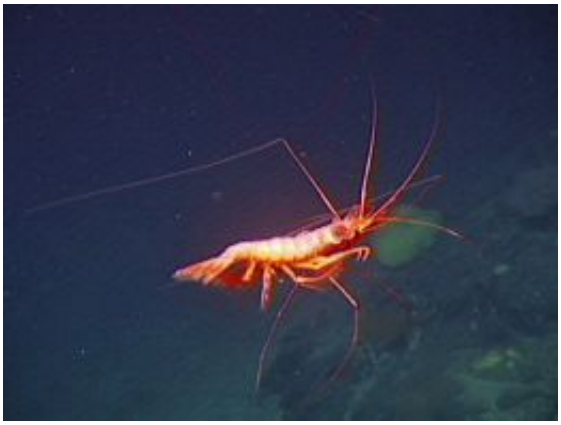
Study shows rising ocean acidification likely to cause shrimp to taste bad

December 23 2014, by Bob Yirka



A deep sea shrimp out in open water. Credit: National Oceanic and Atmospheric Administration

(Phys.org)—A study conducted by a small team of researchers with members from the U.K., Sweden and Canada has revealed that in the future as the oceans become more acidic, it appears likely that the taste of shrimp will become less appealing. In their paper published in the *Journal of Shellfish Research*, the team describes how they raised test shrimp in higher than normal acidic water and then held taste tests with volunteers.

Shrimp, as most everyone knows, is wildly popular the world over—but that popularity may be in jeopardy in the future if findings by the team with this new research prove true. Prior research has suggested that the

oceans are growing more acidic as they absorb more carbon dioxide from the atmosphere. That increase, the team suggests, along with an increase in temperatures is likely to cause stress to shrimp, which it now appears, will likely cause them to be less pleasurable to the human palate.

It is no secret that animals living under stressful conditions wind up suffering degradations in taste—slaughterhouses, for example, attempt to surprise cows, pigs, chickens, etc., with a sudden isolated swift death so that they (and the other livestock) will not stress about their fate beforehand. Now it appears that creatures living in the sea may surprise us in the future with how they taste if they are forced to live under increasingly stressful conditions.

The researchers raised shrimp for three weeks in water with a pH level of 7.5 (the level predicted for the oceans by 2100) rather than the normal 8—the water temperature was slightly higher than normal as well to reflect a gradual warming of the oceans by the end of this century. Other shrimp were raised under current normal conditions. All of the shrimp were cooked by professional chefs and fed to volunteer shrimp lovers who rated the shrimp on how well they tasted.

The researchers found that the shrimp raised under normal current conditions were 3.4 times as likely to be deemed the tastiest among all the shrimp, while those raised in acidic/warm water were found to be 2.6 times as likely to be described as the worst tasting. The researchers also found that the fish raised in the more acidic/warmer water were 1.6 times as likely to die during the three week test. Thus, unless shrimp learn to adapt to the new conditions so they will not feel stressed, they might just find their numbers increasing as people find them less tasty.

More information: First Evidence of Altered Sensory Quality in a Shellfish Exposed to Decreased pH Relevant to Ocean Acidification,

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ABSTRACT
Understanding how seafood will be influenced by coming environmental changes such as ocean acidification is a research priority. One major gap in knowledge relates to the fact that many experiments are not considering relevant end points related directly to production (e.g., size, survival) and product quality (e.g., sensory quality) that can have important repercussions for consumers and the seafood market. The aim of this experiment was to compare the survival and sensory quality of the adult northern shrimp (Pandalus borealis) exposed for 3 wk to a temperature at the extreme of its thermal tolerance (11°C) and 2 pH treatments: pH 8.0 (the current average pH at the sampling site) and pH 7.5 (which is out of the current natural variability and relevant to near-future ocean acidification). Results show that decreased pH increased mortality significantly, by 63%. Sensory quality was assessed through semiqualitative scoring by a panel of 30 local connoisseurs. They were asked to rate 4 shrimp (2 from each pH treatment) for 3 parameters: appearance, texture and taste. Decreased pH reduced the score significantly for appearance and taste, but not texture. As a consequence, shrimp maintained in pH8.0 had a 3.4 times increased probability to be scored as the best shrimp on the plate, whereas shrimp from the pH 7.5 treatment had a 2.6 times more chance to be scored as the least desirable shrimp on the plate. These results help to prove the concept that ocean acidification can modulate sensory quality of the northern shrimp P. borealis. More research is now needed to evaluate impacts on other seafood species, socioeconomic consequences, and potential options.

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