

# ACID DNASE ACTIVITY IN MUSSEL *MYTILUS GALLOPROVINCIALIS*: TEMPORAL VARIATIONS AND POLLUTION EFFECT

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## Abstract

Temporal variation in the level of acid DNase activity in gills and digestive glands of the mussels *Mytilus galloprovincialis* from pristine and polluted area were determined. Acid DNase activity is tissue specific and responsive to physiological requirements and environmental conditions. Preliminary data indicated acid DNase activity in mussel gills as promising biomarker of pollution.

**Keywords:** *Pollution, North Adriatic Sea, Enzymes, Mollusca*

## Introduction

New biomarkers of high sensitivity and low cost are widely investigated for marine biomonitoring purposes. Acid DNase activity has been demonstrated to be a useful biomarker for the assessment of toxic industrial pollutants in the freshwater snail [1] and in mussels from contaminated areas [2]. Our previous investigations showed that the exposure of mussels to model marine pollutants causes the increase of acid DNase activity in mussel hemocytes and hepatocytes indicating acid DNase activity as a promising biomarker [3]. In an attempt to better understand the natural and environmental changes in patterns on the acid DNase activity of *Mytilus galloprovincialis*, mussels are being collected on year basis. Preliminary results are presented.

## Material and Methods

During the one year, beginning August 2012, mussels (5-6 cm in length) were collected from two sites (reference – Crveni otok and one affected by pollution – ACI marina) located in the Rovinj area, Istrian coast, Northern Adriatic. Acid DNase activity was measured in digestive gland and gills according to Fafandel et al. [3].

## Results and Discussion

Acid DNase activity was detected in both tissues studied. The enzyme activity patterns in digestive glands and gills were not similar. In general, acid DNase activity was higher in gills than in digestive gland. In digestive gland maximal level occurs in October (Fig 1) while in gills maximal acid DNase activity was observed in January with no prominent peak in October (Fig 2). DNase activity increases in the period December - January in gills tissue but did not vary significantly in digestive gland where levels of enzyme activity during this period were consistently lower.

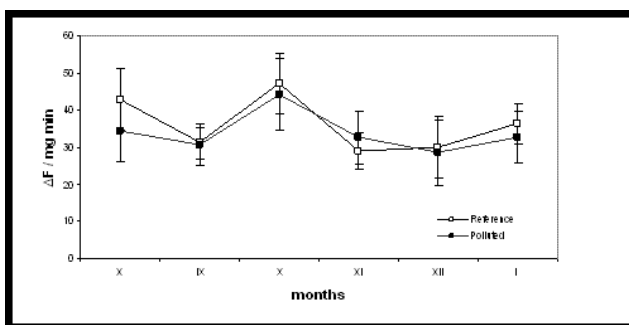


Fig. 1. Temporal variation of acid DNase activity in digestive gland of *Mytilus galloprovincialis* sampled from Crveni otok – reference (empty square) and ACI marina Rovinj – polluted (black square) in Adriatic sea, Croatia. (N=10)

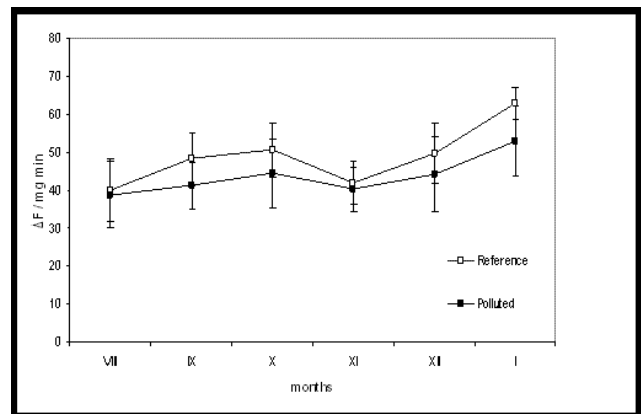


Fig. 2. Temporal variation of acid DNase activity in gill of *Mytilus galloprovincialis* sampled from Crveni otok – reference (empty square) and ACI marina Rovinj - polluted (black square) in Adriatic sea, Croatia. (N=10)

Difference in acid DNase activity due to the pollution impact in digestive gland was not as great as in gill tissue where enzyme activity was lower in mussels from polluted site. The highest difference in DNase activity in gills between reference and polluted site was in January.

Seasonal variations arise from a complex interaction between exogenous factors such as food availability, temperature and pollution and endogenous factors such as spawning. Spawning period was detected as significant increase of acid DNase activity in digestive gland in October due to the intense nucleic acid metabolism during gamete formation. Increase in acid DNase activity in gills during the December – January period reflects tissue-specific requirements probably due to lower temperatures during winter period. From the preliminary data presented in this work it can be concluded that DNase activity in gills can be promising biomarker of marine environmental contamination.

## References

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