



Contribution of Biofertilizers in Organic Certification of Horticultural Produce

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Organic horticulture emphasizes the production of safe, chemical-free fruits and vegetables through ecologically sustainable methods. Biofertilizers—microbial inoculants containing beneficial microorganisms—play a crucial role in improving soil fertility, nutrient availability, and plant productivity without using synthetic fertilizers. Their application is essential to meet organic certification standards. This article discusses the role of biofertilizers in securing organic certification, their mechanisms of action, ecological importance, application methods, and their contribution toward sustainable horticultural production.

Introduction

Organic certification is a legal mechanism that ensures horticultural produce is cultivated under approved organic standards, without chemical pesticides or synthetic fertilizers. Horticultural crops such as fruits, vegetables, spices, flowers, and plantation crops have high demand in domestic and international organic markets. Biofertilizers, due to their eco-friendly nature, cost-effectiveness, and soil-health improvement abilities, have become an essential input for organic farming. Their role aligns with the principles of “Soil Health – Nutrient Recycling – Safe Food Production”, which are key components of organic certification.

Concept of Biofertilizers in Organic Farming

Biofertilizers are **living microbial formulations** that, when applied to the rhizosphere, seeds, or soil, enhance nutrient uptake and promote plant growth naturally.

Major Categories of Biofertilizers Used in Horticulture

Category	Microorganisms	Role
Nitrogen-fixers	Rhizobium, Azotobacter, Azospirillum	Fix atmospheric N ₂
Phosphate solubilizers	Bacillus, Pseudomonas, PSF	Convert insoluble P to soluble form
Potassium mobilizers	Frateuria aurantia	Help K availability
Mycorrhiza (AMF/VAM)	Glomus, Gigaspora	Improves P & water uptake
Zinc solubilizers	Thiobacillus, Bacillus sp.	Makes micronutrients available
Consortium biofertilizers	Mixed strains	Used in fruits & vegetables

Importance of Biofertilizers in Organic Certification

Organic certification bodies (NPOP-India, USDA-NOP, EU Organic) **strictly prohibit chemical fertilizers**, making biofertilizers compulsory. Their use helps in the following ways:

Ensuring Chemical-Free Production

Biofertilizers replace chemical fertilizers, helping farmers comply with **organic norms**.

Improving Soil Fertility & Biological Activity

They enhance:

- Soil structure & aeration
- Organic matter breakdown
- Beneficial microbial population
- Nutrient mineralization

Nutrient Efficiency

Biofertilizers support:

- Nitrogen fixation (20–40 kg N/ha)
- Phosphorus solubilization
- Micronutrient mobilization
- Better nutrient uptake efficiency for horticultural crops

Quality Improvement of Produce

Biofertilizers enhance:

- Fruit size, color, aroma
- TSS (sugar content)
- Vitamin content
- Shelf life (important for certification)

Cost-Effective & Sustainable

They reduce dependency on chemical fertilizers, making **organic production economically viable**.

Mechanisms of Action in Horticultural Crops

Mechanism	Role in Organic Certification
Nitrogen Fixation	Replaces urea & chemical N
Phosphate Solubilization	Increases P availability naturally
Mycorrhiza Symbiosis	Helps water & nutrient absorption
Hormone Production	Boosts root growth & flowering
Disease Suppression	Reduces chemical pesticide need

Example Crops

Mango, banana, tomato, papaya, grapes, citrus, brinjal, capsicum, pomegranate, strawberry.

Role of Biofertilizers in Achieving Organic Certification

1. **Organic Nutrient Management Plan** → must include biofertilizers & manures.
2. **Input Traceability** → biofertilizers come with certificates and batch details.
3. **Residue-Free Produce** → helps pass certification tests.
4. **Soil Biological Health** → improves microbial biomass – a key certification parameter.
5. **Premium Market Value** → certified organic produce sells at higher price.

Application Methods in Horticultural Crops

Method	Dosage
Seed treatment	20–25 g/kg seed
Nursery root dip	1–2% suspension for 30 minutes
Soil application	5–10 kg/acre mixed with FYM
Drip fertigation	Liquid formulation use
Foliar spray (for PGPR)	2–3 ml/L water

Challenges in Adoption

- Poor-quality biofertilizers in local markets
- Lack of awareness among farmers
- Requires proper storage (cool & dark place)
- Response is slow compared to chemicals
- Must be **certified & GMO-free**

Conclusion

Biofertilizers are vital components of organic certification in horticultural crops. They enhance nutrient availability, soil fertility, productivity, and quality of produce—without causing environmental harm. With increasing global demand for chemical-free fruits and vegetables, biofertilizers will become the backbone of certified organic horticulture in the future.

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