

Supplemental material

Fungal Bioaerosol Exposure and Its Effects on the Health of Mushroom and Vegetable Farm Workers in Taiwan

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Supplemental material, Table S1. Worker demographic characteristics and personal protection use (n = 53)

Demographic Data	<i>n</i> (%)
Sex	
Men	11 (20.75)
Women	42 (79.25)
Age (years; Mean \pm SD)	
All	45 \pm 13.67
Men	42 \pm 12.86
Women	46 \pm 13.78
Ethnicity	
Hokkien	29 (54.72)
Hakka	12 (22.64)
Aborigine	4 (7.55)
Chinese	4 (7.55)
Immigrant	4 (7.55)
Education	
Illiterate	4 (7.55)
Elementary school	9 (16.98)
Junior high school	13 (24.53)
Senior high school	21(39.62)
College	4 (7.55)
Graduate school	2 (3.77)
Job category	
Workers	40 (75.47)
Technicians	3 (5.66)
Part-time workers	3 (5.66)
Office workers	3 (5.66)
Other	4 (7.55)
Working years (Mean \pm SD)	6.77 \pm 8.24
Working hours per day (Mean \pm SD)	8.37 \pm 0.97
Smoking status	
Never	45 (84.91)
At least once	8 (15.09)
Wore working clothes	
No	10 (18.87)
Yes	43 (81.13)
Wore mask	
No	42 (79.25)
Yes	11 (20.75)

Wore goggles	
No	51 (96.23)
Yes	2 (3.77)
Wore gloves	
No	10 (18.87)
Yes	43 (81.13)
Wore working shoes	
No	8 (15.09)
Yes	45 (84.91)
Washed hands after work	
No	2 (3.77)
Yes	51 (96.23)
Washed hands with soap after work	
No	32 (60.38)
Yes	21 (39.62)

Approximately 80% of the workers were women, and 77% of the participants were ethnically Hokkien or Hakka, the main ethnic groups in Taiwan. The workers had been working on the mushroom and vegetable farms for approximately 7 years, generally for 8 h per day. Few of the workers wore masks (20.75%) or goggles (3.77%) at work, and most wore gloves (81.13%) and working shoes (84.91%). Most of the workers washed their hands after work (96.23%), and few used soap (39.62%).

Supplemental material, Table S2. Fungal bioaerosol concentrations at different area sampling sites on the five study farms

Farm type	Fungal Spores (spores m⁻³)	Culturable Fungi (CFU m⁻³)
First mushroom		
Compost preparation	8,794	4,759
Harvesting	2,009	2,511
Packaging	2.8×10 ⁴	1,963
Outdoor	510	49
Second mushroom		
Compost preparation	1.1×10 ⁵	3.1×10 ⁴
Harvesting	1.7×10 ⁵	5,496
Packaging	2.6×10 ⁴	8,928
Outdoor	5,159	749
First vegetable (fall)		
Uncultivated field	4,357	1,240
Cultivated field	5,363	988
Packaging	5,346	3,663
Outdoor	3,333	1,025
First vegetable (winter)		
Uncultivated field	4.2×10 ⁴	6,567
Cultivated field	1,653	402
Packaging	1,962	1,323
Outdoor	681	745
Second vegetable		
Uncultivated field	2,809	1,706
Cultivated field	857	1,007
Packaging	568	296
Outdoor	1,138	669
Third vegetable		
Uncultivated field	3.1×10 ⁵	5.1×10 ⁴
Lettuce cultivation	2,803	960
Courgette cultivation	3,105	1,073
Outdoor	3,908	<LOD ^a

^a LOD: Limit of detection

Supplemental material, Table S3. Distributions of worker lung function measurements on the five study farms ^a

Farm type	Measurement time	FEV ₁ (L)		FVC (L)		PEF (L s ⁻¹)		FEV ₁ /FVC (FEV1%)		FEF ₂₅ (L s ⁻¹)		FEF ₅₀ (L s ⁻¹)		FEF ₇₅ (L s ⁻¹)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
First mushroom (n=24)	Before work	1.95	0.49	2.13	0.56	4.19	1.64	91.95	6.67	4.12	1.64	2.98	1.30	1.63	0.98
	After work	1.99	0.57	2.23	0.67	4.09	1.48	90.04	7.40	3.92	1.48	2.99	1.29	1.48	0.86
Second mushroom (n=8)	Before work	2.04	0.47	2.09	0.48	5.15	1.83	97.78	2.27	4.70	1.67	3.89	1.65	2.11	1.19
	After work	2.00	0.85	2.28	0.95	4.00	1.97	87.44	14.71	3.54	2.15	3.00	1.60	1.91	1.09
First vegetable (fall) (n=7)	Before work	2.43	1.05	2.65	1.08	4.94	2.92	91.71	15.70	4.61	2.31	3.61	1.60	1.99	0.79
	After work	2.31	0.56	2.39	0.57	4.60	1.39	96.71	2.56	4.54	1.29	3.69	1.02	1.99	0.60
First vegetable (winter) (n=6)	Before work	2.30	0.47	2.37	0.43	4.94	1.34	96.83	3.54	4.82	1.26	4.37	1.47	2.32	0.80
	After work	2.16	0.52	2.24	0.50	4.33	1.68	96.17	4.49	4.15	1.50	3.70	1.68	2.09	0.91
Second vegetable (n=5)	Before work	2.12	0.33	2.25	0.18	5.06	1.65	94.20	7.91	4.99	1.79	3.55	1.18	1.68	0.78
	After work	2.14	0.33	2.23	0.25	5.71	1.55	95.60	5.31	5.57	1.63	3.84	1.33	1.73	0.65
Third vegetable (n=5)	Before work	2.77	0.57	3.20	0.78	5.69	1.77	87.40	7.63	5.27	2.03	3.51	0.73	1.61	0.27
	After work	2.88	0.53	3.59	1.09	5.16	0.95	85.00	9.92	5.00	1.03	3.78	0.31	1.38	0.27

^a FEV₁: Forced Expiratory Volume in 1 second; FVC: Forced Vital Capacity; PEF: Peak Expiratory Flow; FEF_{25, 50, 75}: Forced Expiratory Flow at 25%, 50%, and 75% of expired volume.