

## Supplementary Materials

**Figure S1.** Locally available botanicals used against green mold pathogen of button mushroom under *in vitro* and *in vivo* condition.



*Juglans regia*



*Artemesia annua*



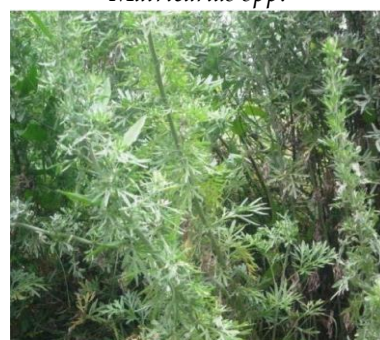
*Matricarias spp.*



*Urtica dioica*



*Mentha longifolia*



*Lavendula officinalis*



*Curcuma longa*



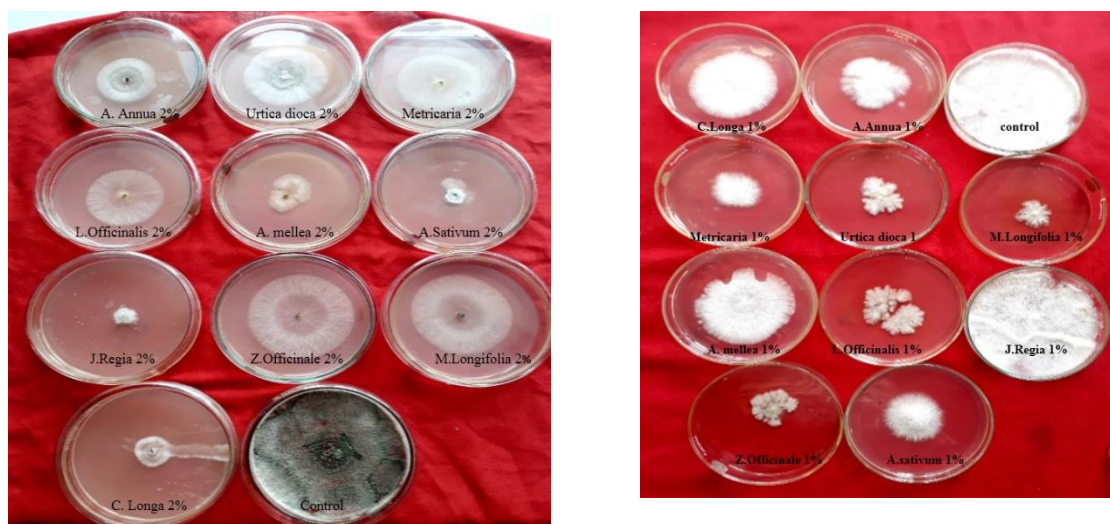
*Azadirachta indica*



*Allium sativum*



*Zingiber officinale*



Botanicals evaluated against *Trichoderma harzianum*      Botanicals evaluated against *A. bisporus*

**Figure S2.** *In vitro* evaluation of ethanol extract of botanical against pathogen (*T. harizianum*) and host (*A. bisporus*)

Where: A. Annua = *Artemesia annua*, L.officinalis = *Levendulla officinalis*, A. Mellea = *Azadirachta mellea*, A. sativum = *Allium Sativum*, J. Regia = *Juglans Regia*, Z. officinale = *Zingiber officinale*, M. longifolia = *Mentha longifolia*, C. longa = *Curcuma longa*

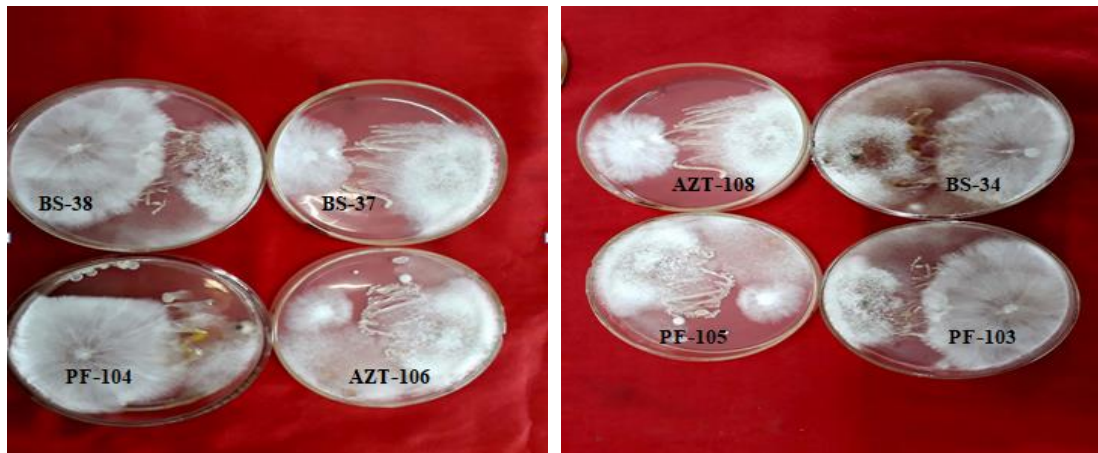


**Figure S3.** Evaluation of bioassay of bacterial antagonists and botanicals against the green mold disease of white button mushroom

