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Tobacco-induced contact dermatitis

Tobacco and tobacco smoke are strongly associated with various skin conditions, among which contact dermatitis is of prime importance. The aetiological and clinical aspects vary according to the different tobacco production and processing steps. Contact dermatitis is frequent in tobacco harvesters, curers and cigar makers, whereas it rarely affects smokers and, only exceptionally, cigarette packaging workers. The skin sites involved also vary, according to whether the exposure is occupational or non-occupational. Tobacco contact irritation is far more frequent than contact allergy. The sensitizing compound in tobacco is unknown; nicotine, while highly toxic, does not seem to cause sensitization, except in rare cases. Besides natural substances, several compounds are added to tobacco during processing and manufacturing. For this reason, identifying the aetiological factors is exceedingly difficult. Another important aspect to take into account is the co-causative role of tobacco in eliciting or exacerbating contact dermatitis in response to other agents, occupational or extra-occupational.

Key words: tobacco, *Nicotiana tabacum*, smoking, contact dermatitis, occupational, aeromediated

The international scientific literature encompasses a series of studies focusing on tobacco as a direct or concomitant aetiological factor for different cutaneous conditions [1, 2], especially contact dermatitis. With regards to the latter, current evidence can be classified as follows:

(1) Research conducted in occupational environments, such as the tobacco industry, ranging from the production of crops and harvesting, to the finished product. Various workers can be affected during the different stages: farmers, harvesters, curing and packaging workers [3-12].
(2) Reports of observations of rare cases of extra-occupational contact dermatitis with cigarettes [13, 14] or smoke [15, 16].
(3) Studies focusing on the complementary influence of tobacco smoke on contact dermatitis from other causes, either occupational or not [17-26].

As other authors have remarked in the past [5, 27], given the considerable aetiopathogenetic and clinical implications, we believe that the topic warrants further analysis, particularly to establish a correct methodology for studying alleged cases of contact dermatitis resulting from tobacco.

Tobacco (*Nicotiana tabacum* L.) and its manufacturing

Nicotiana tabacum L., of the Solanacaee family (*figure 1*), is an annual (sometimes bi- or triennial) herbaceous plant, that grows 1-3 metres high. It is native to tropical America, although it has since been farmed in many other areas of the world, except northern regions. From a commercial standpoint, together with *N. rustica* L., which grows in northern territories, it is the most important species of its kind. Long considered as a single species, *N. tabacum* L. is, instead, a mix of various different forms and of hybrid origin

Figure 1. *Nicotiana tabacum L.*.

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(*angustifolia, brasiliensis, fruticosa, havanensis, latissima, macrophylla, virginica, etc.*) [3, 4, 27, 28].

The natives of America had long smoked tobacco in pipes, or as rolled-up dessicated leaves, or even sniffed or chewed them. It was a Spanish monk, Thevet, who then introduced tobacco to Europe in 1517 [12].

Just like wine, the chemical constituents of ripe tobacco qualitatively and quantitatively depend on several factors: the hybrid state of the plant, the soil and climate, the height of the leaves, the time and method of the harvest, the type of curing (air or humidity), the plant age, and the method and length of fermentation of the leaves. The chemical composition, which also varies within different areas of the same leaf, includes different waxes, paraffins, fatty acids, organic acids, ketones, aldehydes, phenols and polyphenols, catechols, tannins, nicotine, nor-nicotine (demethylated nicotine), anabasine (3-pyridyl-2-piperidine), and many other low molecular weight substances.

The main toxic compound is nicotine (C10H14N2), that ranges in quantity from 1% to 10%, depending on the variety of tobacco. Nicotine is freed through fermentation and curing, along with ammonium, carbon oxide, carbon dioxide, and furanic aldehyde. Despite the intense odour and mucosal irritation and headache, as complaints by trainee tobacco workers, poisoning symptoms (nausea, vomiting, mental confusion, and convulsions) are rare among tobacco industry workers, whereas these symptoms are more frequent in workers handling nicotine used in agricultural pesticides. As can be deduced from its chemical formula (*figure 2*) and as first stated by Sulzberger in 1934 [29], nicotine would appear to be non-sensitizing, except in rare cases.

