

CONTACT HYPERSENSITIVITY TO MUSTARD KHAL AND MUSTARD OIL

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This report describe 2 females patients having contact dermatitis due to mustard khal—the residue of mustard seeds after the oil has been extracted out. The dermatitis was caused by mixing mustard khal with the cattle feed and was occurring on the hands and forearms, though the face, ear-lobules and neck were also involved because of the practice of applying mustard oil on the hair. Patch tests were positive with the mustard khal and its fractionation products in both the patients and with mustard oil in one patient.

Key words : Contact hypersensitivity, Mustard khal, Mustard oil.

Mustard (*Brassica juncea*) is a common crop grown in northern India. Its seed is utilized for extracting an oil (mustard oil) which is used for cooking as well as local massage for the hair and skin. In addition, this oil has antibacterial as well as antifungal activity and is thus also used as a household remedy for common skin ailments. After the oil has been extracted out, the residue of the seeds contains a significant amount of proteins and other nutrients. This is called *mustard khal* in the local language and is used in combination with other types of fodder for feeding the cattle. Recently, we observed two patients who developed contact dermatitis due to handling the mustard khal for animal feed, and mustard oil for local applications.

Case Reports

Case 1

The patient was a 47-year-old female who had been developing itchy, erythematous, papulo-vesicular lesions on both her hands ever since she was 15-year-old. Subsequently, she became aware that her dermatitis worsens on preparing the cattle feed; and avoiding that work leads to recovery. There was no dermatitis on any other part of her body though she was continuing to

apply mustard oil on her scalp hair and skin. For the last 8 months, she had not prepared cattle feed at all, and thus there had been no dermatitis on her hands. However, she developed itching and erythematous papular lesions on her forearms, arms, neck, forehead, ear-lobules and sides of the face. These lesions had been persistent for the last 8 months except when she was taking treatment.

Since she was a farmer-woman, her first patch tests included the common insecticides (Flit, andrene, chlorobenzene, DDT) and fertilizer urea 10% in water, in addition to mustard khal. Positive reaction was obtained with the mustard khal only. In the next set of patch tests, positive reactions were obtained with the mustard khal, the ether-soluble fraction of mustard khal, and mustard oil used by the patient. Milder reactions were also obtained with jawar flour (*Sorghum vulgare*) and wheat flour (*Triticum aestivum*), while patch tests with the flours of bajra (*Pennisitum typhoides*) and gram (*Cicer arietarium*) and wheat husk were negative. For the next set of patch tests, mustard khal was extracted 5 times with 5 times the volume of solvent ether, the ether-soluble fraction (ESF) was decanted and evaporated to dryness, while the ether-insoluble residue (EIR) was further extracted with diethyl acetone in the same manner. The acetone-soluble fraction (ASF) was also evaporated to dryness

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and the acetone-insoluble residue (AIR) was also preserved for patch tests. Patch tests were done with all these fractions in addition to the mustard khal, mustard oil, leaves, flower and seeds of *Argemone mexicana* and flours of jawar and wheat. Patch tests were positive with all these agents except the flower of *Argemone mexicana*. The patch test reactions with the ether and acetone residues of mustard khal were far severer compared to those with the ether and acetone soluble fractions and the mustard oil. The cupric acetate test¹ for the presence of *Argemone mexicana* as a contaminant in the mustard khal and mustard oil used by the patient was negative.

Case 2

The second patient was a 35-year-old female who was having itching and erythematous papules on her both forearms, forehead, cheeks, ear-lobules, neck and dorsum of both feet for the last 1½ years. The lesions were persisting ever since, though there was a slight improvement between October and February or when she was taking treatment. The first patch tests with *Parthenium hysterophorus*, *Lantana camara*, *Calotropis procera*, *Gravillea robusta* (silver oak), *Eucalyptus sp*, *Sarsa indica* (ashok) and *Azadirachta indica* (neem) were negative. Since she was a farmer, the second set of patch tests included seeds and leaves of jawar (*Sorghum vulgare*), wheat (*Triticum aestivum*), bajra (*Pennisitum typhoides*) and maize (*Zea mays*), leaf of sugarcane (*Saccharum afficinatum*), grass (*Cynodon dactylon*), mustard khal and mustard oil. Positive reactions were obtained only with the leaf of maize and mustard khal. For the next set of patch tests, mustard khal was extracted with solvent ether and diethyl acetone in the same manner as described earlier. Patch tests were done with the mustard khal used as such and its four fractions; mustard oil; leaf, flower and seeds of *Argemone mexicana* and leaf of maize. Positive reactions were obtained with ether and diethyl acetone insoluble residues and mustard

khal only. Cupric acetate test for *Argemone mexicana* in the mustard khal and the mustard oil brought by the patient was negative.

Comments

Contact dermatitis has been recorded with clove oil,² sesame oil,³ costusroot oil,⁴ castor oil,^{5,6} olive oil,⁷ and jojoba oil,⁸ but to our knowledge mustard oil and mustard khal have not been reported to cause contact dermatitis, although Gaul 1964² has reported a patient having contact hypersensitivity to the synthetic oil of mustard. There is however, an unconfirmed^{9,10} belief that mustard oil is an irritant. This belief, however, seems untenable because mustard oil is extensively used in a major part of north India and there is no confirmed report of irritant dermatitis or contact hypersensitivity to this agent. On the other hand, contact hypersensitivity to *Argemone mexicana* has been reported by us earlier.¹¹ This is a wild shrub which grows in vacant plots, foot paths and along side the fields in several Indian states. Its seeds are similar to those of mustard and when *Argemone* grows by the side of mustard fields, these frequently contaminate the mustard seeds¹ and thus the products made from mustard. The positive patch test reaction with *Argemone mexicana* in case 1 led to the suspicion that the dermatitis in case 1 may actually be due to contamination of the patient's mustard oil and khal with *Argemone mexicana*. The test for *Argemone mexicana* in the patient's mustard oil and khal were however negative, confirming that our patient was hypersensitive to mustard itself. Even otherwise, the patch test reactions with mustard oil and khal were far severer compared to the reactions with *Argemone mexicana*.

The causative antigen(s) in mustard khal could not be extracted out by repeated extractions with ether and acetone. In fact, the antigen(s) seemed to be insoluble in these solvents.

In order to evaluate if mustard oil and mustard khal can be irritants, patch tests were undertaken with these agents on 29 individuals taken as controls. Mustard oil produced a positive reaction in 1 case only, while mustard khal was positive in 12 cases. These findings suggest that mustard oil is not an irritant though mustard khal can lead to an irritant reaction in some individuals due to a relatively higher concentration of the causative agent(s). Further studies are essential.

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