A- Experimental layout

B, C, D- Integrated management components of botanicals and bacterial antagonists

E- Un-infested (Check-II)



BS =*Bacillus subtilis*, PF =*Pseudomonas fluorescens*, AZT=*Azotobacter* spp.

**Figure S4:** *In vitro* evaluation of bacterial antagonists against the green mold pathogen (*T. harzianum*) and white button mushroom (*A. bisporus*)

**Table S1: Mean sum of squares of botanical extracts**

Source of Variation	Degree of Freedom	Mean Sum of square	Grand Mean	C.V.
Effect of Botanical extracts on severity (%) of green mould disease of white button mushroom				
ENVIRONMENT-I				
Treatment	9	2.491*	2.968	0.15
ENVIRONMENT-II				
Treatment	9	2.949*	2.759	0.20
Pooled				
Treatment	9	0.379*	2.863	0.21
Environment	1	5.399*		
Interaction	9	0.409*		
Effect of Botanical extracts on number of fruit bodies				
Effect of Botanical extracts on diameter of pileus				
Treatment	9	670.23*	91.24	0.04
Effect of Botanical extracts on fruit bodies weight				
Treatment	9	115.97*	11.09	0.19
Effect of Botanical extracts on button yield				
Treatment	9	20.86*	10.11	0.16
Effect of Botanical extracts on weight of pileus				
Treatment	9	120.5*	8.32	0.30
Treatment	9	0.326*	3.422	0.56
Effect of Botanical extracts on weight of stipe				
Treatment	9	0.107*	4.464	0.44
Effect of Botanical extracts on diameter of stipe				
Treatment	9	0.492*	1.262	1.58
Effect of Botanical extracts on <i>Trichoderma harzianum</i>				
Botanical	9	459.51*	51.32	60.32
Concentration	2	45.71*		
Botanical × concentration	18	507.65*		
Effect of Botanical extracts on <i>Agaricus bisporus</i>				
Botanical	9	114.86*	51.32	60.32
Concentration	2	27.45*		
Botanical × concentration	18	132.41*		

**Significance at 5%**

**TableS2: Mean sum of squares of bacterial antagonists**

Source of Variation	Degree of Freedom	Mean Sum of square	Grand Mean	C.V.
Effect of Bacterial antagonists on severity (%) of green mould disease of white button mushroom				
ENVIRONMENT-I				
Treatment	10	14.491*	12.688	0.15
ENVIRONMENT-II				
Treatment	10	12.949*	10.473	0.20
Pooled				
Treatment	10	0.379*	13.580	0.21
Environment	1	5.399*		
Interaction	10	0.409*		
Effect of Bacterial antagonists on number of fruit bodies				
Treatment	10	119.759*	89.06	0.04
Effect of Bacterial antagonists on fruit bodies weight				
Treatment	10	52.606*	11.53	0.19
Effect of Bacterial antagonists on button yield				
Treatment	10	20.86*	9.21	0.16
Effect of Bacterial antagonists on weight of pileus				
Treatment	10	1.232*	6.679	0.30
Effect of Bacterial antagonists on diameter of pileus				
Treatment	10	0.326*	3.525	0.56
Effect of Bacterial antagonists on weight of stipe				
Treatment	10	0.107*	4.440	0.44
Effect of Bacterial antagonists on diameter of stipe				
Treatment	10	0.492*	1.264	1.58
Effect of Bacterial antagonists on <i>Trichoderma harzianum</i>				
Treatment	9	7.657*	90.96	3.6
Effect of Bacterial antagonists on <i>Agaricus bisporus</i>				
Treatment	9	10813*	30.32	2.7

Significance at 5%

**Table S3.** *In vivo* effect of botanical extracts on quality parameters of white button mushroom (*Agaricus bisporus*)

