

Contact dermatitis to dioxybenzone

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Contact dermatitis to sunscreen agents of the PABA, salicylate, and cinnamate types is well documented (Fisher 1973). A patient with contact dermatitis to dioxybenzone in a sunscreen preparation has recently been observed.

The patient was a 46-year-old sheet metal worker who has admitted to the dermatology service of the Miami Veterans Administration Hospital for a scaling, hyperpigmented, impetiginized dermatitis of the face, neck and upper chest and back. Skin biopsy showed findings consistent with chronic contact dermatitis. He had been using several topical preparations, including Solbar®, which is composed of oxybenzone 3 % and dioxybenzone 3 % in a vehicle containing methyl cellulose, isopropyl myristate, methylphenylpolysiloxane, methyl paraben and propyl paraben. The patient was treated with compresses and oral cloxacillin, and his eruption promptly cleared.

Standard patch tests to the following materials were performed:

Allergen	48 h	72 h
Solbar (as is)	++	++
oxybenzone (2 % pet.)	—	+
dioxybenzone (2 % pet.)	++	++
paraben mix (5 % each of ethyl, methyl, and propyl)	—	—
isopropyl myristate (20 % pet.)	—	—
methyl cellulose (as is)	—	—

Exposure of patch test sites to long wave ultraviolet light in a standard dose for photopatch testing failed to intensify any of the above reactions. In addition, patch tests to oxybenzone and dioxybenzone on 10 normal volunteers were negative.

This patient's sensitivity to dioxybenzone appeared to be the most clinically relevant. The weak reaction to oxybenzone may represent concomitant sensitization (both compounds are present in the sunscreen) or cross-sensitization between similar chemicals. The possibility of contamination of the oxybenzone preparation used for patch testing with traces of dioxybenzone was ruled out by chromatographic analysis of the preparations by the method of the United States Pharmacopeia (Moyer 1975), which demonstrated that each preparation was free from traces of the other, in a system capable of detecting known contamination at a level of 0.1 %. The patient was advised to discontinue the use of Solbar, and his eruption has not recurred.

References

- Fisher, A. A. (1973) *Contact Dermatitis*. 2nd ed., pp. 209–216. Philadelphia: Lea & Febiger.
- Moyer, J. H. (Pres.) (1975) *The United States Pharmacopeia XIX*. pp. 155–156. Easton, Pennsylvania: Mack Publishing Company.

The primula allergen primin

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Primula dermatitis is nearly always caused by *Primula obconica* whose highly sensitizing properties may be due to the accessibility of con-

centrated primin on the surface of the plant (Nestler 1904).

Most primula species have long hairs on the

Table 1. Results of Craven spot tests (Agrup et al. 1968), Brachtendorf spot tests (Agrup et al. 1968). Gas chromatographic analysis (Agrup et al. 1968) is termed positive if a peak occurs at the same site as the one of primin. As appears from the table, patch test reactions confirmed the spot and chromatographic analyses

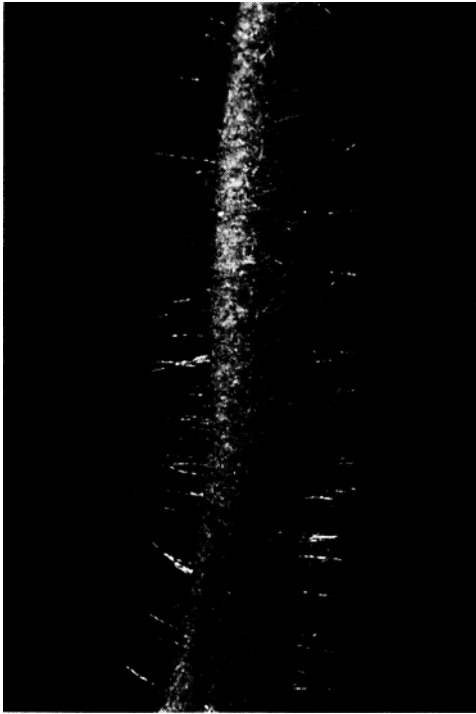
Primula species and organ	Craven test	Brachten-dorf test	Gaschro-matogram	Patch test
<i>P. obconica</i> leaf, ether extract	pos	pos	pos	pos
<i>P. obconica</i> stem	pos	pos	ND	pos
<i>P. obconica</i> stem, ether washed	neg	neg	ND	ND
<i>P. obconica</i> stem – inside	neg	neg	ND	ND
<i>P. obconica</i> short hairs	pos	ND	ND	ND
<i>P. obconica</i> short hairs, ether extract	pos	ND	pos	ND
<i>P. obconica</i> long hairs	neg	ND	ND	ND
<i>P. obconica</i> long hairs, ether extract	neg	ND	neg	ND
<i>P. obconica</i> sepals, lower side	pos	ND	ND	ND
<i>P. obconica</i> sepals, lower side	pos	ND	ND	ND
<i>P. obconica</i> "Reizfrei", leaf	pos	ND	ND	pos
<i>P. obconica</i> "Reizfrei", ether extract of leaves	pos	pos	pos	pos
<i>P. sinensis</i>	neg	ND	ND	neg
<i>P. sinensis</i> , ether extract	neg	ND	ND	ND
<i>P. malacoides</i>	neg	ND	ND	neg
<i>P. malacoides</i> , ether extract	neg	ND	neg	ND
<i>P. sieboldi</i> , ether extract	neg	ND	neg	neg
<i>P. alpicona luna</i> , ether extract	neg	ND	neg	ND
<i>P. alpicona violacea</i> , ether extract	neg	ND	neg	ND
<i>P. anisodora</i> , ether extract	neg	ND	neg	ND
<i>P. bullesiana</i> , ether extract	neg	ND	neg	ND
<i>P. chioranta</i> , ether extract	neg	ND	neg	ND
<i>P. denticulata</i> , ether extract	neg	ND	neg	ND
<i>P. elatior</i> , ether extract	neg	ND	neg	ND
<i>P. japonica</i> , ether extract	neg	ND	neg	ND

