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Ecotoxicological assessment of valproic acid in aquatic organisms

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INTRODUCTION & AIM

Antiepiletic medication is frequently found in aquatic environments due to their increased use as well as lack of efficient wastewater treatment strategies.

Their presence in water endangers both fauna and flora, threatening the life of aquatic organisms.

Valproic acid (VPA), a commonly prescribed AED, is a known human teratogenic drug, although, its effects on aquatic organisms are still poorly understood.

The aim of this study is to evaluate the effects of VPA on aquatic organisms commonly used in ecotoxicological studies, *Lemna minor*, *Daphnia magna* and *Chlorella vulgaris.*

METHOD

Test organisms	Valproic acid	Duration	Parameters analysed
Lemna minor	0; 0,93; 4,65; 9,3; 23,25; 46,5; 93 mg/L	7 days	Number of fronds Length of the root Pigmentation
Chlorella vulgaris	0; 6; 12,5; 25; 50; 100 mg/L	48 hours	Growth rate
Daphnia magna	0; 6; 12,5; 25; 50; 100 mg/L	21 days	Viability of offspring Length of offspring Age of the postures

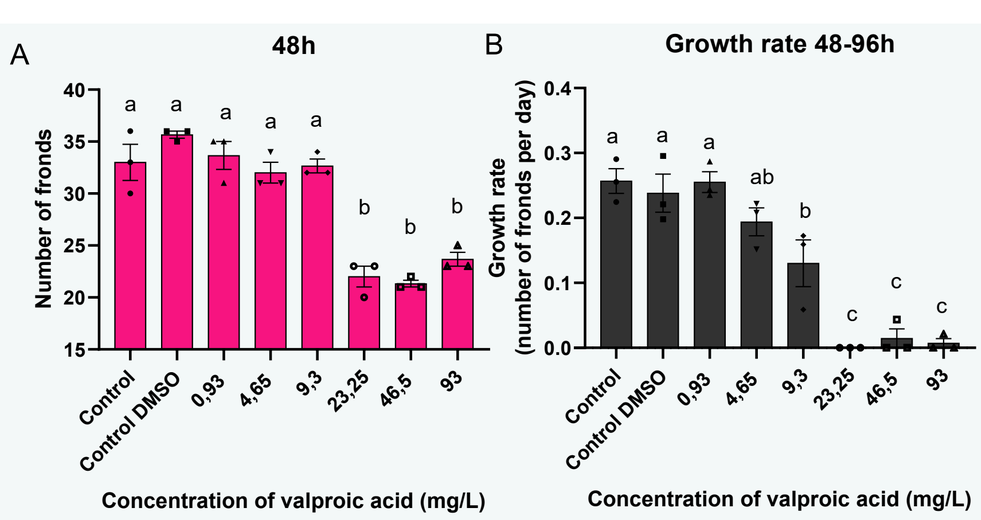
20 ±1°C
14h/10h

These testes were conducted using OECD Guideline 221, 201 and 211.

RESULTS & DISCUSSION

LEMNA MINOR

VPA decreased the number of fronds, growth rate, root's length and pigmentation of *L.minor*



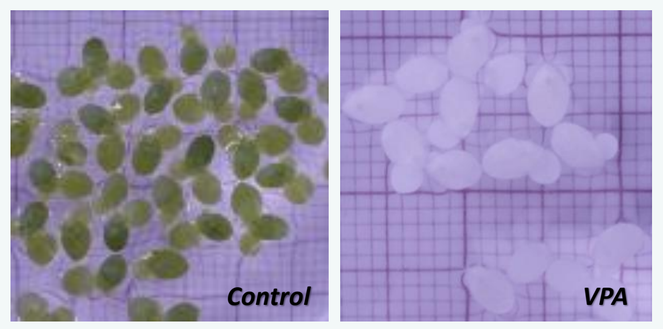
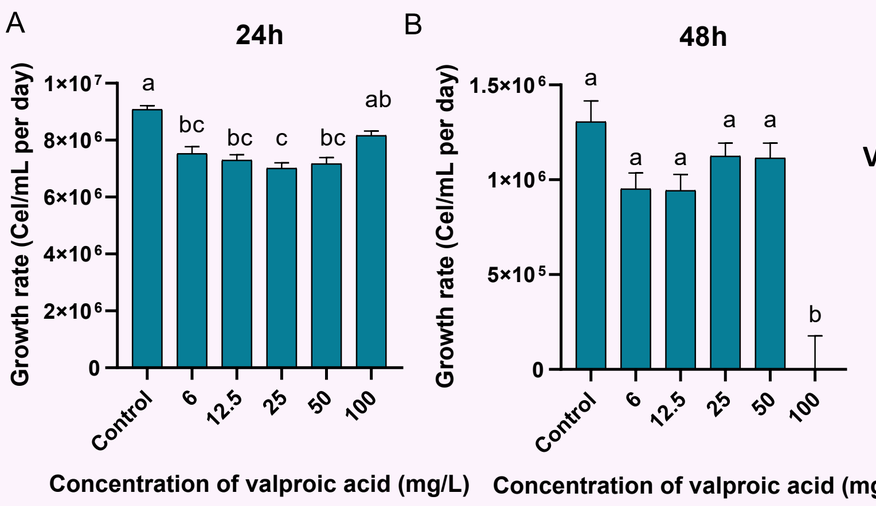


Figure 1. The effect of valproic acid on *Lemna minor*. The number of fronds, growth rate and root's length is represented in graphs A, B and C, respectivaly. The pigmentation loss is represented in images D.

