

# Results of patch testing with lavender oil in Japan

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We report the annual results of patch testing with lavender oil for a 9-year period from 1990 to 1998 in Japan. Using Finn Chambers and Scanpor tape, we performed 2-day closed patch testing with lavender oil 20% pet. on the upper back of each patient suspected of having cosmetic contact dermatitis. We compared the frequency of positive patch tests to lavender oil each year with those to other fragrances. We diagnosed contact allergy when patch test reactions were + or <+ at 1 day after removal. The positivity rate of lavender oil was 3.7% (0–13.9%) during the 9-year period from 1990 to 1998. The positivity rate of lavender oil increased suddenly in 1997. Recently, in Japan, there has been a trend for aromatherapy using lavender oil. With this trend, placing dried lavender flowers in pillows, drawers, cabinets, or rooms has become a new fashion. We asked patients who showed a positive reaction to lavender oil about their use of dried lavender flowers. We confirmed the use of dried lavender flowers in 5 cases out of 11 positive cases in 1997 and 8 out of 15 positive cases in 1998. We concluded that the increase in patch test positivity rates to lavender oil in 1997 and 1998 was due to the above fashion, rather than due to fragrances in cosmetic products.

**Key words:** lavender oil; aromatherapy; essential oils; patch testing; fragrance; contact allergy; annual variation. © Munksgaard, 2000.

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Lavender oil is an essential oil extracted by steam distillation (1) from the flowers and leaves of lavender grass. It is used as a cosmetic ingredient, especially in men's cosmetics, and in bath essences, room air fresheners, and oils for aroma-

therapy. We report the results of patch testing with lavender oil for each year from 1990 to 1998 in Japan. We compared the positivity rate of patch tests to lavender oil each year with those to other fragrances.

*Table 1.* Patch test positivity rates of essential oils each year from 1990 to 1998

|                     | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---------------------|------|------|------|------|------|------|------|------|------|
| lavender oil        | 1.1  | 1.5  | 1.3  | 3.8  | 0.0  | 1.1  | 0.9  | 8.7  | 13.9 |
| cananga oil         | 1.7  | 1.1  | 1.7  | 1.9  | 0.9  | 0.6  | 0.0  | 1.6  | 0.0  |
| farnesol            | 0.6  | 1.2  | 2.3  | 2.2  | 0.0  | 0.0  | 0.0  | 0.0  | 2.3  |
| geraniol            | 0.0  | 0.0  | 0.9  | 0.7  | 0.0  | 0.0  | 0.0  | 1.5  | 0.0  |
| geranium oil        | 1.1  | 2.2  | 3.9  | 4.0  | 1.8  | 1.1  | 0.9  | 2.4  | 0.0  |
| hydroxycitronellal  | 0.6  | 0.8  | 1.4  | 0.0  | 1.0  | 0.6  | 1.2  | 1.5  | 2.3  |
| jasmine absolute    | 0.0  | 0.7  | 3.0  | 0.6  | 0.0  | 0.6  | 0.0  | 1.6  | 1.8  |
| rose oil Bulgaria   | 0.6  | 0.4  | 0.9  | 0.0  | 0.9  | 0.0  | 0.0  | 0.8  | 0.0  |
| sandalwood oil      | 1.9  | 0.4  | 1.4  | 0.7  | 0.0  | 0.0  | 1.2  | 1.5  | 0.0  |
| ylang ylang oil     | 2.8  | 1.8  | 2.6  | 4.3  | 2.7  | 1.1  | 0.0  | 3.2  | 1.8  |
| total number        | 177  | 273  | 236  | 161  | 112  | 177  | 111  | 126  | 110  |
| men                 | 5    | 3    | 1    | 0    | 0    | 2    | 0    | 0    | 0    |
| women               | 172  | 270  | 235  | 161  | 112  | 175  | 111  | 126  | 110  |
| average age (years) | 37.1 | 37.7 | 38.3 | 36.6 | 35.5 | 35.8 | 36.5 | 33.3 | 33.6 |
| highest age (years) | 78   | 86   | 76   | 70   | 70   | 75   | 75   | 75   | 85   |
| lowest age (years)  | 16   | 15   | 17   | 17   | 18   | 13   | 10   | 14   | 17   |

