

CONTACT POINT

Discordant Patch Test Reactions to 2-Bromo-2-Nitro-Propane-1,3-Diol (Bronopol): A Multicenter Study From REIDAC

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2-Bromo-2-nitro-propane-1,3-diol (bronopol) is a formaldehyde releaser that was included as an emerging allergen needing to be evaluated in the European series in 2019 [1], and as a candidate allergen for inclusion in the Spanish baseline series based on data from the Spanish Registry for Research in Dermatitis

and Contact Allergy (REIDAC), in TRUE Test 0.25 mg/cm² or 0.5% pet. in 2022 [2].

In a previous Spanish study, we perceived a frequency of sensitization to bronopol of 0.36% (15/4088) and we noted that the

[Correction added on 09 January 2026, after the first online publication: The copyright line was changed.]

TRUE Test detected 13 of 15 overall reactions to bronopol. We found a current relevance of 6/13 in TRUE Test and none in petrolatum. However, one limitation of this work was that the data could not be directly compared because they came from different populations [3].

The present study was then designed within REIDAC due to differences, with the aim of updating epidemiological data regarding sensitizations to bronopol and evaluating discordant patch test reactions to bronopol.

1 | Methods

A multicenter observational prospective study was performed in the Dermatology departments of Spanish hospitals that belonged to REIDAC, which included 3603 patients from 2022 to 2024. The patients were tested simultaneously with both bronopol 5% pet., using Finn Chambers supplied by AllergEAZE (Calgary, Canada) and with the TRUE Test incorporating bronopol 0.25 mg/cm² supplied by SmartPractique (Phoenix, Arizona), respectively.

Readings were done on day (D) 2 and D4 and graded according to The International Contact Dermatitis Research Group evaluation criteria (+, ++ and +++ as positive).

Irritant and doubtful (+/?) reactions were excluded as positive results.

In this study, relevance scores were defined as current relevance when the patient had proven skin contact with products containing the allergen and noted worsening of dermatitis, past relevance when associated with past contact dermatitis, and as unknown relevance otherwise.

2 | Results

Out of 3603 patch-tested patients with both preparations of bronopol, 46 patients (which implies a prevalence of 1.28%; 95 CI=[0.96–1.70]) had at least one positive reaction to bronopol (+, ++, +++). Regarding doubtful and irritant reactions, 4 doubtful (+/?) to the TRUE Test vs. 6 (+/?) and 1 irritant reaction with bronopol 5% pet.

Of the 46 patients with at least a positive reaction, 26 (56.5%) patients were positive only to the TRUE Test, 8 (17.4%) patients were only positive to bronopol 5% pet., and 12 (26.1%) patients were positive to both TRUE Test and bronopol 5% pet. Thus, we obtained 38 patients positive to TRUE Test and only 20 to bronopol 5% pet. The agreement observed between the two patches was fair (Kappa value = 0.3) (Table 1).

Of the 46 patients with at least one positive reaction, current relevance was established in 15 (32.6%). In patients who showed positive reactions only with the TRUE test, current relevance was detected in 27% (7/26). No cases with current relevance were found in positive patients only to bronopol 5% pet. (0/8). In patients who showed positive reactions to both preparations, all cases with current relevance for bronopol 5% pet. were detected by TRUE Test, 67% (8/12).

TABLE 1 | 46 positive patients out of 3603 patients.

	TRUE Test 0.25 mg/ cm ² positive	TRUE Test 0.25 mg/cm ² negative
Bronopol 0.5% pet. Positive	12	8
Bronopol 0.5% pet. Negative	26	3557

Note: Positive and negative reactions to bronopol with bronopol 5% pet. and with the TRUE Test 0.25 mg/cm².

All patients with current relevance had an intensity of at least + and none of the patients with intensity (+/?) showed current relevance.

3 | Discussion

Formaldehyde releasers are preservatives widely used in Spain. In a Spanish study by Pastor-Nieto et al. [4], bronopol was the most frequent formaldehyde releaser, found in 2.7% of checked products, mostly in household cleaning products. These data make bronopol interesting to study.

In our analysis, there are few concordant patch test reactions. More sensitizations were detected with the TRUE Test than with bronopol 0.5% pet. Patch test concordance maybe be conditioned by the type of allergen, support, formulation, location, with false positives and false negative reactions, differences in the sensitivity and specificity of patch test, or who applied or assessed the tests [5–7].

Current relevance was obtained in more than 60% of the patients positive to both preparations compared with ~30% of those patients with only the TRUE Test and none of the patients who were positive only to bronopol 0.5% pet. This current relevance supports the usefulness of bronopol patch testing to diagnose allergic contact dermatitis in our clinical practice.

Additionally, if we take into account the intensity, no relevance was found in doubtful readings (+/?). So weak positivity in bronopol patch tests did not contribute to identifying new currently relevant contact dermatitis.

In conclusion, according to this study, the frequency of contact allergy to bronopol may be underdiagnosed in our current series if we perform patch tests with 0.5% pet. If there is a high clinical suspicion, another preparation such as the TRUE test should be used. Hence, we consider bronopol to be an allergen that should be kept under study and included as a candidate in baseline series but perhaps at higher test concentrations when it is tested in petrolatum.

Author Contributions

Tatiana Sanz Sánchez: investigation, conceptualisation, methodology, data curation, writing original draft, project administration. **Ana**

María Giménez-Arnau: investigation, conceptualisation, data entry, interpretation of results, discussion of findings and review manuscript. **Juan Francisco Silvestre Salvador:** investigation data entry, discussion of findings and review manuscript. **Pedro Mercader-García:** discussion of findings and review manuscript. **Marta Andreu-Barasoain** and **Enrique Gómez de la Fuente:** investigation, discussion of findings and review manuscript. **Violeta Zaragoza Ninet, Susana Córdoba Guijarro, Francisco Javier Miquel Miquel, Ricardo González Pérez, Inmaculada Ruíz González, Esther Serra Baldrich, José Manuel Carrascosa Carrillo, Fátima Tous Romero, Francisco Javier Ortiz de Frutos, Mercedes Rodríguez Serna, María Elena Gatica Ortega, Carmen Paredes Suárez, Francisco Navarro-Triviño, Pablo Chicharro, María Antonia Pastor Nieto, José Juan Pereyra Rodríguez, Paloma Sánchez-Pedreño Guillén** and **Marta Elosua-González:** investigation. **Araceli Sánchez-Gilo** and **Gemma Melé i Ninot:** investigation, resources. **Miguel Ángel Descalzo** and **Mercè Grau-Pérez:** formal analysis, investigation, methodology, writing – review and editing, conceptualisation, project administration. **Leopoldo Borrego:** conceptualisation, investigation, funding acquisition, writing – review and editing, methodology, data curation, project administration.

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Ethics Statement

The REIDAC was approved by the Research Ethics Committee of the Complejo Hospitalario Universitario Insular-Materno Infantil (CEIm-CHUIMI-2017/964).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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