

*Review*

# **Recent Advancements in Pathogenic Mechanisms, Applications and Strategies for Entomopathogenic Fungi in Mosquito Biocontrol**

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**Table S1** Recent research of fungal metabolites in mosquito control

Fungi	Target	Species	Extraction agent	Effective ingredient	Reference
<i>Aspergillus terreus</i>	Larvae Pupae	<i>Anopheles stephensi</i> <i>Culex quinquefasciatus</i> <i>Aedes aegypti</i>	Ethyl acetate Methanol	n-hexadecanoic acid; methyl 12,15-octadecadienoate; butyl 9-hexadecenoate; bis(hex-5-en-1-yloxy) (dimethyl)silane; 4-(2,3-imethoxybenzylidene)-3-methyl-1-(4-nitrophenyl)-2-pyrazolin-5-one; and 1,4 epoxynaphthalene-1(2H)-methanol, 4,5,7-tris(1,1-dimethylethyl)-3,4-dihydro	[49]
<i>Metarhizium anisopliae</i>	Larvae Pupae Adult	<i>Anopheles stephensi</i> <i>Aedes aegypti</i> <i>Culex quinquefasciatus</i>	Ethyl acetate	camphor; caprolactam; and monobutyl phthalate	[48]
<i>Metarhizium anisopliae</i>	Larvae	<i>Aedes aegypti</i> <i>Culex quinquefasciatus</i>	–	Cell free culture filtrates*	[124]
<i>Penicillium toxicarium</i>	Larvae Adults	<i>Anopheles gambiae</i>	Ethyl acetate		[82]
<i>Aspergillus lateralis</i> ; <i>Cladosporium</i> ; <i>Trichoderma</i> <i>Diaporthe</i> ; <i>Albifimbria</i> <i>Emmilia</i> ; <i>Sarocladium</i>	Larvae	<i>Aedes aegypti</i>	Ethyl acetate isopropanol		[125]

<i>Aspergillus niger</i>	FREP1 protein of Plasmodium	<i>Anopheles gambiae</i>		<i>P-orlandin</i>	[83]
<i>Fusarium oxysporum</i>	Larvae Pupae	<i>Anopheles stephensi</i> <i>Aedes aegypti</i> <i>Culex quinquefasciatus</i>	Ethyl acetate	carbonic acid, bis (1-methylethyl) ester; 4-heptanol, 2-Methyl; and 1-4-benzopyram-4-one-5, 6, 7, 8-tetrahydro-3-hydroxy-2-methyl	[46]
<i>Penicillium</i> spp.	Larvae	<i>Aedes aegypti</i> L <i>Culex quinquefasciatus</i>	Ethyl acetate		[126]
<i>Trichoderma asperellum</i>	Larvae	<i>Anopheles</i>	Methanolic extract	2,3-di hydro thiopene; p-cymene; alpha pinene; hexadecanoic acid; 8-methyl quinoline; (Z, Z)-9,12-octa decadienoic acid, methyl ester; and 2,3-dihydro-3,5-dihydroxy-6-methyl-4H-Pyran-4-one	[71]
<i>Aspergillus tamarii</i>	Larvae	<i>Aedes aegypti</i> <i>Culex quinquefasciatus</i>	Ethyl acetate	preg-4-en-3-one, 17. $\alpha$ -hydroxy-17. $\beta$ -cyano-; Trans-3-Undecene-1,5-diyne; and pentane, 1,1,1,5-tetrachloro-	[127]
<i>Penicillium daleae</i>	Larvae	<i>Culex quinquefasciatus</i> <i>Aedes aegypti</i>	Ethyl acetate		[128]
<i>Beauveria bassiana</i>	Larvae	<i>Culex quinquefasciatus</i>	Ethyl acetate	N-hexadecanoic acids; Z, Z-9,12 octadecadienic acid; 9-eicosyne; heptacosane; tetrateracontane; and 7 hexyleicosane	[46]

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<i>Penicillium</i> spp.	Larvae	<i>Culex quinquefasciatus</i>	Ethyl acetate	Propanoic acid, ethyl ester; Acetic Acid, Propyl Ester; Isopentyl Acetate; Acetic Acid, 2-Methylpropyl Ester; Behenic alcohol; 1-Hexadecene; 1-Octadecene; 1-Hexacosanol; N-Hexadecanoic acid; 1-Tetradecanol; 1-Dodecene; Tetradamine; and Octadecanoic acid	[129]
<i>Trichoderma longibrachiatum</i> ; <i>Trichoderma viride</i>	Larvae	<i>Aedes aegypti</i> <i>Aedes albopictus</i>	–	Cell free culture filtrates*	[84]
<i>Aspergillus</i> spp.	Larvae	<i>Aedes aegypti</i>	Ethyl acetate	Aspergillol B	[79]
<i>Aspergillus flavus</i>	Larvae	<i>Aedes aegypti</i>	-	aflatoxins (B1, B2, G1 and G2)	[70]

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\* Cell free culture filtrate: no extraction agent