Many different occupational categories are involved in tobacco manufacturing (*table 1*). Farmers tend the plants, using insecticides, herbicides and compounds, which speeds up the growth and ripening processes [12]. In late autumn, harvesters pick the ripe green leaves, cut them in the fields, load them onto transport vehicles, and finally hang them in curing barns or huts. Tobacco curing goes through a slow excitation process, lasting 1-2 months, generally obtained by warm air conditioning. The fermentation stage, that occurs due to the plant's own enzymes (oxidases and peroxidases), follows after moistening of the leaves, which are kept under specific conditions for several months. The leaves are then bundled, pressed, and sent to the factory. There, the processing starts with "stripping": the removal of nerves from each leaf.

When making cigars, different varieties of tobacco are mingled with specific tools; the nucleus is wrapped in half a leaf of tobacco and the extremities are plugged with glue derived from alginates, mucillages or cellulose compounds. Some cigars are treated with matting agents. Most of these stages are still performed by hand. The process of making cigarettes, on the other hand, is highly industrialised these days; tobacco strips are blended, moistened with water vapour, and minced. Tobacco is then left to dry, before being toasted and adding fragrances. Finally, the bundling, paper wrapping, and filter placement occur through an automated process.

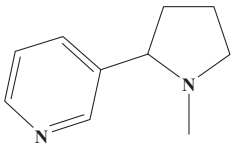

Figure 2. The structural formula of nicotine-[(S)-3-(1-methyl-2-pyrrolidinyl) pyridine].

Table 1. Occupational categories and pertinent contactants in the tobacco industry.

Farmers
Tobacco plants
Fertilizers
Insecticides
Herbicides
Ripening agents
Growing agents
Harvesters
Tobacco leaves
Pesticides
Tobacco curers
Tobacco leaves
Volatile substances (nicotine, ammonium, carbon monoxide and carbon dioxide, furanic aldehyde)
Manufacturing personnel
Tobacco leaves
Glues
Colour diluting agents
Aromatic substances
Olive oil
Food aromas
Alcohols
Wines
Sweeteners
Moistening and preserving agents
Colorants
Bactericides and fungicides
Plasticizers

Tobacco rolls can be lubricated with olive oil. Aromatic substances used are industrial secrets, as is so often the case, and account for 1-5% of the total product weight. As a matter of fact, many of these substances are listed in periodic publications [30]; they include wines, alcohols, honey, cocoa, caramel, balsams, food aromas (menthol, vanillin, and isoeugenol), and licorice [14]. Moistening and preserving agents are allowed, such as parabens, propylene glycol, sorbic acid and its salts for tobacco; thiabendazole, hexamethylene-tetramine or formaldehyde for paper and glues. Combustion-altering agents include acetates, lactates, malates, nitrates, tartrates, or alum. Adhesives used in cigars are made from gum arabic, Tragacanth gum, melamine formaldehyde, urea-formaldehyde, or glyoxal. The external wrapping of cigars and cigarettes can be coloured with tartrazine or erythrosine. Cigarette paper may contain formaldehyde, bronopol, ziram and isothiazolinones, while triacetin (glycerol triacetate) is applied to the filter as a plasticizer [11].

Tobacco toxicity

The best characterised chemicals found in tobacco and tobacco smoke include polycyclic aromatic hydrocarbons (PHs), such as benzopyrene, and the highly addictive alkaloid, nicotine and its metabolites. PHs have traditionally

