

ORIGINAL ARTICLE

Use of topical herbal remedies and cosmetics: a questionnaire-based investigation in dermatology out-patients

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Abstract

Background Although topical remedies and cosmetics based on herbal ingredients are becoming increasingly popular with the public due to the perception that botanical compounds are safer and healthier than their synthetic counterparts, a large number of adverse cutaneous effects of plant extracts, notably contact sensitization, have been reported in medical literature.

Objective To evaluate the prevalence of herbal compound usage in a dermatological out-patient population and to estimate the incidence of consequent cutaneous side-effects.

Methods Four hundred patients were subjected to a self-administered 15-item questionnaire to assess both prevalence and type of topical botanical preparations used and occurrence of skin adverse reactions.

Results Two hundred forty-one patients (60.25%) reported use of natural topical products, predominantly aloe, marigold, chamomile, propolis and arnica. Females used herbal products, for both medicinal and cosmetic purposes, more frequently than males. Fifteen patients (6.22%) referred one or more adverse cutaneous reactions.

Conclusion Herbal preparations were widely used in the examined population, but, despite the common belief in the innocuous nature of botanical extracts, the incidence of side-effects referred by the patients confirms that they should be regarded as a potential source of adverse skin events. The lack of adequate patch testing in case of suspected contact allergic dermatitis, incomplete or misleading product labelling, and the risk of chemical adulteration may represent further concerns as regards application of botanical products.

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Keywords

adverse events, alternative medicine, botanical remedies and cosmetics, plant extracts

Conflicts of interest

None declared.

Introduction

In recent years, the demand for cosmetics and topical remedies containing botanical extracts has dramatically increased due to their pleasing fragrance, purported therapeutic properties, and the widespread perception that these products are safer than their synthetic counterparts.^{1,2}

Indeed, various active principles of herbal origin have been shown to exhibit curative effects and are thus marketed as treatments for numerous skin ailments.³ In fact, herbs may have antioxidant, anti-inflammatory, antibacterial, antifungal, antihistaminic, immune-stimulating, and sun-blocking activity; they may also reduce burning and itching, accelerate wound healing, strengthen capillaries, and act as antitumour promoters.⁴⁻¹² Moreover, plant extracts are included in many cosmetic formulations

designed to hydrate, moisturize, soften, cleanse, perfume, exfoliate, lighten or tan skin.¹³ Botanical ingredients are also widely used in hair care products such as hair growth stimulants, colorants and antidandruff treatments.

However, the healing properties of the medicinal herbs contained in many preparations marketed for their ostensible cosmetic and/or therapeutic attributes have not been documented; thus, adequate scientific proof of their efficacy is lacking.

Furthermore, despite the popular belief in the harmlessness of natural ingredients, numerous cases of potential adverse reactions to plant extracts have been reported,¹⁴ in particular cutaneous side-effects such as allergic contact dermatitis, irritant contact dermatitis, phototoxic reactions, airborne dermatitis, and contact urticaria.¹⁵⁻¹⁸

Table 1 Demographics of the enrolled population

Age (years)	Females			Males			Total		
	Allergy Unit	General Unit	Total	Allergy Unit	General Unit	Total	Allergy Unit	General Unit	Total
18–20	11	9	20	5	9	14	16	18	34
21–30	27	30	57	15	9	24	42	39	81
31–40	32	28	60	14	14	28	46	42	88
41–50	34	20	54	8	20	28	42	40	82
> 50	43	46	89	12	14	26	55	60	115
total	147	133	280	54	66	120	201	199	400

The aims of the present study were therefore to determine: (1) the popularity of topical products containing herbal components in a population from the north of Italy; (2) the most common botanical extracts contained therein; (3) the purported function of these preparations; (4) the reasons behind the choice of these non-conventional treatments; (5) their perceived tolerance and efficacy; and (6) the frequency of cutaneous reactions experienced in the population investigated, with a view to estimating the incidence of possible side-effects associated with the use of such remedies.

Materials and methods

The test population consisted of the first consecutive 400 out-patients aged over 18 who presented themselves to either the Allergy or General Units of the Dermatology Department and completed a self-administered 15-item questionnaire. Patients included in the study were not subject to any demographic or clinical selection, and refusal or inability to complete the questionnaire were therefore the sole exclusion criteria.

