

## Determination of target biogenic amines in fish by GC-MS: investigating seafood quality

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and aminoglycosides only in isolates from affluent waters.

**Conclusion:** The residual waters, upon arriving at urban wastewater treatment plant, are subjected to a depuration process to eliminate chemical and biological contaminants. However, our study revealed the presence of multiresistant bacteria in effluents, which allows their dissemination in the environment and its impact on public health.

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## Research and identification of *Cryptosporidium* and *Giardia lamblia* in wastewater treatment plants

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**Introduction:** *Cryptosporidium* spp. and *Giardia lamblia* are parasitic protozoa that are responsible for diarrhea and gastroenteritis in humans and animals. The most frequently identified source of infestation is water, and exposure involves either drinking water or recreation water. In young and old people as well as in immunocompromised individuals it can cause severe diarrhea, syndrome of malabsorption, growth delay and death.

Since the cysts and oocysts are resistant to some treatments used in domestic water systems it is important to understand if the treatment done in wastewater treatment plants (WWTP) is efficient or not. The aim of this work was to evaluate if treatment done in WWTP is enough to eliminate this infections forms.

**Materials and methods:** Samples of 3L were collected before and after the treatment in 7 WWTP of SIMTEJO in the great Lisbon area (Alcantara, Beirolas, Chelas, Ericeira, Frielas, Malveira and São João da Talha). All the samples were concentrated by centrifugation in Centrifuge 5810R (3500 rpm/3 min), followed by 24h of sedimentation. Microscopic analysis for research and identification of *Cryptosporidium* oocysts and *Giardia* cysts after different staining methods was done.

**Results:** Before treatment, all water samples presented *Cryptosporidium* oocysts and *Giardia lamblia* cysts. All the WWTP that have done the tertiary treatment with chlorine continue to present oocysts and cysts. Only WWTP of Beirolas and of Frielas that have used UV rays, as final treatment, did not presented the resistant parasitic forms (cysts and oocysts).

**Discussion and conclusions:** These results suggest that treatment with chlorine is not efficient to eliminate oocysts or cysts, which is in agreement with other studies as reported by Omarova et al. [1]. The presence of these resistant forms in water represents a risk factor of contamination of population in general, specially children, elderly people and immunocompromised individuals. The treatment of water should not be neglected.

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## Determination of target biogenic amines in fish by GC-MS: investigating seafood quality

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**Introduction:** Worldwide there is a strong requirement for food quality and safety [1], with the chemical and biological nature of hazards being the major concern. Fish degradation is a complex phenomenon where a series of events occur simultaneously, influencing each other and beginning immediately at the time of death [1]. Consequently, a reliable fish quality analysis is essential for consumer protection. Thus, the main aim of the present study was to develop an analytical approach based on sample treatment and GC-MS methodologies to detect biogenic amines as products of seafood degradation.

**Materials and methods:** For the GC-MS analysis two Atlantic fish species were selected (*Trachurus trachurus* and *Sarda sarda*). The fish were fileted and exposed to room temperature for 9 days (*T. trachurus*) and 13 days (*S. sarda*). Samples were collected every day and frozen (-80°C) for later analysis. Following the periods of exposure, stored samples, were homogenized in 75:25 Methanol: 0,4N HCl. Then, samples were treated and analyzed by GC-MS as described by Richard et al. [2].

**Results:** The results show that biogenic amines arise after two days of exposure in analysed fish samples. Following GC-MS analysis, putrescine, tyramine, spermine and spermidine emerged in two days and cadaverine and phenylethylamine after four days of exposure. However, cadaverine, spermine and spermidine decreased below LD (limit of detection) after nine days of exposure showing a different profile over exposure time.

**Discussion and conclusions:** The different biogenic amines profile found is compatible with the bacterial activity in sea food, namely biogenic amines which are usually produced by decarboxylation of free amino acids and transamination of aldehydes and ketones by the action of diverse microorganisms. Moreover, although GC-MS seems to be reliable technique to analyse biogenic amines in seafood samples more analysis should be performed focused on other sample treatment methodologies and cross-checking with other analytical techniques (e.g. LC-MS/MS and HPLC) until validation.

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## Assessment of fish quality: the Quality Index Method versus HPLC analysis in *Sarda sarda* (Bloch, 1793)

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