Table 2. The patients who reacted positively to lavender oil on patch testing in 1997 and 1998

| Year | Case no. | Age | Sex | Occupation           | Contact with lavender                                         |
|------|----------|-----|-----|----------------------|---------------------------------------------------------------|
| 1997 | 1        | 20  | F   | office worker        | drank herb tea every day                                      |
| 1997 | 2        | 52  | F   | beautician           | used lavender oil at work                                     |
| 1997 | 3        | 39  | F   | English teacher      | experienced aromatherapy using lavender oil                   |
| 1997 | 4        | 46  | F   | housewife            | used room air freshener containing lavender oil               |
| 1997 | 5        | 62  | F   | house wife           | grew lavender                                                 |
| 1997 | 6        | 36  | F   | housewife            | unexplained                                                   |
| 1997 | 7        | 59  | F   | housewife            | unexplained                                                   |
| 1997 | 8        | 45  | F   | office worker        | unexplained                                                   |
| 1997 | 9        | 44  | F   | office worker        | unexplained                                                   |
| 1997 | 10       | 22  | F   | student              | unexplained                                                   |
| 1997 | 11       | 53  | F   | office worker        | unexplained                                                   |
| 1998 | 1        | 21  | F   | student              | placed room air freshener containing lavender oil on her desk |
| 1998 | 2        | 27  | F   | unemployed           | wore perfume containing lavender oil                          |
| 1998 | 3        | 26  | F   | office worker        | had put lavender in her car                                   |
| 1998 | 4        | 27  | F   | office worker        | used aroma candle containing lavender oil                     |
| 1998 | 5        | 53  | F   | cafeteria manager    | grew lavender                                                 |
| 1998 | 6        | 41  | F   | housewife            | used room air freshener containing lavender oil               |
| 1998 | 7        | 19  | F   | waitress             | used room air freshener containing lavender oil               |
| 1998 | 8        | 20  | F   | office worker        | wore perfume and room air freshener contained lavender oil    |
| 1998 | 9        | 48  | F   | office worker        | unexplained                                                   |
| 1998 | 10       | 26  | F   | unemployed           | unexplained                                                   |
| 1998 | 11       | 49  | F   | housewife            | unexplained                                                   |
| 1998 | 12       | 26  | F   | office worker        | unexplained                                                   |
| 1998 | 13       | 33  | F   | office worker        | unexplained                                                   |
| 1998 | 14       | 24  | F   | postgraduate student | unexplained                                                   |
| 1998 | 15       | 22  | F   | student              | unexplained                                                   |

## Patients, Materials and Methods

### Patients

The patients included in this study are shown in Table 1. These were 1483 patients who were suspected of having cosmetic contact dermatitis.

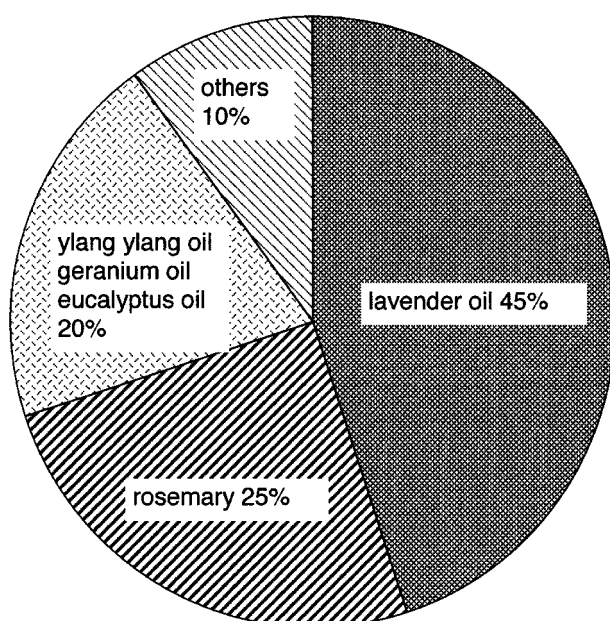


Fig. 1. Market share of essential oils in Japan.