The questionnaire solicited the following information: demographics; use of topically applied botanical preparations (regular or occasional use, cosmetic and/or therapeutic aim); reasons for choosing natural products as opposed to conventional synthetic compounds; characteristics of the treatment employed (formulation, natural active principle/s, treated body surface/s, perception of efficacy and tolerability); and adverse reactions (skin signs and symptoms, location/s, presumed culprit/causative compound/s).

Results

Two hundred and eighty women (70% of the entire population) and 120 men (30%) filled in the questionnaire; the age distribution of the enrolled patients is shown in Table 1. Among the studied population, 201 patients were being treated at the Allergy Unit, while 199 were recruited at other Units of the Dermatology Department.

Two hundred and forty-one out of the 400 patients questioned (60.25%) used natural topical products: 184 were women (65.7% of the enrolled female population) and 57 were men (47.5% of the male population). In most cases, herbal preparations were used sporadically (51.75% of the interviewed people), while 8.5% of the studied population used botanicals on a regular basis. Table 2

shows the prevalence of herbal preparation usage among the enrolled patients according to sex and age, along with the purpose of use (cosmetic and/or therapeutic).

The reasons for choosing herbal remedies were found to be as follows: (1) perceived safety of botanical products with respect to synthetic preparations (50.2% of the answers); (2) curiosity about alternative remedies (43.1%); and (3) seeking an alternative treatment as conventional therapies had failed (6.7%).

Table 3 shows the different forms of herbal preparations used by the patients; the areas of the body treated with natural products are listed in Table 4; the patients' perception of efficacy and tolerability of treatments is reported in Table 5; and Table 6 shows the species of medicinal plants contained in the herbal cosmetics and remedies reported to be used by the studied population.

Analysis of the occurrence of self-reported adverse skin reactions is shown in Table 7. Skin side-effects are listed based on patients' age, medicinal and/or cosmetic use of herbal compounds, and affected body areas. Clinical patterns of cutaneous symptoms were not considered, as their incidence was based on patients' descriptions only and not assessed by a dermatologist. Fifteen patients (6.22% of the users) described adverse cutaneous events. The self-reported prevalence of adverse reactions among women (7.07%) was greater than that described by the male population (3.51%). The number of body areas involved (21 sites) exceeded the number of patients referring these events (15 patients) as five patients reported cutaneous reactions in more than one treated area (4 patients reported side-effects involving two different exposed surfaces, and one patient reported side-effects at three different exposed surfaces).

Discussion

Overall, 241 out of the 400 patients questioned (60.25%) were found to use natural topical products, which indicates the great popularity of these preparations in the population investigated.

Comparing the use of herbal preparations among the 10-year age groups (Table 2a), the largest prevalence was verified among 31- to 40-year-old patients (71.95%), while the 50-year-old patients were found to have a lesser tendency to use natural compounds (46.09%). The high prevalence found in the lowest age group (55.88% of 18- to 20-year-old patients) seems to suggest a great interest in alternative natural remedies among young adults.

Table 2 (a) Prevalence of herbal preparation usage among the enrolled population according to sex and age; (b) Medicinal and/or cosmetic use of herbal products

a

Age (years)	Females users (percentage of users in age group)	Males users (percentage of users in age group)	Total users	Enrolled population	Percentage of users in age group
18–20	10 (52.63%)	9 (47.37%)	19	34	55.88%
21–30	40 (76.92%)	12 (23.08%)	52	81	64.20%
31–40	46 (77.97%)	13 (22.03%)	59	88	71.95%
41–50	44 (75.86%)	14 (24.14%)	58	82	65.91%
> 50	44 (83.02%)	9 (16.98%)	53	115	46.09%
Total (percentage among whole users)	184 (76.35%)	57 (23.65%)	241 (100%)	400	60.25%