been implicated in tobacco-related carcinogenesis, exerted through DNA binding and consequent damage/mutation [31]. Nicotine, working through the neuronal nicotinic acetylcholine receptors in the brain, is responsible for the addictive nature of tobacco use; the alkaloid has also been implicated in conditions such as delayed wound healing and reproductive disorders [32].
It has become apparent that nicotine binds to multiple receptors and activates several highly central signal transduction pathways. Furthermore, nicotine is converted, during the production of cigarettes and chewing tobacco, to two highly mutagenic nitrosamines, N'-nitrosonornicotine and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone, and is metabolised *in vivo* to cotinine. As a result, nicotine exerts, both directly and indirectly through its metabolites, various cell-type specific effects, altering functions such as the production of cell surface and extracellular matrix proteins, proliferation, attachment to various surfaces, and chemotaxis [33]. Exposure of macrophages to stream cigarette smoke condensates in an animal model showed how macrophages fail to acquire functional capabilities in response to IFN-γ, such as antibody-mediated phagocytosis and surface expression of class II MHC [34]. Nicotine has also been implicated in the generation of free radicals and the process of programmed cell death in human cell models. In particular, a study focusing on nicotine-induced premature aging found increased levels of cell cycle regulating proteins, such as p21, bcl-2, and caspase 3 after acute nicotine exposure [35]. Finally, a few studies suggest a genotoxic effect of nicotine itself [33, 36].

Contact irritation and contact allergy

As discussed above, there are many irritant or sensitizing agents in tobacco production that generally vary depending on the stage of manufacture. Therefore, in cases of contact dermatitis, besides tobacco itself, all the above-mentioned contactants should be considered as possible aetiological agents. In this way, various reported cases, which have remained undiagnosed from an aetiological perspective and sometimes been incorrectly attributed to contact with tobacco, could likely have been more precisely characterised.
There is a prevalence of contact irritation cases in the literature resulting from the mechanical-traumatic action of tobacco itself or from the chemical-pharmacological actions of substances, such as nicotine and alkaloids. Irritant contact dermatitis is frequent both in tobacco harvesters/curers and in cigar makers. These subjects can also develop contact allergy to tobacco, given that even nowadays they are constantly exposed to contact with tobacco leaves [5, 6, 11, 37-41]. Allergic contact dermatitis is, however, less frequent than irritation, while it appears to be exceptional among smokers [42-44] and tobacco sniffers [45].

Occupational clinical aspects

The affected site and the morphology of the dermatitis vary according to the tobacco production stages. Tobacco harvesters show mild eczematous lesions on the hands, generally caused by mechanical trauma or the alkalinity of tobacco [3, 5, 6]. These workers sometimes show a peculiar presentation, with bilateral involvement of the ventral and medial surfaces of the arms (one side generally being more severe than the other); eczematous lesions can also affect the back and the armpits. This distribution pattern reflects the common way these workers harvest and carry tobacco leaves; under their arms pressed against the body. The arms are generally more extensively involved than the trunk, probably because they are often left bare [12]. Both of these clinical presentations can be provoked by tobacco itself, or by substances used on the crops, such as pesticides and growth-enhancing (maleic hydrazide) and ripening (etephon) agents [12].
Workers processing tobacco leaves often present with contact dermatitis of the hands (the fingertips in particular) with variably severe lesions which can extend to the forearms. The affected skin turns brown by direct contact with tobacco, but the stain is easily rinsed off with soap and water. Another characteristic feature of these workers is calloused fingertips and nail involvement, secondary to the "stripping" manoeuvre; the brown stain is followed by thickening of the nail plates, distal onycholysis, and subungual hyperkeratosis [3, 5, 11]. An aeromediated mechanism can induce, although rarely, eczematous lesions on the face from contact with air-dispersed tobacco powder [8, 11].
In the rare cases of contact allergy to tobacco (*table 2*) [46-49], the dermatitis is notably resistant and the patient is ultimately forced to change employment, although cases of spontaneous desensitization have been described [48]. In one worker employed in a cigarette factory, hand contact allergy was due to triacetin contained within filters; patch tests were also positive for diacetin and acetin [49].

