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## Occupational health hazards faced by workers in the minor chilli processing industry

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#### Abstract

The objective of the present investigation was to survey the occupational health hazards of dust faced by workers and to identify and assess personal protective equipment for workers in the minor chilli processing industry. To this purpose, 14 (9 males and 5 females) workers were selected deliberately and a planned timeframe was followed for collecting data. The chilli mill workers evaluation of dust hazards was carried out in five, three and two different types of respirable, skin and eye personal protective equipment respectively. All 14 workers at chilli mill were subjected to one-hour suitability checks for respirable protectors and accessibility tests for chosen PPEs. Results revealed that the majority of the workers in the chilli mill showed increased symptoms of skin itching, hacking, sputum and nasal drainage issues. The research has revealed that cotton matt dust mask (two layers) and dust safety goggles, as well as disposable plastic polythene hand gloves and industrial yellow rubber hand gloves, were regarded by the chilli mills workers to be best suited and acceptable.

**Keywords:** Chilli mill workers, dust hazards, symptoms, personal protective equipment

#### Introduction

Chilli is regarded as a commercial crop of spice. Various assortments are developed for different utilizations like vegetables, pickles, flavour and toppings. In everyday life, chillies are the main fixing in a wide range of foods around the planet as it adds sharpness, taste, flavour and shading to the dishes. Chillies are dried in the warm sun in tropical areas until they become light and papery while maintaining their pungence and red colour. The powdered dried chillies are often used in curries preparation. Several years previously, dried chillis used for the home were normally powdered, but in past few years, the grinding of dried chillis in a powder has become a massive business as a minor chilli processing industry. This is done by machinery that is supplied electrically or fuel in nearly every city and town.

These chilli mill units produce a generous amount of dust, particularly airborne dust because of fugitive emanations from different tasks, during milling operation workers are exposed to various degrees of particulate matter (PM). This is a major occupational health hazard to workers' respiratory framework, skin and eyes. There are three to eight employees in each mill, but the number of people working in that occupation must be significant given the enormous number of units around the country. There is a requirement for sufficient personal protective equipment's to minimize exposure to hazards that cause serious workplace diseases and disorders. The present investigation was conducted to survey the occupational health hazards of dust faced by workers and to identify and assess personal protective equipment for workers in the minor chilli processing industry.

#### Research Methods

The present study was conducted in Udaipur city. Fourteen (9 males and 5 females) chilli mill workers were selected deliberately for the study. These people worked for five to two decades in chilli mills. To generate information on self-reported health hazards, a survey questionnaire and interview procedure had been used. The workplace was also inspected thoroughly to understand the working environment. Data were analyzed utilizing weightage score and frequency.

Personal protective equipment (PPE) was selected that is commonly accessible on the market. Five types of respirable protective equipment as a disposable surgical face mask (2-ply), disposable surgical face mask (3-ply), cotton matty face mask (1-layer), cotton matty face mask (2-layers) and an agricultural dust mask.

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Three types of skin protective equipment as disposable plastic polythene hand gloves, yellow rubber hand gloves and disposable Cotton hand gloves. Two types of eye protective equipment are dust safety goggles and face shields. Respirable protective equipment was subjected to suitability checks for one hour each on 14 workers during the work duration and also an acceptability test was conducted on all PPEs to obtain a total acceptability score.

### Research Findings and Discussion

The results of this study were presented under the following

subheadings, together with the relevant discussions:

#### A general profile of the chilli mill workers

The data in Table 1 showed that the mean age of workers was 41.85 years (range 29 to 53 years), while the current industry average employment period was 12.85 years (range 5 to 25 years) and workers work duration was 8 hours per day. There were 4 present smokers, one was a former smoker, and 9 were no smokers. 8 (57.14 per cent) workers were literate and the rest were illiterate.

**Table 1:** General profile of the workers (n=14)

Survey content	Workers
Mean age (years)	41.35 years
Sex	9 (Male) 5 (Female)
Level of education	8 (literate) & 6 (illiterate)
<b>Smokers</b>	
Present smokers	4
Former smokers	1
No smokers	9
Average employment period in chilli mill (years)	12.85 years
Working time (h/day)	8

**Table 2:** Use of PPE by workers (n=14)

Type of personal protection	Workers
<b>Respiratory</b>	
Nuisance dust mask	–
Damp towel	8
Nil	6
<b>Hearing</b>	
Ear muffs	–
Ear plugs	–
Nil	14
<b>Vision</b>	
Goggles	–
Face shields	–
Nil	14
<b>Skin</b>	
Impervious gloves	–
Cotton gloves	–
Nil	14

#### Use of personal protective equipment

Personal Protective Equipment (PPE) was not available and was not used. The data in the Table 2 brought to the light that damp towels were used by workers more often than other personal protection devices. The workers in the chilli mill were not wearing masks and caps on their heads. The level of noise in the mill was higher, yet no earmuffs were utilized. Face masks are highly recommended in the workplace. This would assist to protect the health of workers from the dust, which emits in the workplace environment.

#### Dust emission sources at chilli mill

The dust emission sources at the chilli mill unit comprise of

two sections; Cleaning section: during the chilli unload, near chilli stem breaking unit, near the feeding hopper, near cyclone separator unit, near chilli powder collection unit and packaging area. Milling section: near grinding mill discharge, near the rotary hammer.

