

Umweltbundesamt | Postfach 1406 | 06813 Dessau-Roßlau

European Chemicals Agency  
P.O. Box 400  
00121 Helsinki  
Finland

**Third party submission of information on potential candidates for substitution - Cybutryne (product type 21)**

Please find enclosed additional information from an ongoing project funded by the Federal Environment Agency of Germany (UFOPLAN 2011, FKZ 3711 67 432) on the inventory of leisure boats in Germany and concentrations of cybutryne and its major transformation product M1 in selected marinas.

The results presented below indicate reasons for concern for the aquatic environment, especially in freshwater environments. The submission emphasizes the need (a) to substitute the active substance cybutryne as soon as possible and (b) to restrict its utilization in the European Union during national product authorization.

On behalf of the Federal Environment Agency of Germany



Dir. u. Prof. Ingrid Nöh  
Head of Unit Biocides

**date:**

08.04.2014

**e-mail:**

einvernehmensstellebiozid@uba.de

**Umweltbundesamt**

Wörlitzer Platz 1  
06844 Dessau-Roßlau  
Tel.: +49 (0)340 21 03-0  
Fax: +49 (0)340 21 03-2285  
www.uba.de

Dienstgebäude Bismarckplatz  
Bismarckplatz 1  
14193 Berlin

Dienstgebäude Corrensplatz  
Corrensplatz 1  
14195 Berlin

Dienstgebäude Marienfelde  
Schichauweg 58  
12307 Berlin

Dienstgebäude Bad Elster  
Heinrich-Heine-Str. 12  
08645 Bad Elster

Dienstgebäude Langen  
Paul-Ehrlich-Str. 29  
63225 Langen

## Inventory of leisure boats in Germany and concentrations of cybutryne and M1 in selected marinas

The reliable inventory of boats and the regional distribution of marinas and further mooring sites is a prerequisite for robust calculations of environmental antifouling concentrations released from pleasure boats. For Germany, such area wide data are lacking so far. For that reason, a comprehensive survey was initiated and funded by the Federal Environment Agency (UFOPLAN 2011, FKZ 3711 67 432) with the aim of quantifying the amount of leisure boats in marinas and other locations in inland and coastal waters. In 2011, the laboratory LimnoMar (Hamburg) was engaged with this project, which will be finished by the end of 2014. In the following, some results were presented in extracts.

The census of the number of leisure boats at berth in German waters revealed a total of c. 206.300, whereby c. 146.400 (=71%) boats were located in freshwater, c. 54.100 (=26.2%) boats in brackish waters (salinity <18‰), and only c. 5.800 (=2.8%) boats in marine waters (salinity >18‰) (Fig. 1).

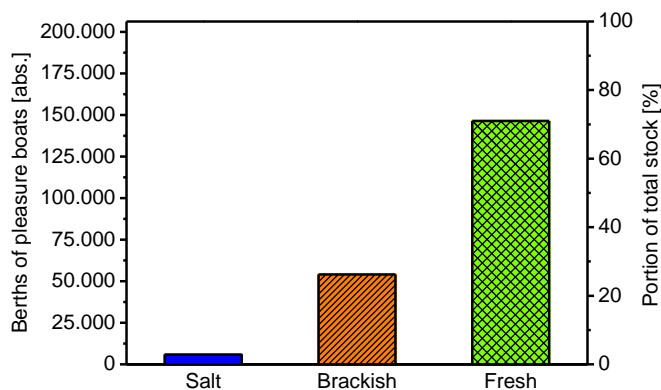


Fig. 1: Stock of pleasure boats at berth in German coastal and inland waters

On a regional scale, areas of high densities of leisure boats were identified at the western Baltic coast (40.000 berths), the Lower Elbe around Hamburg, the Ruhr district (10.000, each) in North Rhine-Westphalia, the lake district around Lake Müritz (19.000) in Mecklenburg-West Pomerania, the pre-alpine lakes incl. Lake Constance (23.000), and the Havel-Spree area in and around the city of Berlin (43.000).

Furthermore, on local inland scale marinas and landing stages are often closed-packed at lakefronts and riverbanks. Especially at slow running or stagnant water bodies those clusters of small marinas often exceed more than 1.000 berths in total (e.g. area of Berlin).

The structure and characteristics of freshwater harbours were quite heterogeneous and did not fit into a rigid classification scheme of 'closed' or 'open' harbours (Fig. 2). In this project 'closed harbours' were defined by a three-sided embankment. The rest was classified as 'open harbours'. Whereas 70 % of marinas at the North Sea were assigned as closed indicating the refuge character for ships during stormy periods, only 21 % of the inland marinas fulfilled this criterion. Thus the rest of 79 % of anchoring places at freshwater sites were more or less open to their adjacent water bodies.

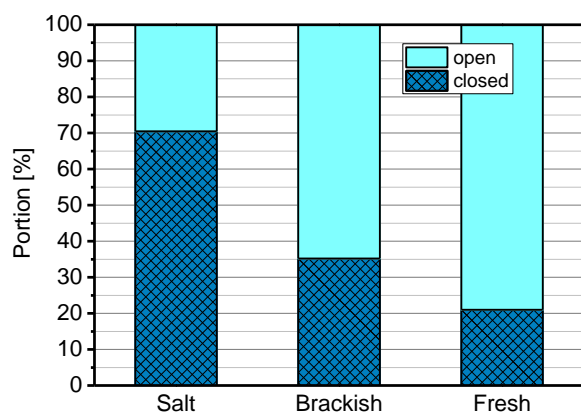


Fig. 2: Portion of “closed” and “open” of anchoring places in German coastal and inland waters

In conclusion, the density of leisure boats in German inland waters may be considerable both on a regional and a local scale due to its size and frequency. As a result, releases of active agents from anti-fouling hull coatings appear in those marinas and may affect the aquatic communities there as well as in their adjacent water bodies.