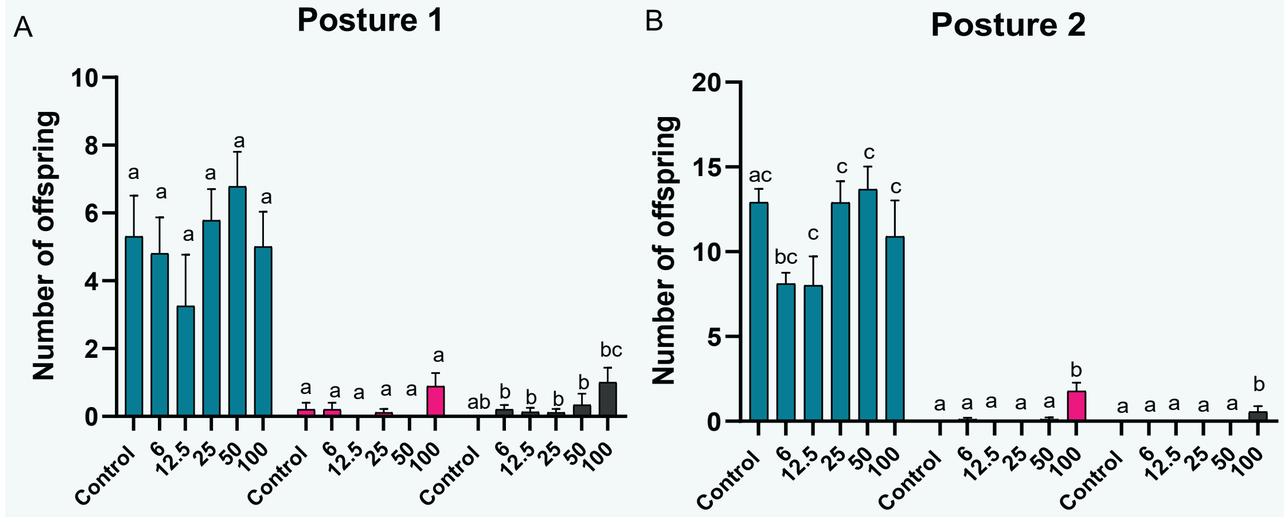
CHLOROELLA VULGARIS



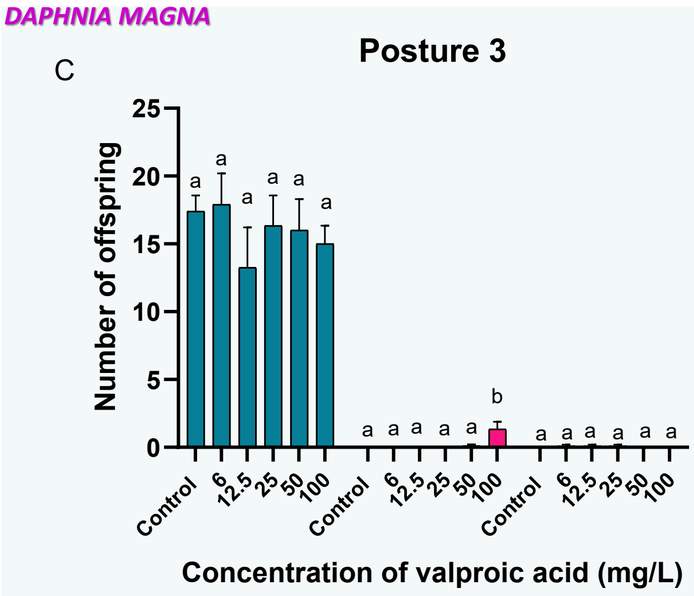
VPA decreased the growth rate, of *C.vulgaris*

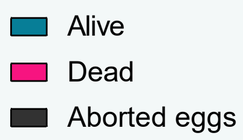
Figure 2. The effect of valproic acid on *Chlorella vulgaris*. The growth rate at 24 and 48h is represented in graphs A and B, respectivaly.

DAPHNIA MAGNA



DAPHNIA MAGNA





VPA negatively affected the number and viability of offspring.

VPA also slight delayed offspring's length as well as Daphnids age at each posture, although, not statiscally significant.*

Figure 3. The effect of valproic acid on *Daphnia magna*. The number and viability of the offspring are represented in graphs A, B and C, for the first, second and third posture, respectivaly.

*Data not shown

CONCLUSION

VPA has several harmful effects on the viability and reproduction of the organisms tested, which highlights the potential danger of VPA on aquatic environments.

FUTURE WORK / REFERENCES

More research should be done to elucidate the environmental concentration of this drug and its effects on further generations.