Extra-occupational clinical aspects

Contact dermatitis in smokers is rare (*table 2*) [50-54]. The first case of contact allergy dates back to 1965, with a description of a man with an intermittent vesicular eczema of the hands. This observation, however, already clinically unconvincing, had been assessed by intradermal tests, rather than by patch tests [51]. Other cases caused by aeromediated contact with tobacco smoke [14-16, 42, 44, 53] or from contact with additives, such as fragrances [15] and sorbic acid [13], are better documented.
Besides the palms, the face can be affected by the aeromediated forms, often showing vertical dark lines extending from the nostrils down to the upper lip, or diffuse hyperpigmentation [15, 16]. In cases of such involvement in smokers, however, an airborne contact allergy to the fumes of phosphorus sesquisulfide, an igniting chemical present in the head of particular brands of matches ("zolfanelli"), should also be suspected [55]. As we have demonstrated, these matches can also induce allergic contact dermatitis on the antero-lateral surface of the thighs (when kept in trouser pockets) or on the anterior aspect of the trunk (when kept in the shirt pocket) [55].
Smokers can also show oral mucosa alterations, such as "nicotinic stomatitis" [27, 56], leukoplakia, and "palatitis ab igne" [57]. The latter, characterised by intense dark plaques on the central palate, has been described in a Philipino

Table 2. Cases of occupational and non-occupational tobacco allergic contact dermatitis in the literature.

Publication	No. of cases	Type of contact	Site of dermatitis	Allergen(s)	Skin test	Strength of report
Karrenberg [46]	1	O (packed tobacco leaves)	Hands, face	Tobacco leaves	PT	CR
Stauffer [47]	1	O (tobacco leaves)	Hands	Moist tobacco leaf	PT	CR
Franchi [37]	60	O (cigar workers)	Hands	Fermented tobacco	PT near dermatitis site	UC
Vero and Genovese [38]	3	O (cigar workers)	Hands, thighs, buttocks	Tobacco leaves	PT	CR
Samitz *et al.* [39]	3	O (cigar and cigarette workers)	Hands	Tobacco leaves	PT	CR
Calnan [40]	1	O (tobacco leaves)	Diffuse	Tobacco leaves	PT	CR
Chanial *et al.* [48]	9	O (tobacco leaves)	Hands, face	Dry and moist tobacco	ST (positive in 3 cases)	UR
Unna and Schulz [49]	1	O (tobacco leaves)	Hand	Triacetin	PT	CR
Rycroft *et al.* [6]	1	O (cigarette worker)	Hands	Fresh tobacco leaf	PT	CR
Pecegueiro [8]	1	O (air-cured tobacco)	Light-exposed areas	Cured tobacco leaf	PT	CR
Gonçalo *et al.* [9]	1	O (tobacco worker)	Exposed areas	Dry and green tobacco leaves	PT	CR
Newman [50]	1	CS	Hand, upper lip	Diethylene glycol	PT	CR
Cormia and de Gara [51]	1	CS	Hand	Tobacco	IT with immediate reaction	UR
Weary and Wood [42]	1	CS	Hand	Tobacco residues	PT	CR
Shanon and Tas [45]	1	TS	Nostrils	Tobacco	PT (false positive reactions in controls)	UR
Camarasa and Alomar [52]	1	CS	Fingers, upper lip, around the mouth	Menthol	PT	CR
Dawn *et al.* [53]	314	CS	Face	Various parts of cigarettes Components of matches	PT (positive in 31 patients)	CR
Neild [43]	1	CS	Lips	Smoked filter	PT	CR
Lowell and White [44]	1	CS	Fingers, lower lip	Tobacco leaf	PT	CR
Kato *et al.* [15]	1	CS	Upper lip	Tobacco smoked	PT	CR
Sasaya *et al.* [16]	1	CS	Face	Brands of unsmoked tobacco	PT	CR
Carew and Muir [54]	1	CS	Smoking hand	Formaldheyde, smoked filter paper	PT	CR

O: occupational; CS: cigarette smoker; TS: tobacco sniffer; PT: patch testing; ST: scratch testing; IT: intradermal test with immediate reaction; CR: convincing report; UR: unconvincing report.

woman who used to smoke a pack of cigarettes per day, holding the ignited extremity in her mouth.
Tobacco sniffers can present with contact dermatitis involving the skin around the nasal choanae [45].

