

THE IDEAL BASE FOR PATCH TESTING

Ashok Kumar Bajaj and Arun Chatterjee

A study was conducted to find out a suitable vehicle for patch testing in India. Various bases tested were petrolatum, propylene glycol, polyethylene glycol 400, lanolin, olive oil and plastobase. The observations suggest that polyethylene glycol 400 is the most suitable vehicle for patch testing.

Key words : Bases, Petrolatum, Propylene glycol, Polyethylene glycol 400, Olive oil, Lanolin, Plastobase, Usage test.

A base is required for patch testing various chemical and pharmaceutical antigens in an appropriate concentration. An ideal base should not produce frequent positive/false positive reactions. Keeping this in mind, various bases have been evaluated in the present study in an effort to find out the most suitable base for a tropical country like India.

Materials and Methods

The subjects attending contact dermatitis clinic of MLN Medical College Allahabad were included in the study. Patients suspected to be having contact dermatitis due to topical medications constituted the bulk of the material. The various bases tested were : yellow petrolatum, propylene glycol, polyethylene glycol 400, lanolin, plastobase and olive oil. Approximately measured amounts of these substances were taken and applied on the back according to the standard procedure¹. The readings were taken after 48 hours and in a large number of patients after 96 hours as well. The reactions were graded as follows :

No reaction	—
Erythema and oedema	+
Erythema and papules	++
Erythema, papules and vesicles	+++
Erythema, vesicles and exudation	++++

From the Department of Skin and V D, Motilal Nehru Medical College, and Dey's Medical Store, Naini, Allahabad, India.

Address correspondence to : Dr. A. K. Bajaj

Results

The results of patch testing with various bases are given in table I. Yellow petrolatum

Table I. Positive patch test reactions with various bases.

Name of the base	Number of cases		
	Tested	Positive	Percentage
Yellow petrolatum	102	35	34.3
Propylene glycol as such	30	7	23.3
Propylene glycol 20 percent	95	20	21.1
Polyethylene glycol 400 as such	76	2	2.6
Lanolin	165	7	4.2
Olive oil	76	6	7.9
Plastobase	31	0	0.0

produced positive reactions in the largest number (34.3%) of cases. During the rainy season, positive reactions were observed in 22 out of 31 cases, while in winter only 3 out of 30 cases showed positive reactions (Table II). Ten

Table II. Positive patch test reactions with petrolatum during the rainy and the winter seasons.

Antigen	Number of patients during the			
	Rainy season (July to Sept.)		Winter season (Dec. to Feb.)	
	Tested	Positive	Tested	Positive
Yellow petrolatum	31	22	30	3

positive cases underwent usage test with yellow petrolatum and none of them developed derma-

titis after daily applications of petrolatum on the right forearm for one week.

Propylene glycol was tested as such and in dilutions of 5%, 10% and 20% in distilled water. The maximum number of positive reactions (23.3%) were observed with the undiluted propylene glycol. None of the cases reacted with 5% and 10% dilutions, while 20% propylene glycol produced positive reactions almost comparable to the undiluted propylene glycol (Table III).

Table III. Positive patch test reactions with various dilutions of propylene glycol.

Antigen	Number of cases		Percentage
	Tested	Positive	
Propylene glycol as such	30	7	23.3
Propylene glycol 20 percent	95	20	21.1
Propylene glycol 10 percent	20	0	0.0
Propylene glycol 5 percent	24	0	0.0

Polyethylene glycol 400 produced occasional positive reactions (2.6%). Lanolin and olive oil produced positive reactions in 4.2% and 7.9% cases respectively.

Plastobase did not produce any positive reactions.

Comments

Yellow petrolatum is bland and occlusive and is the most suitable base for most allergens.² Allergy to petrolatum is almost unknown but Malten³ described one patient who reacted to yellow soft paraffin. In the present study largest number of positive reactions were observed with petrolatum. The positivity was much more common during the hot and humid weather as compared to the cold weather. Usage test in a limited number of cases suggests that the positivity was unlikely to be due to contact hypersensitivity. The positivity in these cases seems to be due to the exaggerated occlusive effect due to hot and humid conditions. Because

of such frequent false positive reactions, petrolatum is not a useful base for patch testing in our country.

Propylene glycol is a viscous, colourless, odourless and tasteless hygroscopic liquid which is miscible with water, alcohols and many other solvents. It is widely used in cosmetics and pharmaceutical bases. It has a low sensitising potential.² Propylene glycol is an irritant when applied under occlusion, as in patch testing, and the difficulty of distinguishing irritant from allergic responses has confused the interpretation of many results. Hannuksela et al⁴ patch tested 1556 cases with glycols and 12.5% were positive with undiluted propylene glycol. On the clinical appearance they interpreted 70% of the reactions as irritant and 30% as allergic. In the present study, 5% and 10% propylene glycol did not produce any positive reaction while 20% and undiluted propylene glycol produced positive reactions in over 20% cases indicating that the reactions were mainly irritant in nature. Thus, propylene glycol is also not suitable as a base for patch testing.

Polyethylene glycols are condensation polymers of ethylene glycol. As their molecular weight rises from 200 to 6000 they change from viscous liquids to waxy solids. These glycols are soluble in water and are also good solvents. They are used as bases for medicaments and cosmetics. Contact dermatitis from the polyethylene glycols is rarely reported.² In the present study also there were only two positive reactions out of 76 cases tested with polyethylene glycol 400, thus proving that it is a very uncommon sensitizer.

Olive oil produced positive reactions in six out of 76 cases though in four cases the positivity was due to irritant reaction. This limits its use as a base.

Lanolin produced positive reactions in 7 out of 165 cases tested. The number of positive reactions observed in this series and the known

sensitizing potential of lanolin⁵ will be inhibiting factors for its use as a vehicle for patch testing.

Plastobase did not produce any positive reaction in 31 cases. A larger number of cases need to be tested to establish its usefulness as a suitable vehicle.

The present study suggests that polyethylene glycol 400 is an ideal base for patch testing chemicals and various pharmaceutical antigens in a country like India.

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