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Kappaphycus alvarezii farmed in Southern Brazil needs to be kept in tanks under controlled conditions of temperature during winter period until the sea conditions become favorable. The aim of this work was to establish the best fertilization regime for *K. alvarezii* during winterization using 25% effluent from the *Litopenaeus vannamei* shrimp reared in a biofloc system (BFT25) and its subsequent effect on growth and carrageenan production during the farming period. Three treatments (n=3) with different BFT25 fertilization regimes were run for four weeks: one week of fertilization and 3 weeks of cultivation just in seawater (SF); fertilization in alternated weeks (AF); and continuous fertilization (CF). In all treatments, seawater or BFT25 was changed weekly. 7 g L^{-1} of seedlings were cultivated in 50 L boxes, in 12 h photoperiod, 165 µmol photons m^{-2} s^{-1} irradiation, constant aeration, 23 ℃ temperature and 35‰ salinity. After the fertilization period, 100 g were removed from each experimental unit, transferred to the sea and cultivated for 5 weeks. In indoor conditions, the seedlings growth rate in SF and AF had no significant differences (0.67 ± 0.15 % day^{-1} and 0.74 ± 0.04 % day^{-1}) and were higher than CF (0.44 ± 0.07 % day^{-1}). All treatments showed similar carrageenan yield (22.45%, 22.71% and 21.33%, respectively). In the sea cultivation, the growth rates of AF and CF treatments had no significant differences (4.16 ± 0.19 %day-1 and 4.01 ± 0.06% day-1, respectively) and were higher than SF (3.46 ± 0.18% day^{-1}). Again, no significant difference in carrageenan yield was observed (21.63%, 20.53% and 19.91%, respectively). AF regime presented better growth results in indoor and outdoor conditions, and the carrageenan yield was not influenced by the treatments.

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The use of carbon dioxide followed by irradiance increment as a strategy to improve the cultivation of the red seaweed *Kappaphycus alvarezii* in tanks

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The tank cultivation of *Kappaphycus alvarezii* has been developed in Southern Brazil as an alternative when the sea temperature is low in winter time. This work aimed to verify if CO_2 and irradiance can be used as strategy to improve this species' tank cultivation. An initial biomass density of 21 g L-1 of seedlings were cultivated in vitro for two weeks with addition of three concentrations of CO_2: 0.1 L min^{-1} ($1CO_2$), 0.2 L min^{-1} ($2CO_2$) and 0.3 L min^{-1} ($3CO_2$) in irradiance of 50 µmol photons m^{-2} s^{-1}. After this period, the CO_2 addition was interrupted and plants were cultivated in higher irradiance (200 µmol photons m^{-2} s^{-1}) for more two weeks. Seedlings with no CO_2 addition were used as control (C). After the CO_2 addition phase and high irradiance phase, the growth rate (GR), chlorophyll a and carotenoids were determined, and samples of treatments and control were observed by light and transmission electronic microscopy. Significant differences in GRs were only observed in $2CO_2$ and $3CO_2$ treatments when the phase is considered. *K. alvarezii* from $3CO_2$ showed cell wall thickening and increasing quantity of starch granules, chlorophyll a and carotenoids than the control. After the irradiance phase, control samples showed stress signs as chloroplasts alterations, decrease in starch granules quantities and an increase in total chlorophyll a and carotenoids. However, samples cultivated with CO_2 showed increase in the quantity and size of the starch granules, mitochondria and Golgi complex. Such alterations suggest a cell response after CO_2 addition as a strategy to prepare the plants to growth when the cultivation conditions are appropriate.

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Effect of a carrageenan feed additive on pacific-white shrimp growth and white spot virus resistance

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The use of bioactive compounds from seaweeds is considered a sustainable alternative to improving the productivity of marine shrimp farms and minimize the losses caused by several diseases. The aim of this work was to evaluate the effect of carrageenan from *Kappaphycus alvarezii* as feed additive on growth performance of the white-leg shrimp *Litopenaeus vannamei* and their resistance after a white spot syndrome virus (WSSV) challenge. *L. vannamei* were reared in 800 L tanks for five weeks, at a density of 30 animals *per tank*, under controlled temperature (28.5 ℃), constant aeration and 100% daily water exchange. Four times a day, 4.5 g animals were fed with diets containing four concentrations of carrageenan: 0.5%, 1.0%, 1.5% and 2.0%. Shrimps fed with a non-carrageenan diet were used as control. The experiment was run in triplicate. After the rearing period, the growth performance and feed conversion were determined. For the WSSV challenge, 30 animals from each treatment and control were infected with the viral inoculum and the cumulative mortality was monitored for 96 h. There was no significant difference in weight gain and food conversion among treatments and controls. Final weight varied from 8.50 g to 10.30 g, and food conversion rate from 1.42 to 1.67. The results of WSSV infection showed that the control group had a higher mortality rate (36.7%) than the treatments (16.7%; 20.0%; 10.0%; 20.0% respectively). We conclude that although no significant differences on growth were detected among the treatments with carrageenan, there was a positive influence in reducing the mortality of *L. vannamei* infected with the white spot syndrome virus.

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Small-scale cultivation of *Chondracanthus chamissoi* in a suspended system in southern Chile

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Chondracanthus chamissoi (C. Agardh) Kützing is a species of economic importance, which is distributed from Peru to Chile forming beds between 0 and 15m deep in protected bays. This species is used for direct human consumption, either fresh or dry. In addition, it is used for the extraction of carrageenan for different uses in the food, pharmaceutical, and personal care industries. Through time, knowledge has been created to develop the cultivation of *C. chamissoi* , is possible to assert that the state of the art for this resource allows passing from the experimental or pilot level to small or medium scale. In this work, productive scale-up cultivation of 1 Ha was evaluated. Using a novel, low-cost system, compatible with the environment. It is based on the use of ropes and flotation elements, with 100-meter length cultivation units, 20 units per hectare. The selected