In the second work package of the project, water concentrations of currently used antifouling biocides were screened in 50 selected marinas in order to reason out the variety found in German leisure boat harbours. According to the quota of marinas addressed by the census at coastal and inland waters, 5 sampling sites situated at the North Sea (salt), 11 sites at the Baltic Sea and other brackish sites, and 34 at inland waters. Sampling was done in the middle of the marinas at 0.5 m water depth from July to August 2013. Among others, the antifouling agents cybutryne and M1 were quantified by use solid phase extraction and GC-MS.

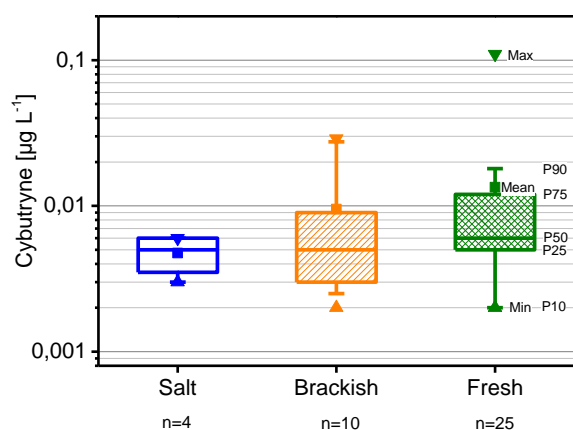


Fig. 3: Concentration of cybutryne as Box-Whisker-Plots in selected marinas at German coastal and inland waters

Cybutryne was quantified at 39 of 50 sites above LOQ (LOQ specified for each analytical run: Median 2 ng L<sup>-1</sup>, P10/P90: 1/5 ng L<sup>-1</sup>). For the total data set of all locations the median concentration was 6 ng L<sup>-1</sup>, whereas the 90 percentile was 20 ng L<sup>-1</sup> and the maximum 110 ng L<sup>-1</sup>.

M1 (GS 26 575) is a relevant transformation product of cybutryne in surface waters. The s-triazine M1 is also a relevant herbicidal agent (Fig. 3). Furthermore, it is at least as persistent as its parent compound cybutryne.

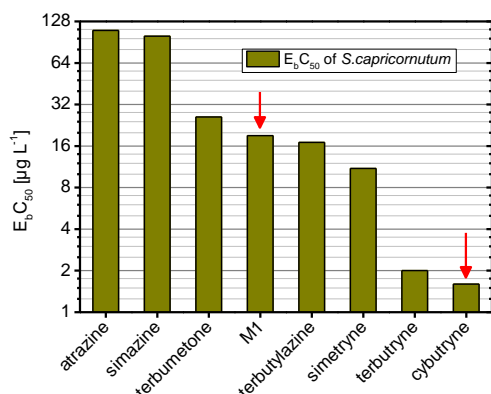


Fig. 4: Herbicide effects of cybutryne and its transformation product M1 among further s-triazines on the green alga *S. capricornutum* (compiled from Okumura et al. 2000, 2003)

M1 had been detected at 23 of 50 sites (LOQ: Median 3 ng L<sup>-1</sup>, P10/P90: 2/9 ng L<sup>-1</sup>). In total, the median concentration was 5 ng L<sup>-1</sup>, the 90 percentile was 14 ng L<sup>-1</sup> and the maximum 71 ng L<sup>-1</sup>.

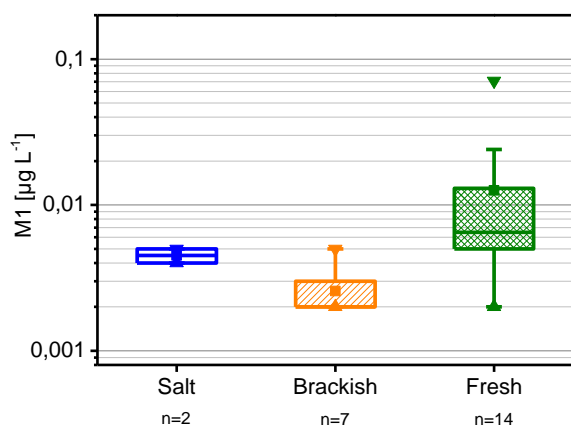


Fig. 5: Concentration of the transformation product M1 as Box-Whisker-Plots in selected marinas at German coastal and inland waters

If the concentration of the breakdown product M1 is added to the parent substance cybutryne (by molecular weight adjustment for cybutryne) to reckon the theoretical concentration of total cybutryne, a median concentration of 8 ng L<sup>-1</sup>, a 90 percentile of 32 ng L<sup>-1</sup> and a maximum 194 ng L<sup>-1</sup> were figured out for the total dataset.

Summing up, there might be some indications for a decline in the use of cybutryne in antifouling products over the past years (compare UBA 2007, Schulz 2013). However, it is still available in some AF-products on the German market (Bewuchs-Atlas e.V. 2012). In this survey, the occurrence of cybutryne and its breakdown product M1 inside the marinas denotes that it is actually widely in use. Furthermore, the median of 6 ng L<sup>-1</sup> and the 90 percentile of 20 ng L<sup>-1</sup> for cybutryne (incl. all sites) indicate reasons for concern for the aquatic environment at least for some locations. In addition, the occurrence of cybutryne in inland marinas is just as relevant as for marine sites since under slow flow or stagnant conditions and at high densities of leisure boats at berth also adjacent water bodies may be affected.

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