The comparative efficiency of a brown algal-derived biostimulant extract (AMPEP), with and without supplemented PGRs: the induction of direct, axis shoots as applied to the propagation of vegetative seedlings for the successful mass cultivation of three commercial strains of Kappaphycus in Sabah, Malaysia

ABSTRACT

Three strains of Kappaphycus spp. (viz. K. alvarezii tambalang brown and green and K. striatus sacol green) were used in the present study to optimize the use of Ascophyllum (Acadian) marine plant extract powder (AMPEP) as a culture medium ingredient acting as a biostimulant, applied with, and without, the addition of terrestrial plant growth regulators (PGRs). This was undertaken in order to develop management tools and best practice recommendations for the mass production of new plantlets (seedlings) for industrial, nursery, and out-planting purposes in eastern Malaysia, Sabah, and Peninsular Malaysia (i.e., Langkawi, Kedah and Batu Maung, Penang). After 45 days of laboratory incubation, the three strains tested demonstrated their best performances at 3 mg L−1 of AMPEP, supplemented with PGR. This evaluation was based on the longest direct axes formed, the shortest time to their appearance, and also their highest percentage emergence. Kappaphycus alvarezii (tambalang green) had the longest direct axes (7.0 ± 0.23 mm), followed by K. alvarezii (tambalang brown) at (6.4 ± 0.48 mm) and finally K. striatus (sacol green). In terms of the highest percentage of direct axes formed, K. alvarezii (tambalang brown), K. alvarezii (tambalang green), and K. striatus (sacol green) were recorded as follows: 100 ± 0.00, 99 ± 1.34, and 98 ± 2.66, respectively. The shortest duration taken for the emergence of direct axes was observed in K. alvarezii (tambalang green) followed by tambalang brown and K. striatus (sacol green) on days 9, 10, and 15, respectively. The use of a brown seaweed-derived extract acting as a biostimulant and as the main ingredient of the culture medium for the micropropagation of three strains of Kappaphycus was highly encouraging and one which may be promoted as a protocol for the economic and commercial mass production of new plantlets (asexual seedlings) which are an urgent requirement for Malaysian seaweed farming to meet its full potential.