b

Age (years)	Females				Males				Total			
	Medicinal use	Cosmetic use	Medicinal and cosmetic use	Total	Medicinal use	Cosmetic use	Medicinal and cosmetic use	Total	Medicinal use (percentage of users in age group)	Cosmetic use (percentage of users in age group)	Medicinal and cosmetic use (percentage of users in age group)	Total (percentage of age users among whole users)
18–20	6	4	0	10	8	1	0	9	14 (73.68%)	5 (26.32%)	0	19 (7.88%)
21–30	16	16	8	40	7	2	3	12	23 (44.23%)	18 (34.62%)	11 (21.15%)	52 (21.58%)
31–40	13	25	8	46	9	3	1	13	22 (37.29%)	28 (47.46%)	9 (15.25%)	59 (24.48%)
41–50	16	23	5	44	11	3	0	14	27 (46.55%)	26 (44.83%)	5 (8.62%)	58 (24.07%)
> 50	22	18	4	44	7	2	0	9	29 (54.72%)	20 (37.74%)	4 (12.03%)	53 (21.99%)
Total	73/184 (39.67%)	86/184 (46.74%)	25/184 (13.59%)	184 (100%)	42/57 (73.68%)	11/57 (19.30%)	4/57 (7.02%)	57 (100%)	115/241 (47.72%)	97/241 (40.25%)	29/241 (12.03%)	241 (100%)

Table 3 Type and number of herbal products used (some patients used more than one product)

Type of herbal products	Number of used herbal products (percentage)
Face and body creams, ointments, lotions	187 (36.03%)
Facial and body cleansers	85 (16.38%)
Hair care formulations and treatments, hair cleansers, hair dyes	58 (11.18%)
Perfumes, fragrances and deodorants	52 (10.02%)
Make-up products	45 (8.67%)
Lip sticks and balms	41 (7.90%)
Intimate hygiene products	38 (7.32%)
Vaginal suppositories and gynaecological creams/lotions	8 (1.54%)
No answer	5 (0.96%)
Total	519 (100%)

Table 4 Treated body areas

Body areas treated	Females (% female users)	Males (% male users)	Total (% users)
Face	133 (31.52%)	35 (27.78%)	168 (30.66%)
Upper limbs	74 (17.54%)	27 (21.43%)	101 (18.43%)
Lower limbs	65 (15.4%)	23 (18.25%)	88 (16.06%)
Trunk	59 (13.98%)	20 (15.87%)	79 (14.42%)
Scalp	51 (12.09%)	18 (14.29%)	69 (12.59%)
Genital	39 (9.24%)	0 (0%)	39 (7.12%)
No answer	1 (0.24%)	3 (2.38%)	4 (0.72%)

Regarding gender differences, herbal products were reported to be used more frequently by women than by men: 184 (65.7%) of the enrolled female population as compared to 57 (47.5%) of the male population.

As far as reason for use is concerned, natural products were found to be employed topically for medicinal, cosmetic or, less frequently, both purposes (Table 2b). However, an interesting gender-related difference in reason for use of these products emerged from our data: among the 184 females using herbal preparations, 86 (46.74%) cited cosmetic use, 75 (39.67%) therapeutic use and 25 (13.59%) both uses, whereas the majority

Table 6 Referred botanical extracts contained in plant compounds

Botanical extract	Number of plant products used (percentage)
Aloe	105 (15.81%)
Marigold	91 (13.70%)
Chamomile	81 (12.20%)
Propolis	79 (11.90%)
Arnica	39 (5.87%)
Tea tree oil	38 (5.72%)
Stinging nettles	33 (4.97%)
Peppermint	30 (4.52%)
Centella asiatica	28 (4.22%)
Horse chestnut	24 (3.61%)
Echinacea	22 (3.31%)
Burdock	16 (2.42%)
Saint John's Wort	11 (1.66%)
Phyto-oestrogens	4 (0.60%)
Mallow	2 (0.30%)
Miscellaneous	19 (2.87%)
Not remembered	36 (5.42%)
No answer	6 (0.90%)
Total	664 (100%)

(73.68%) of the male patients reported use of natural products for curative purposes, and only 19.30% described cosmetic employ. Thus, while men mainly use herbal products as alternative medicaments, women also exploit the cosmetic benefits of topical plant extracts.

As found in previous studies,¹ our patients mainly used herbal remedies as they perceive them to be safer than synthetic alternatives. In addition, many patients cited their curiosity about alternative remedies as a reason for using botanical products or, to a lesser extent they resorted to them when conventional therapies had failed. Dermatological creams and ointments were the most widely used topical herbal preparations, although cleansers, hair care products, perfumes and make-up were also popular (Table 3). The face was found to be the area of the body treated most commonly (Table 4).

