

Capsicum annuum

Tissue culture protocol profile built from the published literature



Family	Solanaceae
Common names	sweet pepper; Aichi; Aji de gallina; Ají; Bell Pepper; Bird Pepper; Capsicum, Chili, Green capsicum, Hot pepper, Paprika, Sweet pepper; Cayenne pepper
Authority	Capsicum annuum L., 1753
Literature scanned	17 Oct 2026

VERIFIED RECORDS

17

3 from full text

PAPERS

12

1992 - 2025

EVIDENCE

Limited

16 protocols graded

GRADE A / B / C

0 / 1 / 15

A = 3+ papers agree

Every figure below was extracted from a published sentence by a rule-based reader, re-derived by a second independent reader, and kept only if both agreed. Unclear sentences were skipped, not guessed. Check the cited paper and validate on your own material before relying on any protocol.

Key findings

- For shoot regeneration & multiplication, BAP is the most reported regulator (5 papers; typical 3–5 mg/L, median 4).
- No verified data yet for: somatic embryogenesis.

Recommended workflow

1

Surface sterilization

Evidence C

1% NaOCl · 10 min

1 paper. Reported by a single paper; treat as a lead to check, not an established protocol.

2

Callus induction

Evidence C

MS with 1 mg/L BAP + 0.1 mg/L IAA

1 paper. Reported by a single paper; treat as a lead to check, not an established protocol. Hormone balance: cytokinin-dominant.

3

Shoot regeneration & multiplication

Evidence C

Medium not stated with 2 mg/L Zeatin + 1 mg/L IAA, cotyledon explants. Median response 92%

1 paper. Reported by a single paper; treat as a lead to check, not an established protocol. Hormone balance: balanced.

4

Rooting

Evidence C

MS with 0.2 mg/L IAA. Median response 87%

1 paper. Reported by a single paper; treat as a lead to check, not an established protocol. Hormone balance: auxin only.

5

Acclimatization

Evidence B

Not specified substrate; survival 81%

2 papers. Two independent papers report this protocol.

Surface sterilization

#	Grade	Steps	Aseptic	Papers
1	C	1% NaOCl · 10 min	-	1

Rank 1 evidence [3]: "The seeds were sterilized with 1% (v/v) NaClO for 10 min, rinsed with deionized water five times, transferred to 200-well trays containing substrate (peat: vermiculite: perlite = 3:1:1, Shouguang Hengxian Agricultural Science and Technology Co., Ltd., Xingyuan Road, Gucheng Sub-district, Shouguang, Shandong Province, China), and then gro

Callus induction

#	Grade	Growth regulators	Explant	Medium	Outcome	Papers
1	C	BAP 1 + IAA 0.1 mg/L	-	MS	optimum reported, no figure	1
2*	C	IAA 2 + BAP 0.3 mg/L	-	MS	42%	1

Rank 1 evidence [1]: "The effect of MS + 4.44 μM 6-BA + 0.57 μM IAA treatment differed the most from the optimal condition, resulting in the production of only large calluses."

Shoot regeneration & multiplication

#	Grade	Growth regulators	Explant	Medium	Outcome	Papers
1	C	Zeatin 2 + IAA 1 mg/L	cotyledon	-	92%	1
2	C	BAP 8 + NAA 0.5 mg/L	cotyledon	MS	70%; 14-15 d	1
3	C	BAP 8 + NAA 0.02 + IAA 1 mg/L	leaf	MS	optimum reported, no figure	1
4	C	BAP 3 + Kinetin 2 mg/L	shoot tip	MS	optimum reported, no figure	1
5	C	GA3 0.5 mg/L	cotyledon	-	optimum reported, no figure	1
6	C	BAP 2 + IAA 0.5 mg/L	-	MS	optimum reported, no figure	1
7	C	BAP 4 + IAA 0.5 mg/L	-	MS	optimum reported, no figure	1
8	C	BAP 5 + IAA 1 mg/L	-	MS	optimum reported, no figure	1

Rank 1 evidence [2]: "The best combination so far was 2 mg/l of zeatin and 1 mg/l of IAA, resulting in 92% of regeneration from cotyledon explant."

