



RATES PROJECT

Improvement of Rural Agricultural Technology Extension System in Asia

TECHNIQUE TO PREVENT GUMBLOOD DISEASE CAUSED BY *PHYTOPHTHORA SPP.* ON ORANGE TREES WITH THE PRODUCT Bio-VAAS.1



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MANUAL TECHNIQUE OF USING Bio-VAAS.1 PRODUCT TO PREVENT GUMBLING DISEASE CAUSED BY PHYTOPHTHORA SPP. ON ORANGE TREES

PART I. GENERAL INFORMATION

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PART II. GENERAL INFORMATION OF THE TECHNIQUE

1. Source of technique

The process is established based on the results of the State-level pilot production project "Improving the production technology and application of the biological product Bio-VAAS.1 to prevent gummosis caused by Phytophthora spp. on orange and durian trees", implemented period from 2022-2023 and the State-level research topic: "Research on production technology and application of synthetic biological products to control yellow leaf, root rot and gummosis on some fruit trees" from 2018-2020. The process was tested and adjusted to fit with local conditions in Cao Phong, Hoa Binh, with the support of AFACI.

2. Scope of application

This technique guides the use of Bio-VAAS.1 preparation produced from antagonistic bacteria *Bacillus siamensis* LHB15, antagonistic actinomycete *Streptomyces misionensis* LHS4 to control gummosis caused by *Phytophthora* spp. on orange trees in Hoa Binh province.



PART III. TECHNIQUE CONTENT

1. Dosage:

Type of fruit tree	Growth state	Dosage/treatment
Orange	Nursery	1 kg/ 1 ton of potting medium
		1.5 kg/ 1000m ² / watering
Orange (500 trees/ha)	New Planting	10 kg/ha (20g/tree)
		10 kg/ha (80g/tree)
	Basic	15 kg/ha (30g/tree)
	Construction	15 kg/ha (120g/tree)
	Business	40 kg/ha (80g/tree)
		40 kg/ha (320g/tree)
Irrigating	All states	5 kg/ha/watering

2. Nursery stage:

- Treatment of potting medium: Before planting, treat at a ratio of 1kg of preparation/1 ton of potting medium, watering 1-2 times/month with an amount of 1.5kg/1,000m²/time.

3. New planting:

- Treatment of planting holes: treat with Bio-VAAS.1 at a rate of 20g/orange planting hole, cover with a 3-5cm layer of soil, then place the tree and fill with soil. It is recommended to treat with Bio-VAAS.1 combined with composted organic fertilizer.

4. Basic construction and business stages:

- Treatment of the roots: Gently remove a thin layer of soil on the surface around the root, below the canopy (be careful to avoid breaking the roots), sprinkle Bio-VAAS.1 evenly on the surface and then fill with soil.



Basic construction stage, treat with 30g/orange tree. In the business stage, treat with 80g/orange tree.

- Treatment with the preparation twice a year: the first time at the beginning of the rainy season (May - June) and the second time in the middle to near the end of the rainy season (August - September); the preparation can be mixed with composted organic fertilizer and then applied. For orange growing areas in Cao Phong: 1st treatment in spring, post-harvest care combined with composted manure; 2nd treatment at the beginning of the rainy season (May - June).

- In the dry season: Water the preparation 1-2 times/month. Keep the soil moist enough when watering and treating the preparation.

5. Note:

- Separate the treatment time of Bio-VAAS.1 preparation from chemical and lime treatment by at least 20 days.

- Use Bio-VAAS.1 preparation when the weather is cool (early morning or cool afternoon). Keep the soil moist enough when treating with Bio-VAAS.1 preparation.