



Research Article

Development of *In Vitro* Regeneration Protocol for Sweet Pepper (*Capsicum annuum* L.) using Cotyledon as ExplantMd. Kawsar Alam Nadim^{1✉}, Md. Monirul Islam¹, Tasnim Zerine Khan¹, Nusrat Binta Atiq², Mariom Mitu³ and Md. Imtiaz Uddin¹¹Biotechnology Division, Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh, Bangladesh²Plant Breeding Division, Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh, Bangladesh³Department of Biochemistry, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh

ARTICLE INFO	ABSTRACT
Article history Received: 12 May 2024 Accepted: 22 September 2024 Published: 30 September 2024 Keywords Boxplot, <i>Capsicum annuum</i>, Genotype, Regeneration, PGR Correspondence Md. Kawsar Alam Nadim ✉: nadim.kawsaralam@gmail.com	Plant tissue culture techniques offer a promising avenue for the efficient propagation of sweet pepper (<i>Capsicum annuum</i> L.), a valuable crop with significant agricultural importance. An effective and repeatable <i>in vitro</i> plant regeneration protocol was developed for the KKN-1 (Lemon yellow) and KKN-8 (Red) genotypes of sweet pepper. Utilizing cotyledonary leaf and cotyledonary node explants, various concentrations and combinations of growth regulators were tested for shoot rejuvenation. For both explants, MS medium supplemented with 8 mg/L BAP, 0.02 mg/L NAA, and 0.5 mg/L IAA was found to be most effective for achieving high rates of response and shoot induction. Notably, cotyledonary node explants outperformed cotyledonary leaf explants, displaying a remarkable 80% response within 11-12 days. Additionally, the supplementation of 1 mg/L IBA with MS medium significantly improved root initiation, with cotyledonary node explants exhibiting the highest responsiveness at 83.77%. Throughout all stages, the genotype KKN-8 (Red) consistently outperformed KKN-1 (Lemon yellow), including in the percentage of regenerated plant establishment.
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Introduction

Sweet peppers are the edible fruits of plants from the *Capsicum* genus of the Solanaceae family. The genus *Capsicum* has around 25 wild and 5 adapted species. *Capsicum annuum* L., *Capsicum chinense* Jacq., *Capsicum frutescens* L., *Capsicum baccatum* L., and *Capsicum pubescens* R and P, are the five adapted species (IBPGR, 1983). *Capsicum annuum* holds the utmost economic importance among all species, and it produces both mild and spicy fruits. *Capsicum annuum*, sometimes known as sweet pepper, pepper, or bell pepper is a widely grown vegetable crop worldwide. Many chemicals, such as steam-volatile oil, fatty oils, capsaicinoids, carotenoids, vitamins, protein, fiber, and mineral elements, are found in sweet peppers (Bosland and Votava, 2000). It is high in vitamins A, B-complex, C, and E, as well as minerals such as molybdenum,

manganese, phosphorus, and potassium. Because of their nutritional value, flavor, aroma, texture, pungency, and color, sweet peppers are used in a wide variety of foods, medications, and cosmetics (Shu *et al.*, 2022; Saleh *et al.*, 2018). They are also grown for their beautiful glossy fruits, which come in a variety of sizes, shapes, and colors including red, green, yellow, brown, and purple. They can be used as a vegetable, condiment, or spice to add color, taste, zest, and piquancy to many cuisines. *Capsicum* typically a summer crop in temperate countries, although sweet pepper is currently being widely grown in Bangladesh (Mahmud *et al.*, 2017). Although some advanced farmers sporadically cultivate capsicum, their production falls short of meeting the increasing demand from those residing in rural areas. (Saha and Salam, 2004).

Cite This Article

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