

Occupational eczema from para-tertiary-butylphenol formaldehyde resins: A review of the sensitizing resins

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The first cases of allergy due to para-tertiary-butylphenol formaldehyde resins (PTBP resins) were found in 1958 in the shoe-making industry. These resins are found in certain neoprene adhesives.

PTBP resin hypersensitivity may be due either to the para-tertiary-butylphenol, to the resin itself, or less frequently to the formaldehyde.

These resins may cause occupational allergy (in the automobile industry and chiefly in the shoe-making industry) and non-occupational allergy (footwear and clothing hypersensitivity).

Patients allergic to PTBP resins have been found to show a cross-reaction to other resins such as Alresen PA 103, Schenectady SP 126 and Schenectady SP 154.

The authors give a reference list of sensitizing neoprene adhesives and PTBP resins so that manufacturers can limit the use of these products as far as possible.

Key words: Allergic occupational eczemas – para-tertiary-butylphenol formaldehyde resins – shoe-making industry.

Received for publication June 2, 1976

The first cases of occupational allergy in shoemakers working with para-tertiary-butylphenol formaldehyde resins were reported by Malten (1958) in the Netherlands. Further cases were subsequently investigated by Calnan & Harman (1959) in Britain, Brehm (1966) and Beetz (1971) in Germany, Foussereau (1976) in France, and Mobacken (1976) in Sweden.

These para-tertiary-butylphenol formaldehyde resins (PTBP resins) are found in certain neoprene adhesives; Union Carbide's CKR 1634® and CKR 1734® resins have

been blamed for the majority of the cases reported.

According to Brehm, patients who are allergic to CKR 1634 are nearly always also allergic to CKR 1734. Malten suggests that PTBP resin hypersensitivity might be caused either by the para-tertiary-butylphenol, by the actual resin or, though less frequently, by the formaldehyde. In 1967, Malten observed that he was encountering fewer cases of para-tertiary-butylphenol allergy than in 1958, probably because the latest resins contained less PTBP. In our

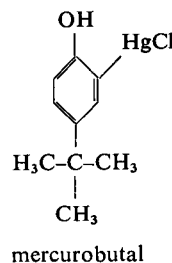
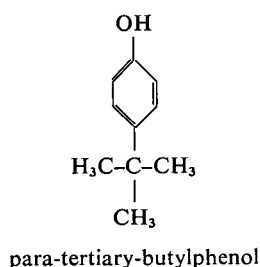


Fig. 1.

opinion, in cases of para-tertiary-butylphenol allergy it might be worth investigating possible cross-reaction with mercurobutol (2-chloromercuri, 4-tert-butylphenol) an antiseptic contained in Mercryl Laurylé® (French trademark) (Fig. 1).

Of all the cases of allergy reported in the literature (106 cases), occupational allergies to para-tertiary-butylphenol formaldehyde resins represent 71 % (75 cases) and clothing and footwear allergies 29 % (31 cases). In the occupational allergy category, the only other sector mentioned apart from the shoe-making industry (42 cases out of 106) appears to be the automobile industry (33 cases). As can be seen from Table 1, the shoe-making industry is the most vul-

nerable sector regarding this type of resin hypersensitivity. Table 2 summarizes the cases reported in the literature.

The following is an account of our own experience with P T B P resin occupational allergy. By compiling our own findings together with the data available in the litera-

Table 1. Number of cases of allergy to PTBP resins for each sector

Shoe-making industry	42
Automobile industry	33
Hypersensitivity to footwear	21
Hypersensitivity to other items of clothing	10

Table 2. Cases of allergy to PTBP resins according to literature

Author	Year	Sector	No. of cases	Allergic to
Malten	1958	Shoe-making industry	10	CKR 1734 and P T B P
Calnan	1959	Shoe-making industry	3	P T B P resin
De Vries	1964	Hypersensitivity to footwear	4	CKR 1634
Brehm	1966	Shoe-making industry	12	CKR 1634 and 1734
Engel	1966	Automobile industry	32	P T B P resin
Suurmond	1967	Hypersensitivity to clothing	8	CKR 1734
Beetz	1971	Shoe-making industry	12	P T B P resin
Foussereau	1970	Shoe-making industry	5	CKR 1634 and 1734
Foussereau	1976	Automobile industry	1	CKR 1634 and 1734
Foussereau	1976	Hypersensitivity to clothing	10	CKR 1634 and 1734
Foussereau	1976	Hypersensitivity to footwear	9	CKR 1634 and 1734
Mobacken	1976	Craftsman shoemakers	?	P T B P resin
Mobacken	1976	Hypersensitivity to clothing	?	P T B P resin

Table 3. Cross-reaction to three resins found in six patients allergic to CKR 1734

Resin \ Patient	1	2	3	4	5	6
CKR 1734	+++	++	++++	+	+++	+++
Alresen PA 103	+++	+++	+++	0	+++	+++
Schenectady SP 126	++++	++	+++	+	+++	+++
Schenectady SP 154	++++	++	+++	0	+++	+++

ture, we have attempted to classify the sensitizing P T B P resins and the commercial neoprene adhesives in which they are found. The formaldehyde content of some of these resins is also summarized.

