



LEDs light spectrum effect on the success of fragmentation and growth of the leather coral *Sarcophyton* spp.

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The increasing demand for soft corals is reflected on the high attention of the scientific community during the last decades, with several studies focus on production techniques and optimization of coral husbandry (Schlacher *et al.*, 2007; Sella and Benayahu, 2010). However, coral culture success is influenced by the interaction of different factors, such as water movement, temperature, nutrients, heterotrophic feeding and light conditions (Rocha *et al.*, 2013a). Light plays a key role in the growth, reproduction and physiology of scleractinian corals that host phototrophic symbionts and it has been found that the photoresponse of corals is species-specific. Several studies have already focused on the effects of irradiance on coral and its algal symbionts (Osinga *et al.*, 2011). Although, only a few works have investigated the role of the spectral quality of light on coral photobiology, physiology and growth (Rocha *et al.*, 2013b)).

In the present study, we hypothesize that light spectrum can influence the growth performance of scleractinian corals when exposed at identical intensities of photosynthetically active radiation (PAR). To test our hypothesis we evaluated the effect of contrasting light spectra with an identical PAR of $70 \pm 10 \mu\text{mol quantum}^{-2}\cdot\text{s}^{-1}$ emitted by T8 fluorescent lamps (used as a control treatment) and three different colours of Light Emitting Diode (LED), white, blue and red. It was evaluated survival and growth rates of *Sarcophyton* spp., an important scleractinian coral in the marine aquarium trade and for the bioprospecting of marine natural compounds. Replicated coral fragments were obtained from two mother colonies and were exposed to the four types of light spectrum for a period of 30 days. At the end of the experiment period, the results showed 100% of survival in coral fragments, and specific growth rate (SGR) of $0,055 \pm 0,09 \%$ /day in control group and $0,091 \pm 0,019 \%$ /day, $0,210 \pm 0,031 \%$ /day and $0,380 \pm 0,245 \%$ /day in, white, blue and red light, respectively. The results also showed a positive role of use a specific light spectrum in coral growth, namely blue and red spectrum. The use of light with specific light spectrum that increasing the growth and health of corals will minimizing the production costs, increasing the feasibility of ex situ production of ornamental scleractinian corals and this study identify the best LED's light spectrum for the growth of the leather coral *Sarcophyton* spp.

References

- Osinga, R., Schutter, M., Griffioen, B., Wijffels, R., Verreth, J.J., Shafir, S., Henard, S., Taruffi, M., Gili, C., and Lavorano, S. (2011). The Biology and Economics of Coral Growth. *Marine Biotechnology* 13, 658-671. doi: 10.1007/s10126-011-9382-7.
- Rocha, R.J.M., Calado, R., Cartaxana, P., Furtado, J., and Serôdio, J. (2013a). Photobiology and growth of leather coral *Sarcophyton* cf. *glaucum* fragments stocked under low light in a recirculated system. *Aquaculture* 414-415, 235-242. doi: <http://dx.doi.org/10.1016/j.aquaculture.2013.08.018>.
- Rocha, R.J.M., Pimentel, T., Serôdio, J., Rosa, R., and Calado, R. (2013b). Comparative performance of light emitting plasma (LEP) and light emitting diode (LED) in ex situ aquaculture of scleractinian corals. *Aquaculture* 402-403, 38-45. doi: <http://dx.doi.org/10.1016/j.aquaculture.2013.03.028>.
- Schlacher, T.A., Stark, J., and Fischer, A.B.P. (2007). Evaluation of artificial light regimes and substrate types for aquaria propagation of the staghorn coral *Acropora solitaria*. *Aquaculture* 269, 278-289. doi: <http://dx.doi.org/10.1016/j.aquaculture.2007.04.085>.
- Sella, I., and Benayahu, Y. (2010). Rearing cuttings of the soft coral *Sarcophyton glaucum* (Octocorallia, Aleyonacea): towards mass production in a closed seawater system. *Aquaculture Research* 41, 1748-1758. doi: 10.1111/j.1365-2109.2009.02475.x.

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