

Allergic contact dermatitis from 3-iodo-2-propynyl-butylcarbamate (IPBC) – an update

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Results from 3 1/2 years of routine patch testing with 3-iodo-2-propynyl-butylcarbamate (IPBC) are presented. From 1996 to 1999, a total of 3168 persons (2093 women and 1075 men) were patch tested with IPBC, and 7 cases were found to be positive. In 2 cases, sensitization could be attributed to cosmetics, and in a further 2 cases cosmetics were the most likely cause of sensitisation. It is concluded that the use of IPBC in cosmetic products can lead to contact sensitization and allergic contact dermatitis. 2 of the 7 reported cases with IPBC allergy were also found positive to thiuram, and possible cross-reactivity between IPBC and thiuram is discussed.

Key words: allergic contact dermatitis; iodopropynyl butylcarbamate; biocides; preservatives; anti-microbials; cosmetics; relevance; thiurams; cross-sensitivity; patch testing technique. © Munksgaard, 2001.

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IPBC (3-iodo-2-propynyl-butylcarbamate) is a biocide which was originally mainly used for wood preservation (1), and which is now also used in cosmetics and cutting oils as a fungicide. In 1996 IPBC was a reported ingredient of 122 cosmetic formulations approved by the FDA, mainly shampoos and conditioners (2). IPBC is manufactured under different trade names, among which are TroysanTM PolyphaseTM (Troy Corp, US) and BiodocarbTM (Milker & Grüning GmbH, Germany). A preparation especially marketed for use as a cosmetics preservative is GlycasilTM (Lonza Ltd, Switzerland), which is manufactured from TroysanTM PolyphaseTM.

According to current legislation, cosmetics marketed within the European Union may contain a concentration of IPBC not exceeding 0.1% (3). Only a few cases of allergic contact dermatitis from IPBC have been published to date. The 1st case of allergic contact dermatitis was reported in a man who was occupationally exposed to a high concentration of IPBC (4). Subsequently, 1 case of allergic contact dermatitis from IPBC in cosmetics and 5 cases of contact dermatitis from occupational exposure to cutting oils have been published (5, 6). Cross-sensitization between IPBC and thiuram has hitherto not been observed, despite similarities in the chemical structure of the 2 substances (2, 4). In this article we report data from 3

1/2 years of routine patch testing of consecutive patients with IPBC.

Patients and Methods

Since 1996, all patients referred to the Department of Dermatology at Gentofte Hospital for patch testing have been tested with IPBC. As patch test material, we initially used a commercially available preparation of IPBC in sodium bicarbonate (Glycasil-STM). Subsequently, pure IPBC was made available from various manufacturers. For some months we used BiodocarbTM, and afterwards TroysanTM PolyphaseTM (Table 1). The patch test concentration of IPBC was 0.1% in petrolatum (pet.), Finn Chamber, and the patch test was placed on the upper back for 2 days, and read on D2, D3, and D7 according to ICDRG guidelines (7).

When a doubtful reaction was seen at more than 1 reading, a double-blind repeated open applications test (ROAT) in the elbow flexures was additionally performed (4).

Results

From 1996 to 1999, a total of 3168 persons (2093 women and 1075 men) have been patch tested with IPBC. The results are summarized in Table 2.

Table 1. Patients patch tested with IPBC in 1996–1999; Positive (POS.) reactions either on patch testing or ROAT

Period	Months	Material	Total		Pos.		?+		IR		–	
			W	M	W	M	W	M	W	M	W	M
1996–97	16	Glycasil TM	690	370	0	3	17	13	1	4	672	350
1997	3	Biodocarb TM	165	71	0	0	4	0	1	0	160	71
1997–99	25	Troysan TM	1222	629	4*	0	29	12	2	4	1187	613
Total	44	IPBC	2077	1070	4	3	50	25	4	8	2019	1034

* Diagnosed by positive reaction either on patch testing or ROAT.