Treatments		Pileus weight (g)	Pileus Diameter (cm)	Weight of stipe (g)	Diameter of stipe (cm)
<i>Juglans regia</i>	0.5%	6.13 <sup>c</sup>	3.23 <sup>e</sup>	4.23 <sup>e</sup>	1.22 <sup>d</sup>
	1.0%	6.27 <sup>ab</sup>	3.47 <sup>c</sup>	4.37 <sup>cd</sup>	1.25 <sup>c</sup>
	2.0%	6.57 <sup>a</sup>	3.67 <sup>a</sup>	4.57 <sup>c</sup>	1.28 <sup>b</sup>
Sub mean		6.32	3.45	4.39	1.25
<i>Allium sativum</i>	0.5%	5.77 <sup>d</sup>	3.19 <sup>ef</sup>	4.34 <sup>cd</sup>	1.24 <sup>c</sup>
	1.0%	6.13 <sup>c</sup>	3.34 <sup>cd</sup>	4.47 <sup>c</sup>	1.28 <sup>b</sup>
	2.0%	6.51 <sup>a</sup>	3.47 <sup>c</sup>	4.68 <sup>ab</sup>	1.33 <sup>a</sup>
Sub mean		6.13	3.33	4.49	1.28
<i>Curcuma longa</i>	0.5%	5.91 <sup>d</sup>	3.24 <sup>e</sup>	4.53 <sup>c</sup>	1.22 <sup>d</sup>
	1.0%	6.13 <sup>c</sup>	3.43 <sup>c</sup>	4.74 <sup>ab</sup>	1.24 <sup>c</sup>
	2.0%	6.47 <sup>a</sup>	3.65 <sup>a</sup>	4.93 <sup>a</sup>	1.28 <sup>b</sup>
Sub mean		6.17	3.44	4.73	1.24
Check I (infested-untreated)		5.63 <sup>e</sup>	3.37 <sup>cd</sup>	4.13 <sup>f</sup>	1.22 <sup>d</sup>
Check II (uninfested-untreated)		6.63 <sup>a</sup>	3.59 <sup>ab</sup>	4.12 <sup>f</sup>	1.22 <sup>d</sup>
CD(p≤0.05)					
Control v/s rest		0.0338	0.0339	0.0875	0.0338
Botanicals		0.0199	0.0198	0.0198	0.0198
Concentration		0.0199	0.0198	0.0198	0.0198
Botanical × Concentration		0.0345	0.0343	0.0342	NS

Mean of three replicates; means followed by same letters are not significantly different at p = 0.05

**Table S4.** *In vivo* effect of bacterial antagonists on quality parameters of white button mushroom (*Agaricus bisporus*)

Treatments		Weight of pileus (g)	Diameter of pileus (cm)	Stipe weight (g)	Stipe diameter (cm)
<i>Psuedomonas flourescens</i> -104	0.5%	6.47 <sup>e</sup>	3.47 <sup>d</sup>	4.33 <sup>e</sup>	1.23 <sup>d</sup>
	1.0%	6.57 <sup>cd</sup>	3.53 <sup>c</sup>	4.49 <sup>d</sup>	1.26 <sup>bc</sup>
	2.0%	7.13 <sup>b</sup>	3.67 <sup>ab</sup>	4.77 <sup>a</sup>	1.33 <sup>a</sup>
Sub mean		6.72	3.55	4.53	1.27
<i>Bacillus subtilis</i> -38	0.5%	6.51 <sup>b</sup>	3.41 <sup>d</sup>	4.27 <sup>e</sup>	1.25 <sup>d</sup>
	1.0%	6.55 <sup>cd</sup>	3.44 <sup>d</sup>	4.31 <sup>d</sup>	1.29 <sup>b</sup>
	2.0%	6.63 <sup>c</sup>	3.61 <sup>ab</sup>	4.69 <sup>ab</sup>	1.34 <sup>a</sup>
Sub mean		6.56	3.48	4.42	1.29
<i>Azotobacter</i> -108	0.5%	6.43 <sup>e</sup>	3.33 <sup>e</sup>	4.33 <sup>e</sup>	1.21 <sup>de</sup>
	1.0%	6.47 <sup>e</sup>	3.37 <sup>e</sup>	4.63 <sup>c</sup>	1.25 <sup>d</sup>
	2.0%	6.55 <sup>b</sup>	3.47 <sup>d</sup>	4.73 <sup>a</sup>	1.33 <sup>a</sup>
Sub mean		6.48	3.39	4.56	1.26
Check I (infested-untreated)		6.49 <sup>e</sup>	3.57 <sup>c</sup>	4.17 <sup>f</sup>	1.19 <sup>de</sup>
Check II (uninfested-untreated)		7.67 <sup>a</sup>	3.91 <sup>a</sup>	4.13 <sup>f</sup>	1.23 <sup>d</sup>
CD(p≤0.05)					
Control v/s rest		0.0333	0.0338	0.0337	0.0338
Biocontrol agent		0.0195	0.0198	0.0197	0.0198
Concentration		0.0195	0.0198	0.0197	0.0198
Biocontrol agent × Concentration		0.0339	0.0343	0.0342	NS

Mean of three replicates; means followed by same letters are not significantly different at p = 0.05.