### Materials

10 fragrances were included in patch testing: lavender oil 20% pet., cananga oil 5% pet., farnesol 5% pet., geraniol 5% pet., geranium oil 20% pet., hydroxycitronellal 5% pet., jasmine absolute 5% pet., rose oil Bulgaria 2% pet., sandalwood oil 2% pet. and ylang ylang oil 5% pet. (2–10).

### Methods

Using Finn Chambers and Scanpor tape, we performed 2-day closed patch testing with the 10 fragrances on the upper back of patients suspected of having cosmetic contact dermatitis. Readings were done at 1 h and 1 day after removal, according to ICDRG recommendations. We diagnosed contact allergy when patch test reactions were + or >+ at 1 day after removal (11).

## Results

### Results of patch testing

The positivity rate of lavender oil was 3.7% during the 9-year period from 1990 to 1998. The positivity rate of lavender oil was higher than those of the other 9 fragrances. The positivity rate of cananga oil 1.1%, farnesol 1.1%, geraniol 0.3%, geranium oil 2.1%, hydroxycitronellal 1.0%, jasmine absolute



Fig. 2. Clinical findings in case no. 1 in 1998.



Fig. 3. The positive patch test reactions to lavender oil in case no. 1 in 1998.

1.0%, rose oil Bulgaria 0.4%, sandalwood oil 0.8% and ylang ylang oil 2.2%.

As for the results of lavender oil, the positivity rate was 1.1% in 1990, 1.5% in 1991, 1.3% in 1992, 3.8% in 1993, 0.0% in 1994, 1.1% in 1995, 0.9% in 1996, 8.7% in 1997 and 13.9% in 1998. The positivity rate of lavender oil increased suddenly in 1997. However, those of the 9 other fragrances showed no corresponding increase in positivity rates (Table 1).

#### *Cases showing positive reactions to lavender oil in 1997 and 1998*

Table 2 shows the patients who reacted positively to lavender oil on patch testing in 1997 and 1998. 5 patients out of 11 who reacted positively to lavender oil had actual contact with lavender, in their daily lives or through their occupations, in 1997. 8 patients out of 15 who reacted positively to lavender oil had actual contact with lavender, in their daily lives or through their occupations, in 1998.

#### **Discussion**

Lavender oil is classified as an essential oil. The rate of use of lavender oil is around 45% among the 40 major essential oils: it has the highest market share in Japan. Lavender oil has the highest frequency of use among essential oils in aromatherapy in Japan (Fig. 1). The reason that it is in such demand is because of its versatility. It is well-known and is evaluated as being very safe (12).

It was very clear that the positivity rate of lavender oil on patch testing suddenly rose in 1997 and 1998. However, the positivity rates of the 9 other fragrances did not change when comparing patch testing before and after 1997. During the 1990s, this pleasant herbal scent came into fashion. Many herb gardens, specially cultivating lavender, were planted in Japan in response to this latest vogue (13). Furthermore, household goods containing the essential oil increased after 1990 because of Japan's new enthusiasm for aromatherapy (14). We consider that the trend for using lavender oil in various ways in our daily life in recent years con-

tributed to a high rate of lavender oil use and a corresponding increase in positive results when lavender oil was patch tested in 1997 and 1998.

In 1998, patient no. 1 had enjoyed a lavender oil room air freshener on the desk in her room and in her car since 1995. She developed itchy erythema on her face in March 1998 (Fig. 2). She was treated with topical medicaments but her facial eruptions persisted. She reacted strongly to lavender oil when patch tested done (Fig. 3). When she removed lavender oil from her living environment, her dermatitis resolved.

Several previous reports of contact allergy to lavender oil have been published. Calnan (15) reported only 6 positive reactions from several European patch test clinics. Brandão reported a hairdresser who developed occupational contact allergy to a lavender shampoo (16). Zina and Bony (17), Rudzki et al. (18) and Rademaker (19) reported allergic contact dermatitis from topical medicaments. Schaller & Kortling (20) and Coulson & Ali Khan (21) reported allergic dermatitis from aromatherapy use. A pleasant aroma is important in making the living environment comfortable for us. However, we should not forget that these some fragrances may induce allergic reactions. We need to understand such characteristics of fragrances before we use them.

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