surfaces of the stalk and leaves (Fig. 1). These, however, do not contain primin (Table 1) and are therefore not relevant to the allergenic properties. Primin is formed in the distal cells of the short hairs (Figs. 2 and 3) which are barely visible with the naked eye. The outermost cell is easily traumatized, and it may burst leaving a resinous drop of allergen on the distal surface of the hair (Nestler 1904).

The amount of allergen formed is determined by external factors such as sun, heat, moisture, manuring, etc. (Brachtendorf 1956) and is highest during a warm summer and lowest during winter when a plant may give negative patch test reactions in a primula-sensitive person (Hjorth 1966, Agrup et al. 1968). The density of the allergenic short hairs is highest on the calyx and decreases in the following order:

flower stalk, carpel, leaf, leaf stem, and inflorescent stem.

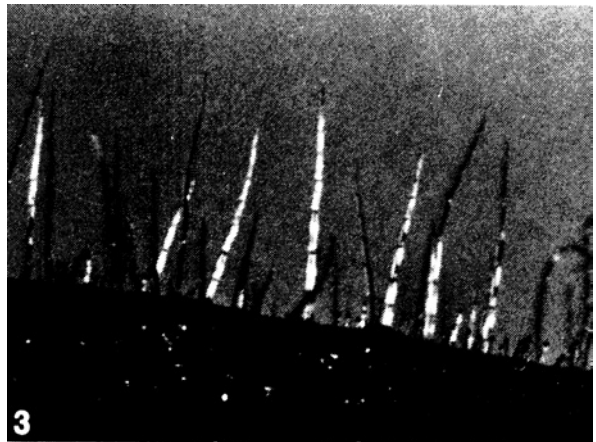
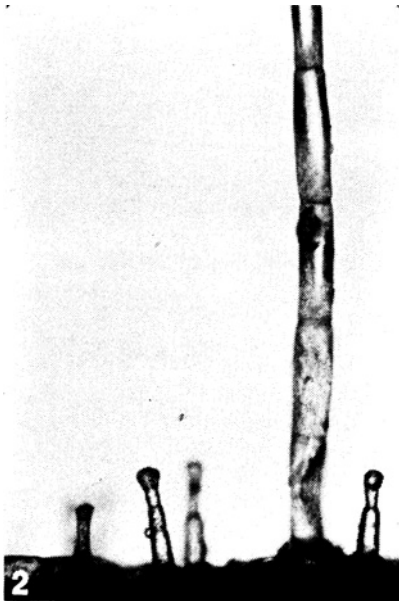
A dip in ethyl ether removes most of the primula allergen as shown by a qualitative analysis using methods described elsewhere (Agrup et al. 1968). Primin could not be demonstrated in other primula species than *Primula obconica* (Table 1). The allegedly hypoallergenic *Primula obconica* "Reizfrei" (Mayer) had a sufficient amount of allergen to produce a positive patch test in a primin-sensitive person. Two spot tests for primin were positive and an ether extract of the "Reizfrei" showed a peak identical with that of primin on gas chromatography. Thus, a *Primula obconica*-sensitive person must concentrate on other species of primula.



References

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- Brachtendorf, J. (1956) Untersuchungen zum Nachweis des Primins bei *Primula obconica*. *Der Züchter* 26, 161-164.
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Fig. 1. Low magnification of stem showing the long hairs and a few short hairs.



Figs. 2 and 3. The figures show the order of magnitude of the long hairs as compared with the allergenic short hairs.