Contact urticaria

Urticaria caused by tobacco and/or its additives commonly shows a direct pharmacological mechanism, or more rarely, an indirect immunological mechanism. Tosti *et al*. reported a case of generalized immunological contact urticaria in a cigarette machine operator. The symptoms began each day, 15-30 minutes after she started working. The total IgE count was normal, while open tests with the different types of tobacco she handled were positive, as was the prick test with tobacco powder. The authors could not perform the radioallergosorbent test with tobacco powder [58].

Tobacco smoke and contact dermatitis from various causes

Different studies have focused on the possible pathogenic role of tobacco smoke in contact dermatitis resulting from other occupational or extra-occupational causes. The first study, carried out in 153 cases of vesicular eczema of the palms, revealed a relevant correlation, especially in males and non-atopic subjects; tobacco smoke was also related to young age [17]. The same significant association was noted in metalworkers showing hand contact dermatitis in response to cutting oils [18]. However, another observation in metalworkers failed to establish a relevant association [19]. An epidemiological survey of the general population in the south of Sweden showed cigarette smoke to be a risk factor for hand contact allergy, regardless of gender and age [21]. A similar study carried out in the north of Norway demonstrated a significantly increased risk in women but not in men [23]. A significant correlation between contact allergy to nickel and tobacco smoke has recently been observed, especially in long-term heavy smokers [20, 24], although another recent study failed to link tobacco smoke to contact allergy [22].
From the above evidence, we can conclude that there is an overall significant association between contact dermatitis and tobacco smoke. As tobacco smoke exerts a negative influence on the immune system [59], many authors believe this influence may extend to the regulation of T-helper mediated immune reactions, thereby fostering the development of contact allergy [20, 26]. Cigarette smoke may also have non-immunological effects, such as reducing the blood flow to the skin, thus altering patch test reactivity [60]. Further studies are needed to better clarify the influence of tobacco smoke on the onset of contact dermatitis elicited by other causes.

Skin tests

Assessment of a suspected case of contact dermatitis in response to tobacco is based on medical history, clinical features (and especially the involved sites), and patch tests results. The personal and family history of atopic eczema, asthma, or hay fever should be investigated, as well as previous contact dermatitis caused by various occupational and non-occupational factors (focusing on inexpensive jewellery and perfume). *Figure 3* illustrates a useful flowchart for a correct diagnosis.
Patch testing should be carried out by experienced physicians in order to distinguish between genuine allergic and false-positive irritant reactions [6]. Besides the standard series, substances to be tested should include cigar and cigarette components, as well as various other allergens added to tobacco during the manufacturing and processing (*table 3*) [5-7, 11, 15, 16, 38, 53, 55, 58, 61-66]. Among these numerous compounds, selection should be based on the patient's clinical features and history.
For cigar makers, the various kinds of green tobacco and cured green leaves should be tested; either the leaves themselves or the respective extracts (usually 1:10 in alcohol and/or ether).
The chemical diversity from one tobacco leaf to another may give rise to false-positive and false-negative patch test reactions. It is therefore essential to test patients with the specific tobacco leaf with which contact has occurred, rather than using a "standard" tobacco leaf [67].
Smokers should be tested with smoked and unsmoked cigarette components (tobacco, paper, ash, or filter), as allergens may originate or be activated during combustion [14, 54]. Patch tests should include all the specific brands and types of cigarettes that the individual smoked, including those borrowed from friends [14]. As a matter of fact, Carew and Muir reported the case of a patient who did not react to her usual roll-your-own cigarette compounds but did react to the smoked filter paper of a particular brand of cigarettes she frequently borrowed from a friend [54].
In order to test cigar and cigarette components, Finn® chambers can be used; each component is placed in an aluminum chamber and secured with purified petroleum [14]. Patch test sites are evaluated at 48, 72, and 96 hours. A large control group (20-30 subjects) should always be concurrently tested with the same substances to discern false-positive reactions, which have frequently been reported in the literature [5, 7, 14, 54, 58, 61, 67].
The sensitizing substance in tobacco itself is unknown. It is likely a volatile, thermostable, coctostable substance, which remains active even after tobacco excitation and curing; it is soluble in ether and alcohol, less so in acetone, and is present in green as well as yellow desiccated leaves. Nicotine, tested in various studies, from 0.5% to 4% in pet, and up to 20% in alcohol and water, has led to negative results [5, 6, 9, 11, 27]. However, some evidence in the literature suggests that base nicotine in transdermal patches might play an aetiological role, and it has been tested accordingly in aqueous solutions from 1% to 50% [63-65]. Other nicotine derivatives and reactive substances cannot be excluded as possible sensitizing agents.
In addition to the above cigar and cigarette components, the standard series of allergens should always be tested (in particular fragrance mix, balsam of Peru, formaldehyde, isothiazolinones, and parabens mix), as well as the various additives used in tobacco production and processing (in particular, cocoa, menthol, liquorice, and colophony) [14, 68]. In smokers, when observing an airborne contact dermatitis involving the face and possibly the hands,