Table 2. Sex, age, localization of eczema, test results, source of exposure and other contact allergies in patients with IPBC allergy diagnosed in 1999 (new cases, *n*=4)

Sex	Age	Localization	IPBC 0.1%	ROAT	Exposure	Other allergies
F	80	widespread	+	++	cosmetic	cobalt
F	54	hands	?+	+	cosmetic	none
F	70	widespread	++	NT	cosmetic ?	multiple
F	73	widespread	+	N/A	cosmetic ?	multiple

In addition to the 3 male cases previously reported (4), 4 additional patients with IPBC contact allergy have been diagnosed; 3 by positive patch tests, and 1 (with a doubtful patch test reaction at all 3 readings) by a subsequent, positive ROAT. The latter 4 cases were all diagnosed in 1999, and all were women. The number of persons patch tested per year in 1996–99 did not vary, but no IPBC allergies were observed in 1997 or 1998.

Of the 4 women with IPBC allergy diagnosed in 1999, 2 had a verified exposure to a moisturizer containing IPBC at a concentration of 0.05%. Both had severe contact dermatitis, and 1 of them was hospitalized with erythroderma. Both patients cleared after discontinuation of the IPBC-containing skin lotion. The other 2 women had multiple allergies relevant to cosmetics, and were exposed to numerous cosmetic products, though IPBC exposure was not identified.

A total of 84 persons in the period 1996–99 had a positive reaction to thiuram mix on patch testing. 2 of these were the above-mentioned patients with multiple allergies including IPBC. Thus, 29% of IPBC-allergic patients had a positive thiuram allergy, as compared to 2.6% of persons not having IPBC allergy. We did not otherwise see signs of association between thiuram and IPBC reactions, e.g., doubtful IPBC reactions in those with positive thiuram reactions or vice versa.

Discussion

Until now, only 9 cases of allergic contact dermatitis from IPBC have been published; 3 male cases with occupational or undetermined causes (4), 1 female case caused by cosmetics (5), and five cases with contact dermatitis from cutting oils (6). In

the current study, we present 4 new cases of IPBC contact allergy, additionally to the previously reported male cases presumed to be related to occupational exposure. The 4 new cases were all women: in 2 cases sensitization from cosmetics was identified, and in 2 suspected.

IPBC is a biocide which is permitted as a cosmetics preservative at concentrations up to 0.1%. At such concentrations, the risk of sensitization is low, according to animal studies (2). The extent of usage of IPBC in cosmetics on the Danish market is not known. It is, however, our impression that IPBC currently is present in only a few cosmetic products available to the Danish consumer, and in 2 of the above-mentioned 4 cases, the patients had been exposed to the same cosmetic product. Continued surveillance for IPBC allergy is necessary, since IPBC contact allergy may increase with increasing availability of IPBC-containing cosmetic products in the future.

The patch test concentration used (0.1% pet.) caused few irritant reactions and a small number of doubtful reactions. The latter reactions may be interpreted either as irritant or weak allergic reactions. It is our experience that 0.5% causes a large number of irritant reactions (4).

The chemical structure of IPBC is very similar to that of thiurams, which raises the question of cross-reaction. Our data may indicate an overrepresentation of thiuram allergy in patients allergic to IPBC, but the number of patients is too small to make any firm conclusions in this area.

Reference

1. Rossmore HW. *Handbook of biocide and preservative use*. Glasgow: Blackie Academic and Professional, 1995.

2. Johnson R S. *Iodopropynyl butylcarbamate (IPBC). Final report*. Washington: Cosmetic Ingredient Review, 1996: 1–29.
3. EU Commission Cosmetics Directive 95/34/EF and 96/41/EF. *Milieu og Energiministeriet* 1996: 805.
4. Bryld L E, Agner T, Rastogi S C, Menné T. Iodopropynyl butylcarbamate: a new contact allergen. *Contact Dermatitis* 1997; 36: 156–158.
5. Pazzaglia M, Tosti A. Allergic contact dermatitis from 3-iodo-2-propynyl-butylcarbamate in a cosmetic cream. *Contact Dermatitis* 1999; 41: 290.
6. Majoie I M L, van Ginkel C J G. The biocide iodopropynyl butylcarbamate (IPBC) as an allergen in cutting oils. *Contact Dermatitis* 2000; 43: 238–240.
7. Fregert S. *Manual of contact dermatitis*, 2nd edition. Copenhagen: Munksgaard, 1996.

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