Herbal compounds were judged both efficacious and well tolerated by the majority of patients using these products (46.06%), although many others (40.66%) considered them well tolerated

Table 5 Patients' perception of efficacy and tolerability

Patients' perception	Females (% female users)	Males (% male users)	Total (% users)
Tolerated and efficacious	85 (46.2%)	26 (45.61%)	111 (46.06%)
Tolerated but of questionable efficacy	74 (40.22%)	24 (42.11%)	98 (40.67%)
Not tolerated	17 (9.23%)	2 (3.51%)	19 (7.88%)
Not efficacious	8 (4.35%)	5 (8.77%)	13 (5.39%)

Table 7 Adverse reactions in enrolled population (five patients reported side-effects at more than one exposed surface)

Patients' age	Number of patients reporting adverse reactions			Use of herbal products cited as cause of adverse reactions			Number of adverse reactions subdivided by areas involved					
	Allergy Unit	General Unit	Total	Medicinal use	Cosmetic use	Medicinal and cosmetic use	Scalp	Face	Upper limbs	Lower limbs	Trunk	Genitals
18–20	0	0	0	0	0	0	0	0	0	0	0	0
21–30	2	2	4	2	1	1	0	3	2	0	0	0
31–40	3	1	4	1	2	1	2	1	3	1	1	0
41–50	3	0	3	2	1	0	0	2	2	0	0	0
>50	2	2	4	2	2	0	1	3	0	0	0	0
Total	10	5	15	7	6	2	3	9	7	1	1	0
Total in %	66.67%	33.33%	100%	46.67%	40%	13.33%	14.29%	42.86%	33.33%	4.76%	4.76%	0%

but of questionable efficacy. Nineteen patients (7.88%) reported that they had ceased application of herbal compounds due to poor tolerability, and 13 patients (5.39%) considered them totally inefficacious (Table 5). These data suggest that, on the whole, botanical products are perceived by consumers as rather pleasant and beneficial.

As reported in Table 6, the most widely used medicinal plant in our population is aloe vera. Mucilaginous gel from the inner portion of the fleshy leaves of this plant, which contains mucopolysaccharides, vitamins and minerals, has both moisturizing and emollient effects,¹⁹ and it is commonly applied topically as an emollient for burns, sunburns, abrasions, and inflammatory skin disorders.²⁰ Furthermore, aloe has shown to exert antibacterial, antifungal, antiviral, antioxidant, antihistamine and anti-inflammatory effects. Table 6 shows that three Compositae plants (marigold, chamomile, arnica) are also among the top 10 herbal ingredients. The Compositae family comprises several medicinal plants which are used widely in modern topical remedies and cosmetics due to their purported pharmacological properties.^{1,4,13} Propolis and tea tree oil (*Melaleuca alternifolia* extract) also emerged as widely used natural ingredients.

Fifteen of the interviewed patients (6.22% of users) reported one or more adverse cutaneous reactions to herbal products (Table 7), and the prevalence of women reporting these side-effects (7.07%) was higher when compared to the male population (3.51%). A higher percentage (4.97%) of adverse skin reactions was found among people attending the Allergy Unit, as compared to patients attending the other Dermatology Units (2.51%). It is interesting that no side-effects were reported by the youngest patients (18–20 years-olds).

Our study examined a population composed of Dermatology out-patients, which could be seen as representing a selected sample. A limitation of our study is that both skin symptoms and causal relationship between exposure to herbal preparations and adverse skin reactions were retrospectively self-reported and not corroborated by clinical assessment by a dermatologist. As a consequence, our analysis did not consider the clinical pattern of skin reactions. The real imputability of herbal extracts to the reported

adverse effects was not proven either, and must be considered as suspect. Possible risk factors for contact dermatitis, such as atopic background and previous documented skin sensitization, were not investigated in our population.

In spite of these limitations, the considerable occurrence of adverse skin reactions to topically applied herbal preparations reported in our population seems to support that the perceived benignity of such products is actually a misconception. Indeed, scientific proof showing that compounds of natural origin are safer than synthetic ones has not yet been published.