Authors' own findings

The 25 cases observed included:

- five cases of occupational hypersensitivity in the shoe-making industry
- one case of occupational hypersensitivity in the automobile industry
- nine cases of footwear hypersensitivity
- eight cases of clothing hypersensitivity (watch straps)
- two cases of clothing hypersensitivity (one belt allergy and one hat allergy).

With a view to informing shoe-making manufacturers as to which P T B P resins are sensitizing, we tested our allergic patients with P T B P (mainly CKR 1634 and 1734) and other resins. In 1970, the following resins were shown to be sensitizing:

Alresen 565 R®

Alresen 631 R®

Schenectady SP 134®

Since then, six patients allergic to CKR 1734 (test concentration: 10 % in lanolin) have been found to show a cross-reaction to the following resins tested at the same concentration: Alresen PA 103®, Schenectady SP 126® and Schenectady SP 154 as shown in Table 3 (Control tests with lanolin are always negative).

Table 4. Reference list of sensitizing neoprene adhesives

Adhesive	Author	Year	Manufacturer
Adhesive 818	Calnan	1959	Adhesive and Allied Products
Balley CM 44	Malten	1958	?
Ceylanbond	Foussereau	1970	Morel, Arpajon, France
Ceylanprène 25	Foussereau	1970	Morel, Arpajon, France
Ceylanprène 65	Foussereau	1970	Morel, Arpajon, France
Chemisol L 1504	Beetz	1971	VEB Schuh-Chemie, Erfurt, German Democratic Republic
Climax	Malten	1958	?
Golden Tip	Malten	1958	Germany
Gripsotite	Calnan	1959	F. Ball and Company
S 708 Rubber Adhesive	Calnan	1959	Dunlop
Saba Select	Malten	1958	Saba, Dinxperlo, Netherlands
Sole Cement 79 D	Calnan	1959	Adhesive and Allied Products
Tivodur 8250	Foussereau	1970	Tivoli, Romans, France
Tivodur Super 55	Foussereau	1970	Tivoli, Romans, France

Table 5. Sensitizing PTBP resins

Adhesive	Manufacturer	Comments
Alresen PA 103	Chemische Werke Albert, Wiesbaden	Sensitizing according to Foussereau
Alresen PA 104	Chemische Werke Albert, Wiesbaden	Sensitizing according to Ziegler (experimental sensitization)
Alresen 565 R	Chemische Werke Albert, Wiesbaden	Sensitizing according to Brehm and Foussereau
Alresen 631 R	Chemische Werke Albert, Wiesbaden	Sensitizing according to Foussereau
CK R 1634 ¹	Union Carbide	Sensitizing according to Malten, De Vries, Brehm, Foussereau
C.K.R. 1734 ¹	Union Carbide	Sensitizing according to Malten, Suurmond and Foussereau
Rousselot 75-22	Rousselot	Sensitizing according to De Vries
Schenectady SP 103	Schenectady, New York	Sensitizing according to Brehm
Schenectady SP 126	Schenectady, New York	Sensitizing according to Foussereau
Schenectady SP 134	Schenectady, New York	Sensitizing according to Foussereau
Schenectady SP 144	Schenectady, New York	Sensitizing according to Brehm
Schenectady SP 154	Schenectady, New York	Sensitizing according to Foussereau
Superbeckacit 1001	Reichhold-Beckacite	Sensitizing according to Brehm
Superbeckacit 1500	Reichhold-Beckacite	Sensitizing according to Brehm and Foussereau
Superbeckacit 1050	Reichhold-Beckacite	Contains butylphenol according to the manufacturer
Superbeckacit 1054	Reichhold-Beckacite	Contains butylphenol according to the manufacturer
Varcum 875 ²	Reichhold-Beckacite	Contains butylphenol according to the manufacturer
Varcum 921 ²	Reichhold-Beckacite	Contains butylphenol according to the manufacturer

¹ Is or was also commercialized by Bakelite Corp., Bloomfield, N.J., U.S.A.

² Is or was also commercialized by Varcum Chemical Corp., Niagara Falls, N.Y., U.S.A.

Table 6. Formaldehyde content of some resins

Resin	Formaldehyde content
Superbeckacit 1001	Low
Superbeckacit 1050	High
Superbeckacit 1054	Intermediate
Varcum 875	High
Varcum 921	High

Reference list of sensitizing P T B P resins
Table 5 lists the sensitizing P T B P resins.

Formaldehyde content of certain P T B P resins

Formaldehyde plays only a very minor role in P T B P allergies. The formaldehyde content of some of these resins as given by Reichhold is nevertheless listed in Table 6.

Reference list of sensitizing neoprene adhesives

The data compiled from the available literature are shown in Table 4.

The chief means of preventing allergic occupational eczemas caused by P T B P resins consist of advising the shoe-making industry to use other types of adhesives and

documenting manufacturers on the P T B P resins.

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