

Short Communications

Airborne irritant contact dermatitis from phosphates in a fertilizer factory

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Case Report

A 46-year-old non-atopic man presented with a 5-year history of a work-related burning, itchy rash on the face and hands. He had been working in a dusty factory making mineral fertilizers for 23 years as a plant operator. Raw materials used in production included rough, dry, wet and baked phosphates (Table 1). The patient wore protective clothing and sometimes gloves, but never any facial protection. There was marked erythema, edema and scaling of the cheeks, nasolabial folds, eyelids, retroauricular areas and neck to be seen, as well as erythema and scaling of the wrists and finger webs.

He was patch tested with the TRUE Test standard series and with a series comprising 1% and 2% pet. of rough, dry, wet and baked phosphates, applied in Square Chambers with Micropore, according to US guidelines (1). There was a + reaction to epoxy resin in the standard series at both D2 and D3, which was of past rather

than current relevance. Several preparations in the phosphates series showed mild irritant reactions at D2, which had faded by D3 (Table 2). The patient was thus diagnosed as having occupational airborne irritant contact dermatitis from phosphates. He was transferred to a laboratory setting where he was no longer exposed to dust particles in the air, with clearance of the lesions.

Discussion

Occupational airborne contact dermatitis has been reported with increasing frequency in recent years (2–4), solid particles being the most frequently reported, rather than gases or droplets. There are few reports of fertilizers causing occupational contact dermatitis. 5 patients developed airborne irritant contact dermatitis after manually scattering them (5). 10 of 54 workers in a mineral fertilizer factory developed dry skin and red scaly hands and wrists (6). No patch testing was performed in any of these patients.

Guinea pig studies have demonstrated skin changes compatible with irritancy of mineral fertilizers (7). Occupational contact allergy to calcium ammonium nitrate in fertilizer (8) and nickel in a fertilizer factory (9) have been reported. Recently, occupational skin contamination with radioactive ²¹⁰Pb and ²¹⁰Po from the dust of phosphated fertilizers has also been reported (10).

References

1. Marks J G, Belsito D V, De Leo V A et al. North American contact dermatitis group patch test results for the detection of delayed hypersensitivity to topical allergens. *J Am Acad Dermatol* 1998; 38: 911–918.
2. Doms-Gossens A E, Debusschere K M, Gevers D M, Dupre K M, Degreef H J, Loncke J P, Snauwaert J E. Contact dermatitis caused by airborne agents. *J Am Acad Dermatol* 1986; 15: 1–13.
3. Doms-Gossens A E, Deleu H. Airborne contact dermatitis: an update. *Contact Dermatitis* 1991; 25: 211–217.
4. Huygens S, Goossens A. An update on airborne contact dermatitis. *Contact Dermatitis* 2001; 44: 1–6.

Table 1. Different forms of phosphates

Substance	Chemical composition
rough phosphate	Ca ₃ (PO ₄) ₂ + CaCO ₃
dry phosphate	Ca ₃ (PO ₄) ₂ + CaCO ₃
baked phosphate	Ca ₃ (PO ₄) ₂ + CaO
wet phosphate	Ca ₃ (PO ₄) ₂ + CaCO ₃
water R.W.	0.01% H ₂ O [Cl ⁻]
water M.W.	0.1% H ₂ O [Cl ⁻]

Table 2. Results of patch tests with phosphates series

Substance	D2	D3
rough phosphate 1% pet.	?+	—
rough phosphate 2% pet.	?+	—
dry phosphate 1% pet.	?+	—
dry phosphate 2% pet.	—	—
baked phosphate 1% pet.	—	—
baked phosphate 2% pet.	—	—
wet phosphate 1% pet.	—	—
wet phosphate 2% pet.	?+	—

5. Kovalenko M I. Dermatitis caused by mineral fertilizers. *Vest Dermatol Venereol* 1969; 43: 87–88.
6. Gura A N, Mazina N M, Bukhova V P, Kurshakova T S, Fedorov S M. The pathogenesis of dermatoses due to contact with mineral fertilizers. *Vest Dermatol Venereol* 1990; 6: 36–38.
7. Gura A N, Fedorov S M. Morphological skin changes in the action of complex mineral fertilizers. *Vest Dermatol Venereol* 1990; 7: 41–42.
8. Pasricha J S, Gupta R. Contact dermatitis due to calcium ammonium nitrate. *Contact Dermatitis* 1983; 9: 149.
9. Pecegheiro M. Contact dermatitis due to nickel in fertilizers. *Contact Dermatitis* 1990; 22: 114–115.
10. Santos P L, Gouvea R C, Dutra I R. Human occupational radioactive contamination from the use of phosphated fertilizers. *Sci Total Environ* 1995; 162: 19–22.