removed by pipet, eggs were counted, and the

eggs were left for 48h and the number of nauplii counted to determine egg viability. Two experiments were conducted, with the first experiment at low food (≈12,000 cells/ml) and the second at high food (≈25,000 cells/ml). 3 phytosterols were used in both experiments.

Processing Description

BCO-DMO Processing Notes:
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- filled in the empty cells in expt, sterol_id and sterol_name columns with the data from the preceding cell.
- replaced special characters with ascii characters
- replaced spaces with underscores

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Parameters

Parameter	Description	Units
experiment	experiment identifier	unitless
sterol_id	sterol identifier	unitless
sterol_name	full chemical name of sterol	unitless
replicate	replicate number	unitless
eggs_per_female	number of eggs produced per female	eggs
viability	percent of eggs that were viable	unitless

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Instruments

Dataset-specific Instrument Name	Turner hand-held fluorometer
Generic Instrument Name	Fluorometer
Dataset-specific Description	Used to measure chlorophyll-a.
Generic Instrument Description	A fluorometer or fluorimeter is a device used to measure parameters of fluorescence: its intensity and wavelength distribution of emission spectrum after excitation by a certain spectrum of light. The instrument is designed to measure the amount of stimulated electromagnetic radiation produced by pulses of electromagnetic radiation emitted into a water sample or in situ.

Dataset-specific Instrument Name	
Generic Instrument Name	In-situ incubator
Dataset-specific Description	Sanyo MIR252 incubator
Generic Instrument Description	A device on shipboard or in the laboratory that holds water samples under controlled conditions of temperature and possibly illumination.

Dataset-specific Instrument Name	
Generic Instrument Name	Microscope - Optical
Dataset-specific Description	Olympus SZH30 stereo microscope
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

Dataset-specific Instrument Name	
Generic Instrument Name	Shaker
Dataset-specific Description	LabGenius Digital Orbital Shaker
Generic Instrument Description	A Shaker is a piece of lab equipment used to mix, blend, or to agitate substances in tube(s) or flask(s) by shaking them, which is mainly used in the fields of chemistry and biology. A shaker contains an oscillating board which is used to place the flasks, beakers, test tubes, etc.

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Project Information

Collaborative Research: Effects of Marine Algal Sterols on Zooplankton Growth and Reproduction (PhytosterolsZooplank)

Description from NSF award abstract:
Autotroph-herbivore interactions in marine food webs are important to fisheries, the global carbon cycle, and, because of harmful algal blooms, human health. The recent hypothesis that harmful algae interfere with the growth and reproduction of zooplankton because of specific structural modifications of the algal

sterols will be tested in research on the roles of nutritional factors in planktonic food webs. The effects of marine algal sterols on herbivorous crustaceans will be investigated in three calanoid copepods, *Acartia hudsonica*, *Eurytemora affinis*, and *Calanus finmarchicus*, and brine shrimp, *Artemia salina*. In this project, studies will be carried out to determine whether marine algal sterols can be metabolized to cholesterol by zooplankton and the relative efficiency of this process. This information is critical for assessing the nutritional value of different algal diets. Using the metabolic studies as a foundation, further experiments will seek to determine whether selected sterols, some of which have structural similarities to steroid hormones, have an inhibitory impact on the growth and reproduction of crustaceans. The analytical techniques used in these experiments will be high-field 13C-nuclear magnetic resonance spectrometry (NMR) and gas chromatography-high resolution mass spectrometry (GC-HRMS). Test sterols for these experiments will be labeled with stable isotopes (13C and 2H) in specific positions by chemical synthesis.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1061973
NSF Division of Ocean Sciences (NSF OCE)	OCE-1061957

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