

Candlenut (*Aleurites moluccana*) Seed Export Treatment Using Nanotechnology with Microbial Antagonist Secondary Metabolites as a Preventive Drug: A Review

Title	Candlenut (<i>Aleurites moluccana</i>) Seed Export Treatment Using Nanotechnology with Microbial Antagonist Secondary Metabolites as a Preventive Drug: A Review
Author Order	3 of 3
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Abstract	<p>Candlenut seed quality is an important aspect of plantation commodities used to export from Indonesia. But, this commodities have many problems with export processing, such as infection and destruction by pest microorganisms, especially caused by quarantined pest microorganisms. To enhance germination, beneficial microbes that produce secondary metabolites produce biostimulants, such as plant growth enhancement, increased nutrient uptake, and improved plant resilience to pest stress. This review highlights the most viable alternative to seed treatment for preventive quarantine using nanotechnology, such as nanomaterials based on secondary metabolites of candlenut seeds. Secondary metabolites from microbial antagonists are beneficial for increasing plant productivity and production, but seed production is still not widely known and performed. In addition, nanoparticles can be used to absorb nutrients from secondary metabolites that must be protected before export inspection by a quarantine agency. The results are generally positive, but more scientific information needs to be acquired for candlenut crops and under variable quarantine export inspection to understand the effects of seed treatments. Keywords: candlenut seed, export, quarantine, nanotechnology</p>
Publisher Name	Bada Penerbitan Fakultas Pertanian (BPFP), Fakultas Pertanian, Universitas Bengkulu
Publish Date	2024-06-30
Publish Year	2024
Doi	DOI: 10.31186/aa.27.1.7-13
Citation	
Source	Akta Agrosia
Source Issue	Vol 27 No 1 (2024)
Source Page	7-13
Url	https://ejournal.unib.ac.id/Agrosia/article/view/35075/15019
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