#### Health symptoms assessment due to chilli dust

Data in Table 3 showed the health concerning symptoms and dust allergy disorders among 14 workers in the chilli mill and it was discovered that the majority of the workers in the chilli mill showed increased symptoms of skin itching, hacking, sputum and nasal drainage issues.

**Table 3:** Distribution of subjects according to the reported dust symptoms (n=14)

S. No.	Symptoms	Strongly concurred	Concurred	Unsure	Denied	Strongly denied
1	Hack	3	5	–	4	2
2	Chest snugness	–	4	5	5	–
3	Dryness of the throat	2	3	1	6	2
4	Asthma	–	–	1	8	5
5	Dryness of the nose	–	3	4	7	–

6	Seeping of the nose	2	7	2	3	–
7	Sputum	1	5	3	5	–
8	Wheeze and watery eyes	3	2	1	7	1
9	Skin itching	4	3	3	2	2
10	Skin rash	–	1	5	6	2

### Identification and assessment of personal protective equipment's

Data in Table 4 showed that the characteristics to check the adequacy of respirable protective equipment when using breathing resistance, the sensation of tightness on the face, air spillage from edges, sweat intensity, any conversation problems as well as spoiling and smudging of protectors. To

identify varying performance capacity and discomfort levels, every performance indicator was further categorized into three categories, each low, medium and high. As for agricultural dust masks, their breathing resistance was discovered medium to high is because when the metabolism of workers is heightened then the breathing resistance of the mask gets high, hence workers felt difficulty in breathing.

**Table 4:** Frequency feedback by workers for various masks and performance indicators (n=14)

Performance indicator	Level	Respirable dust protectors				
		DSFM (2-ply)	DSFM (3-ply)	CMFM (1 layer)	CMFM (2 layer)	ADM
Breathing resistance	Low	10	9	10	8	1
	Med	4	5	4	5	5
	High	–	–	–	1	8
The sensation of tightness on the face	Low	9	8	4	4	4
	Med	4	6	10	8	6
	High	1	–	–	2	4
Air spillage from edges	Low	4	6	2	6	11
	Med	8	8	7	8	3
	High	2	–	5	–	–
Sweat intensity	Low	2	1	6	7	14
	Med	8	10	7	6	–
	High	4	3	1	1	–
Spoil and Smudge of Skin	Yes	1	1	–	–	–
	No	13	13	14	13	14
Conversation problem	Yes	–	–	–	–	–
	No	14	14	14	14	14

### Reparable dust protectors

Data in Table 5 showed that the maximum score was a cotton matty dust masks (2 layers) for the suitability test. The second

and third scores were disposable surgical face masks (3-ply) and agricultural dust masks.

**Table 5:** Suitability score for chosen respirable dust protectors

Performance indicator	Dust protectors code number				
	1	2	3	4	5
Breathing resistance	38	37	38	35	22
Sensation of tightness on face	36	36	32	30	28
Air spillage from sides	30	34	25	34	39
Sweat intensity	26	26	33	34	42
Spoil and Smudge of Skin	27	27	28	28	28
Conversation problem	28	28	28	28	28
Total Score	185	188	184	189	187

Weightage

Low = 3\*

Med = 2\*

High = 1\*

Yes = 1\*

No = 2\*

### Comparative acceptability of personal protective equipment's

Data in Table 6 showed that the acceptability score of PPE chosen by chilli mill workers. For respirable dust protectors, the cotton matty dust mask (two layers) scored first place. For eye dust protectors, dust safety goggles take top acceptance.

And lastly, for skin dust protectors, disposable plastic polythene and yellow rubber hand gloves both showed promising aspects to those who have allergic or burning reactions particularly in workers' hands since that part of the body is in regular interaction with the chilli.

**Table 6:** Acceptability score for chosen PPEs in the chilli mill (n=14)

Reparable dust protectors	Acceptability test rating			Score
	Excellent (3*)	Good (2*)	Okay (1*)	
Disposable surgical face mask (2-ply non-woven fabric)	3	9	2	29
Disposable surgical face mask (3-ply non-woven fabric)	7	7	–	35
Cotton Matty face mask (1 layer)	4	8	2	30
Cotton Matty face mask (2 layers)	9	5	–	37
Agricultural dust mask	4	9	1	31
<b>Eye dust protectors</b>				
Dust safety goggles	8	5	1	35
Face shields	3	8	3	28
<b>Skin dust protectors</b>				
Disposable plastic polythene hand gloves	10	4	–	38
Yellow rubber hand gloves	8	6	–	36
Cotton hand gloves	2	6	6	24

### Conclusion

This can be concluded that the workers at the chilli mill faced health hazards associated with workplace chilli dust, which include burning sensations, skin itching, hacking, eye irritation, sputum and nasal drainage. The majority of workers were wearing Damp towels as breathing dust protectors. None of the workers was using appropriate personal protective equipment's to protect themselves. Awareness of the usage of PPEs, such as face masks, hand gloves, eye gear and earmuffs should be emphasized and encouraged among chilli mill workers.

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