Rooting

#	Grade	Growth regulators	Explant	Medium	Outcome	Papers
1	C	IAA 0.2 mg/L	-	MS	87%	1
2*	C	IAA 0.2 mg/L	-	-	optimum reported, no figure	1
3	C	NAA 1 mg/L	-	-	100%	1
4	C	IBA 0.5 mg/L	-	MS	optimum reported, no figure	1

Rank 1 evidence [1]: "The best rooting induction medium is MS + 1.14 μM IAA, with a rooting rate of 86.7%."

Acclimatization

#	Grade	Substrate	Survival	Papers
1	B	Not specified	81% (78-85)	2

Rank 1 evidence [4]: "The plantlets showed 77.5% survival during acclimatization and transplanting."

Rank 1 evidence [5]: "After hardening, the rooted plants were transferred to the greenhouse conditions where they grew, matured and flowered normally with a survival rate of 85%."

Typical growth regulator doses

One value per paper. Range = interquartile range with 3+ papers, otherwise min-max.

Rooting

Regulator	Papers	Typical range, mg/L	Median	Most common
IAA	1	0.2 - 0.2 (min-max)	0.2	0.2
IBA	1	0.5 - 0.5 (min-max)	0.5	0.5
NAA	1	1 - 1 (min-max)	1	1

Shoot regeneration & multiplication

Regulator	Papers	Typical range, mg/L	Median	Most common
BAP	5	3 - 5 (IQR)	4	4
IAA	5	0.5 - 1 (IQR)	1	1
GA3	1	0.5 - 0.5 (min-max)	0.5	0.5
Kinetin	1	2 - 2 (min-max)	2	2
NAA	1	0.26 - 0.26 (min-max)	0.26	0.26
Zeatin	1	2 - 2 (min-max)	2	2

Callus induction

Regulator	Papers	Typical range, mg/L	Median	Most common
BAP	2	0.3 - 1 (min-max)	0.65	0.3
IAA	2	0.1 - 2 (min-max)	1.05	2

Points to double-check

- Callus induction - close competitor: MS with 2 mg/L IAA + 0.3 mg/L BAP (1 paper).
- Rooting - close competitor: medium not stated with 0.2 mg/L IAA (1 paper).

References for quoted evidence

[1] Li X, Mushtaq N, Xing N, et al. (2024) Efficient In Vitro Regeneration System and Comparative Transcriptome Analysis Offer Insight into the Early Development Characteristics of Explants from Cotyledon with Partial Petiole in Small-Fruited Pepper (*Capsicum annuum*).. International journal of molecular sciences. doi:10.3390/ijms25147547

[2] Hyo-Geur. Park, Kyung-Young Choi, Do-Hyun Lee (1992) EFFECT OF EXPLANTS AND GROWTH REGULATORS ON SOMATIC EMBRYO-GENESIS AND ADVENTITIOUS ORGANOGENESIS IN CAPSICUM ANNUUM. HortScience. doi:10.21273/hortsci.27.6.618c

[3] Xia K, Hu P, Wu G, et al. (2025) Prohexadione calcium boosts pepper stem rigidity: coordinated regulation of hormonal crosstalk and lignin deposition drives xylem reinforcement.. BMC plant biology. doi:10.1186/s12870-025-07255-6

[4] Tilahun Hailu, Balcha Abera, Jiregna Daksa (2015) In Vitro Direct Organogenesis Protocol for Mass Propagation of an Elite Ethiopian Hot Pepper (*Capsicum annuum* L.) Cultivar: Mareko Fana. American Journal of Plant Sciences. doi:10.4236/ajps.2015.69143

[5] Mahmoud Otroschy, Kosar Moradi, Mojtaba Khayam Nekouei, et al. (2010) Micropropagation of Pepper (*Capsicum annuum* L.) Through in vitro Direct Organogenesis Organogenesis. Asian Journal of Biotechnology. doi:10.3923/ajbkr.2011.38.45

How to read this report

- Summaries combine different papers. Media, explants, genotypes and culture conditions differ, so trends are associations, not controlled comparisons.
- Grades reflect how many independent papers agree, not how good the science is. Always read the cited sentence and its paper.
- Papers without open-access full text are read from abstracts only, so some protocols will be missing.
- * close competitor: score within 15% of the leader. Doses are in mg/L after unit conversion.