In fact, the list of undesired effects of herbal remedies and cosmetics is long; many of the plants employed contain pharmacologically active substances or potential toxic components, or are capable of adversely interacting with other drugs.^{14,21,22}

The most common cutaneous side-effect of topical herbal preparations is allergic contact dermatitis.^{15,18,23} Aloe vera, for instance, which represented the most commonly used active principle of herbal origin in our population, is considered a weak sensitizer.²⁴ Likewise, the allergologic relevance of other plants (arnica, chamomile, propolis, tea tree and marigold) widely employed among the examined population has also been documented.^{25–29} Not only do plants contain potential allergens, they may also incorporate potent irritants.

When contact dermatitis due to topical products containing plant compounds is suspected, several problems must be taken in consideration. Patch tests including standard substances as well as the patient's own products are essential; however, as only a limited number of standardized botanical allergens are available, numerous cases may go unrecognized.^{30–32}

Of further concern is the fact that it is often difficult to standardize the active ingredients contained in botanical preparations.³¹ The concentration of active principles in extracts of natural origin can be considerably varied due to factors such as manufacturing technology, chemical reactions (oxidation), variety and origin of raw material, and to the possibility that the same substance may be carried in different ingredients.³³ Furthermore, in many countries, quality-control measures to ensure the purity, concentration, or safety of herbal components are not required by law.^{1,23,34,35}

Moreover, synthetic fragrances and preservatives may be present in products claiming to be based on natural ingredients;³⁶ for example, some topical products, like Chinese herbal creams, have repeatedly been shown to be adulterated with corticosteroids.^{37,38}

In addition, since terms like 'natural' and 'herbal' are perceived to indicate benign properties without the risk of adverse effects, patients often neglect to mention natural remedies or botanical cosmetics during medical histories recorded for evaluation of contact dermatitis.¹⁴ Furthermore, patients can be reluctant to divulge the use of these agents for fear of criticism from their physicians,¹ and these same physicians often fail to question patients about use of herbal products or supplements.

In conclusion, accompanying the growth in popularity of topical preparations containing botanical extracts, an increase in adverse effects from these products should be expected. Many patients may be unaware of the potential hazards of using these substances on their skin. Hence, dermatologists should always suspect botanical allergy in patients with contact dermatitis and a history of using medical or cosmetic products containing botanical extracts.

