Reductive dissolution of pyrite by methanogenic archaea and its physiological consequences

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1
00:00:02,869 --> 00:00:01,429
hi i'm devin payne and i'm going to be

2
00:00:04,230 --> 00:00:02,879
talking about the reductive dissolution

3
00:00:05,910 --> 00:00:04,240
of pyrite by methanogens and its

4
00:00:07,349 --> 00:00:05,920
physiological consequences

5
00:00:09,430 --> 00:00:07,359
so we've shown that methanogens can

6
00:00:10,790 --> 00:00:09,440
reduce pyrite by growing these cells

7
00:00:12,070 --> 00:00:10,800
with either pyrite or chronological

8
00:00:13,509 --> 00:00:12,080
forms of iron and sulfur

9
00:00:14,950 --> 00:00:13,519
and we see that when the cells grow with

10
00:00:16,630 --> 00:00:14,960
pyrite they reduce it and produce

11
00:00:17,910 --> 00:00:16,640
sulfide that's measurable in solution in

12
00:00:20,310 --> 00:00:17,920
our biotic cultures

13
00:00:21,750 --> 00:00:20,320

but not in our abiotic microcosms and

14
00:00:23,189 --> 00:00:21,760
this research was published in the isme

15
00:00:24,790 --> 00:00:23,199
journal this year where we also showed

16
00:00:26,230 --> 00:00:24,800
that methanogens require direct surface

17
00:00:27,349 --> 00:00:26,240
access to pyrite to grow

18
00:00:28,790 --> 00:00:27,359
where when cells are provided with

19
00:00:29,509 --> 00:00:28,800
pyrite that's green solution they grow

20
00:00:31,109 --> 00:00:29,519
very well

21
00:00:32,709 --> 00:00:31,119
however when pirates sequester dialysis

22
00:00:34,310 --> 00:00:32,719
tubing we see no growth and this

23
00:00:36,470 --> 00:00:34,320
finding was further corroborated by our

24
00:00:38,630 --> 00:00:36,480
observations of cells growing in close

25
00:00:40,470 --> 00:00:38,640
contact with the minerals

26
00:00:42,630 --> 00:00:40,480
this growth on pirate has physiological

27
00:00:43,990 --> 00:00:42,640
effects at the level of cell size and

28
00:00:45,750 --> 00:00:44,000
the amount of iron per cell

29
00:00:47,510 --> 00:00:45,760
where pyrite grown cells are smaller and

30
00:00:49,350 --> 00:00:47,520
accumulate more iron than ferrous iron

31
00:00:51,110 --> 00:00:49,360
and sulfide grown cells

32
00:00:53,029 --> 00:00:51,120
this research was recently accepted in

33
00:00:55,029 --> 00:00:53,039
the journal bacteriology

34
00:00:57,430 --> 00:00:55,039
with that i would like to acknowledge my

35
00:00:59,110 --> 00:00:57,440
mentor dr eric spoyd our boyd lab

36
00:01:01,110 --> 00:00:59,120
members collaborators and our funding

37
00:01:01,590 --> 00:01:01,120
sources which includes the department of