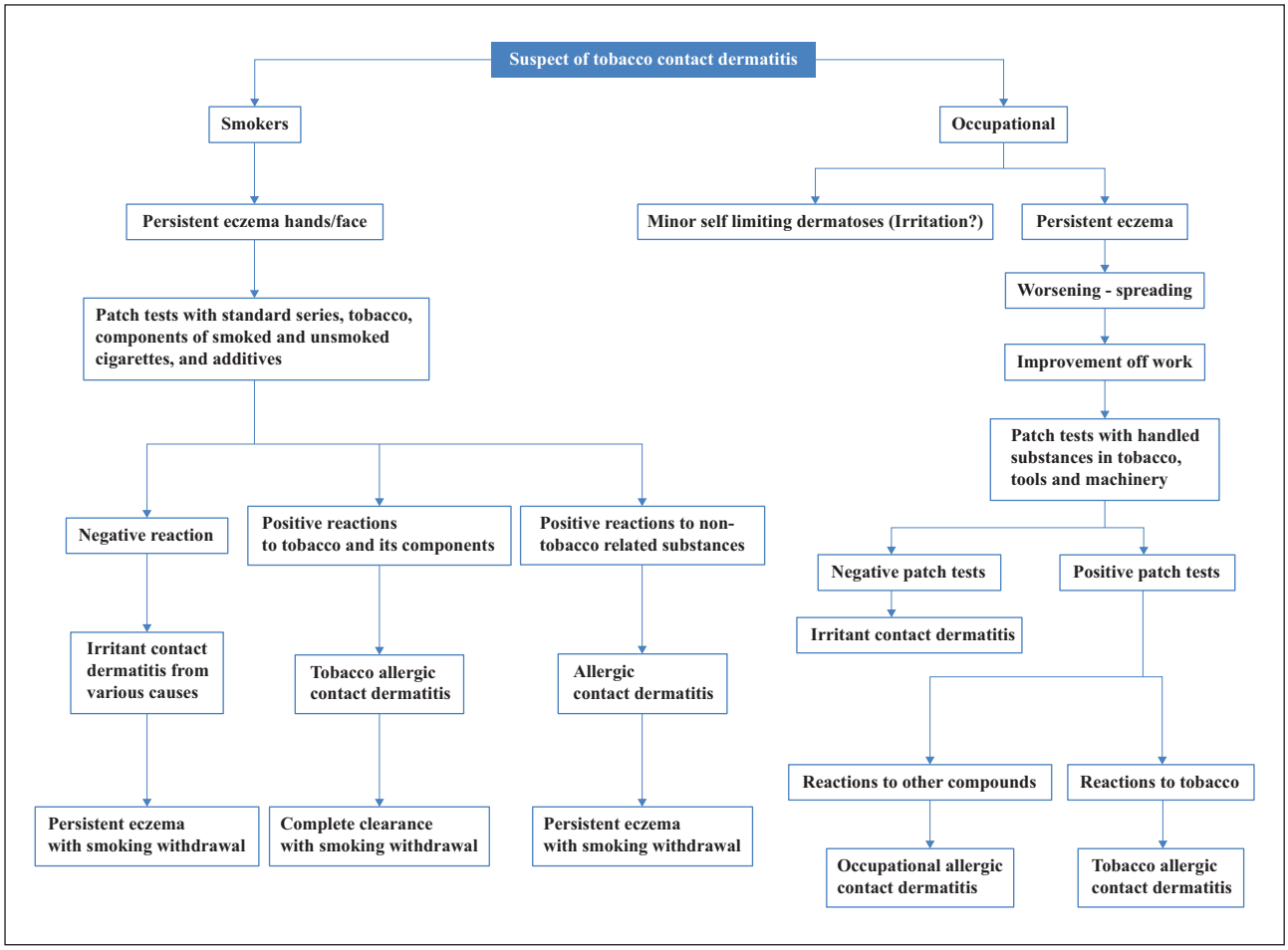

Figure 3. Flow diagram of evaluation of suspected tobacco contact dermatitis.

volatile substances contained within matches, such as phosphorus sesquisulfide, as well as "strike anywhere" match heads themselves, should also be tested [53, 55].
With regards to additives, the Philip Morris website lists all the ingredients and their respective proportions for the various kinds of products [69]. More information on the subject is available from Bates *et al*. [70].
Besides standard patch tests, some authors carry out 20-minute patch tests with tobacco leaf and prick tests with moistened tobacco leaf [67]. In cases of contact urticaria, the open patch test with green leaves and prick test with tobacco powder are used [58].

Discussion

Tobacco production workers are exposed to a wide array of irritant and/or sensitizing agents, some of which are natural components of the plant while others are added during the farming and manufacturing stages. Although to a much lesser degree and with decreased risks, smokers are exposed to the same substances.
It should also be noted that tobacco combustion generates more than 4,000 volatile compounds [66].
Tobacco smoke can be subdivided into gas and particulate phases. The gas portion comprises carbon monoxide and carbon dioxide, nitrogen oxide, ammonium, volatile nitrosamines, hydrocyanide, volatile sulphur compounds, nitriles and other nitro-derivatives, hydrocarbons, alcohols, aldehydes, and ketones. The particulate is made up of nicotine, water and tar [66].
Contact dermatitis, through either direct or aeromediated mechanisms, is relatively common among harvesters and workers in cigar manufacturing, while it is substantially less frequent in cigarette production plant workers and smokers. From a clinical perspective, the variety of morphological patterns and body sites involved is surely peculiar. The aetiological sensitizing substance in tobacco has, however, yet to be revealed. Nicotine, a small molecule (molecular weight: 162.23) that easily passes through skin, has been demonstrated to act as a sensitizer only when contained within transdermal patches; conversely, patch tests of tobacco workers and smokers affected by contact dermatitis are generally negative.
Tobacco smoke also seems to be a risk factor for the development of contact dermatitis due to other causes, although the pathogenic mechanism is still unclear.
Considering the range of consistent pathological conditions and alterations (both systemic and cutaneous) [1, 2, 71] induced by tobacco use (*table 4*), we and others firmly believe that dermatologists share the responsibility to encourage smokers to quit, in order to promote general health and a better skin condition and appearance, in

Table 3. Substances to patch test in subjects with suspected tobacco contact dermatitis.