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References

- Bedi MK, Shenefelt PD. Herbal therapy in dermatology. *Arch Dermatol* 2002; **138**: 232–242.
- Eisenburg DM, Kessler RC, Foster C, Norlock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States: prevalence, costs and pattern use. *N Engl J Med* 1993; **328**: 246–252.
- Buchness MR. Alternative medicine and dermatology. *Semin Cutan Med Surg* 1998; **17**: 284–290.
- Brown DJ, Dattner AM. Phytotherapeutic approaches to common dermatological conditions. *Arch Dermatol*; **134**: 15–17.
- Koo J, Arain S. Traditional Chinese medicine for the treatment of dermatologic disorders. *Arch Dermatol* 1998; **134**: 1388–1393.
- Greenwood D. Honey for superficial wound and ulcers. *Lancet* 1993; **341**: 90–91.
- Lyss G, Schmidt TJ, Merfort I, Pahl HL. Helenalin, an anti-inflammatory sesquiterpene lactone from arnica, selectively inhibits transcription factor NF- κ B. *Biol Chem* 1997; **378**: 951–961.
- Korting HC, Schafer-Korting M, Hart H, Laux P, Schmid M. Anti-inflammatory activity of hamamelis distillate applied topically to the skin. *Br J Clin Pharmacol* 1993; **44**: 315–318.
- Efam SE, Udoh KT. The antimicrobial spectrum of honey and its clinical significance. *Infection* 1992; **29**: 527–529.
- Katiyar SK, Ahmad N, Mukhtar H. Green tea and skin. *Arch Dermatol* 2000; **136**: 989–994.
- Record IR, Dreosti IE. Protection by black tea and green tea against UVB and UVA+B induced skin cancer in hairless mice. *Mutat Res* 1998; **422**: 191–199.
- Lahiri-Chatterjee M, Katiyar SK, Mohan RR, Agarwal R. A flavonoid antioxidant, silymarin, affords exceptionally high protection against tumor promotion in the SENCAR mouse skin tumorigenesis model. *Cancer Res* 1999; **59**: 622–632.
- Aburjai T, Natsheh FD. Plants used in cosmetics. *Phytother Res* 2003; **17**: 987–1000.
- Ernst E. Adverse effects of herbal drugs in dermatology. *Br J Dermatol* 2000; **143**: 923–929.
- Bruynzeel DP, Van Ketel WG, Young E, van Joost T, Smeenk G. Contact sensitization by alternative medical medications containing plant extracts. The Dutch Contact Dermatoses Group. *Contact Dermatitis* 1992; **27**: 278–279.
- Koh D, Ong CN. Phytophotodermatitis due to the application of *Citrus hystrix* as a folk remedy. *Br J Dermatol* 1999; **140**: 737–738.
- Schaller M, Korting HC. Allergic airborne contact dermatitis from essential oils used in aromatherapy. *Clin Exp Dermatol* 1995; **20**: 143–145.
- Kiken DA, Cohen DE. Contact dermatitis to botanical extracts. *Am J Contact Dermat* 2002; **13**: 148–152.
- Klein AD, Penneys NS. Aloe vera. *J Am Acad Dermatol* 1988; **18**: 714–720.
- Reynolds T, Dweck AC. Aloe vera leaf gel: a review update. *J Ethnopharmacol* 1999; **68**: 3–37.
- Mochitomi Y, Inoue A, Kawabata H, Ishida S, Kanzaki T. Stevens–Johnson Syndrome caused by a health drink (Eberu*) containing ophiopogonis tuber. *J Dermatol* 1998; **25**: 662–665.
- Greer JM, Rosen T, Tschen JA. Sweet's syndrome with an exogenous cause. *Cutis* 1993; **51**: 112–114.
- Thomson KF, Wilkinson SM. Allergic contact dermatitis to plant extracts in patients with cosmetic dermatitis. *Br J Dermatol* 2000; **142**: 84–88.
- Morrow DM, Rapaport MJ, Strick RA. Hypersensitivity to aloe. *Arch Dermatol* 1980; **116**: 1064–1065.
- Paulsen E. Contact sensitization from Compositae-containing herbal remedies and cosmetics. *Contact Dermatitis* 2002; **47**: 189–198.
- Reider N, Komericki P, Hausen BM, Fritsch P, Aberer W. The seamy side of natural medicines: contact sensitization to arnica (*Arnica montana* L.) and marigold (*Calendula officinalis* L.). *Contact Dermatitis* 2001; **45**: 269–272.
- Giorando-Labadie F, Schwarze MP, Bazex J. Allergic contact dermatitis from chamomile used in phytotherapy. *Contact Dermatitis* 2000; **42**: 247.
- Ting PT, Silver S. Allergic contact dermatitis to propolis. *J Drugs Dermatol* 2004; **3**: 685–686.
- Knight TE, Hausen BM. Melaleuca oil (tea tree oil) dermatitis. *J Am Acad Dermatol* 1994; **30**: 423–427.
- Johansen JD, Anderson TE, Veien N, Avnstorp C, Andersen KE, Menné T. Patch testing with markers of fragrances contact allergy. Do clinical tests correspond to patients' self-reported problems? *Acta Derm Venereol (Stockh)* 1997; **77**: 149–153.
- Aberer W. Contact allergy and medicinal herbs. *J Dtsch Dermatol Ges* 2008; **6**: 15–24.
- Simpson EL, Law SV, Storrs FJ. Prevalence of botanical extract allergy in patients with contact dermatitis. *Dermatitis* 2004; **15**: 67–72.
- Koh HL, Woo SO. Chinese proprietary medicine in Singapore: regulatory control of toxic heavy metals and undeclared drugs. *Drug Saf* 2000; **23**: 351–362.
- Huxtable RJ. The harmful potential of herbal and other plant products. *Drug Safety* 1990; **5** (Suppl. 1): 126–136.
- Ang HH, Lee KL. Evaluation of mercury contamination in *Smilax myositiflora* herbal preparations. *Int J Toxicol* 2007; **26**: 433–439.
- Rastogi SC, Johansen JD, Menné T. Natural ingredients based cosmetics. Content of selected fragrance sensitizers. *Contact Dermatitis* 1996; **34**: 423–426.
- Wood B, Wishart J. Potent topical steroid in a Chinese herbal cream. *NZ Med J* 1997; **110**: 420–421.
- Keane FM, Munn SE, du Vivier AWP et al. Analysis of Chinese herbal creams prescribed for dermatological conditions. *Br Med J* 1999; **318**: 563–567.