Standard allergens
Balsam of Peru, 25% pet (flavouring agent)
Fragrance mix, 8% pet (flavouring agent)
Colophony, 20% pet (water-resistant agent in cigarette filter)
Cl- and Me- isothiazolinone, 0.01% aq (preservative in paper and glues)
Formaldehyde, 1% aq (preservative)
Parabens mix, 16% pet (preservative in tobacco)
Nickel sulphate, 5% pet (tools, machinery)
Cigarette and cigar components
Cigarette unsmoked filter, as is
Cigarette smoked filter, as is
Cigarette unsmoked tobacco, as is
Cigarette smoked tobacco, as is
Cigarette ash *, as is
Cigarette paper, as is
Tobacco wet green leaf **, as is
Tobacco dry green leaf **, as is
Tobacco cured leaf **, as is
Nicotine, 0.5-20% aq or alcohol or pet
Additional allergens
Menthol, 2% pet (flavouring agent)
Isoeugenol, 1-5% pet (flavouring agent)
Anethole, 2-5% pet (flavouring agent)
Orange oil, 2% pet (flavouring agent)
Peppernut oil, 2% pet (flavouring agent)
Vanilla, as is (flavouring agent)
Vanillin, 10% pet (flavouring agent)
Cocoa and cocoa products (flavouring agents)
Liquorice extract, 0.5-5% pet (flavouring agent)
Cedar woods **, as is (boxes for cigar)
Sorbic acid, 2% pet (preservative in tobacco)
Thiabendazole, 1% pet (preservative in tobacco and glues)
Glycerol triacetate, 1-10% alcohol (plasticizer in cigarette filter)
Propylene glycol, 10% aq (texture agent in tobacco and paper)
Bronopol, 0.5% pet (bactericide and fungicide in tobacco, wrappers and glues)
Formaldehyde resins (urea-melamine), 10% pet (adhesives)
Hesamethylenetetramine, 2% pet (preservative in wrapping for tobacco and glues)
Dimethyldithiocarbamate (Ziram), 1% pet (biocide in tobacco, wrappers and glues)
Bis(diethyldithiocarbamate) zinc (Zineb), 1% pet (pesticide)
Manganous ethylenebis (dithiocarbamate) (Maneb), 1% pet (pesticide)
Gum arabic, 50% aq (vegetable gum)
Tragacanth gum, 1% aq (vegetable gum)
Diethylene glycol, 2% aq (anti-drying agent)
Phosphorus sesquisulfate, 1% pet (in matches)
"Strike anywhere" match heads, as themselves

**Combusted remnants of tobacco from the filter end of smoked cigarette; **In occupational environments only.*

particular. This advice should be given regularly, along with other recommendations, such as those concerning appropriate sun/UV exposure, as a part of the dermatologist's daily prevention strategy. ■

Table 4. Cutaneous and systemic conditions associated with tobacco.

Influence on disease onset and/or exacerbation
Psoriasis
Palmo-plantar pustulosis
Surgical wounds (healing delay)
Squamous cell carcinoma of the skin
Squamous cell carcinoma of the lips
Squamous cell carcinoma of the anogenital region
Squamous cell carcinoma of the oral cavity
Hidradenitis suppurativa
Lupus erythematosus (systemic, subacute, chronic)
Favre-Racouchot syndrome
Contact allergy
Hair loss
Direct cause
Oral melanosis (tar deposits)
Irritant contact dermatitis
Allergic contact dermatitis
Airborne irritant and contact allergy
Pigmentation of upper lips
Contact urticaria
Nicotine stomatitis
Palatitis ab igne
Oral leukoplakia
Urticaria
Black hairy tongue
Peridontal disease
Cosmetic effects
Dark yellow colouration of finger and fingernails
Calluses of finger tips (tobacco strippers)
Broken nails (tobacco strippers)
Brown colour of hands (tobacco strippers)
Extrinsic skin aging (facial rhytides)
Facial elastosis
Changes in tooth colour
Dryness of facial skin
Systemic diseases
Lung cancer
Other cancers
Chronic obstructive pulmonary disease
Pneumonia / influenza (worsen)
Coronary heart disease
Cerebrovascular disease
Diabetes (worsen)
Inflammatory bowel disease (worsens Crohn's disease / improves ulcerative colitis)

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