



## **Menthol Capsules in Cigarette Filters – Increasing the Attractiveness of a Harmful Product**

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Increasing the Attractiveness of a Harmful Product

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Responsible for the content:

German Cancer Research Center (DKFZ)  
Unit Cancer Prevention and  
WHO Collaborating Centre for Tobacco Control

Head:

Dr. Martina Pötschke-Langer

Im Neuenheimer Feld 280  
D-69120 Heidelberg, Germany

Phone: +49 (0) 62 21 42 30 07

Fax: +49 (0) 62 21 42-30 20

Email: [who-cc@dkfz.de](mailto:who-cc@dkfz.de)

Internet: [www.tabakkontrolle.de](http://www.tabakkontrolle.de)

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## **Menthol Capsules in Cigarette Filters – Increasing the Attractiveness of a Harmful Product**

### **Authors**

Dipl. Biol. Sarah Kahnert

Dr. Martina Pötschke-Langer

Susanne Schunk

Dr. Urmila Nair

Dr. Katrin Schaller

Ute Mons, M. A.

**German Cancer Research Center, Heidelberg**



# Contents

- Preface** ..... V
- Key points** ..... VII
  
- 1 Menthol and its significance as a cigarette additive** ..... 1
  
- 2 Cigarettes with menthol capsules embedded in the filter** ..... 3
  - 2.1 Menthol content and possible influence on tobacco smoke composition ..... 6
  - 2.2 Development of capsule cigarette filters ..... 7
  - 2.3 Marketing of cigarettes with menthol capsules: target group young consumers ..... 13
  
- 3 The market for menthol cigarettes and the target group of adolescents** ..... 19
  - 3.1 The market for menthol cigarettes in the USA ..... 19
  - 3.2 The market for menthol cigarettes in Japan ..... 22
  - 3.3 Spread of cigarettes with menthol capsules ..... 22
  
- 4 Recommendations** ..... 25
  
- References** ..... 27
- List of authors** ..... 31



# Preface

Additives in tobacco products, particularly flavouring compounds, increase the attractiveness of these products. They promote smoking initiation by children and adolescents and make it more difficult for smokers to quit. The German Cancer Research Center (DKFZ) calls for a German and European ban on tobacco additives, such as menthol, sugar, fruit flavours and other substances which mask the unpleasant, harsh and irritating character of tobacco smoke. Such a ban is intended to protect consumers from the hazardous health effects of tobacco smoking. Informations on these issues are available in several DKFZ publications wherein an urgent need for regulation has been emphasized.

Recently, the tobacco industry has introduced cigarettes with a new technology in several European Union member states – which has already been available in Japan, the USA and other countries. This new technology makes cigarettes more attractive as it offers a capsule filled with a flavouring solution, embedded in the cigarette filter where the smoker can crush it at any chosen time. Thus the aromatic liquid is released from the capsule and causes the smoke to taste different. Wherever the products have already been launched on national markets, the capsule contains menthol. Crushing the menthol capsule in the filter is designed to give consumers a “kick of freshness” and release the menthol more quickly and directly. The innovation seems to be particularly appealing to young people. Moreover, the advertising for these products is also directed towards this very target group.

Patents applied by the tobacco industry show that menthol is only one of many possible flavours that can be filled in these capsules. Thus it is possible that the range of products may be expanded even further in the case of cigarettes using the new capsule technology. This will probably tempt even more people into consuming these products that are dangerous to health.

The document aims to raise awareness among decision-makers in the political field and the general public about the consequence of these novel capsule filter cigarettes and provide them with scientific rationale for regulation to ban this new technology.

Prof. Dr. Otmar D. Wiestler  
Chairman of the Management Board  
and Scientific Director  
German Cancer Research Center (DKFZ)  
Heidelberg, January 2012





# Key points

## Menthol

- Menthol has a characteristic odour and taste. It has a cooling, pain-relieving and slightly numbing effect. When added to tobacco products it masks the unpleasant characteristics of smoke and enables the smoker to inhale more deeply.
- Menthol as an additive is of particular importance. It is not only used in cigarettes which have the word “menthol” included in their label but a small amount of menthol is contained in most other cigarettes as well.
- Menthol has a variety of physiological effects and thus increases the attractiveness of cigarettes. It promotes smoking initiation among children and adolescents and makes it more difficult for smokers to quit. When menthol is added, products that are already harmful to health are made even more risky.

## Cigarettes with menthol capsules

- Over the past years, cigarettes with menthol capsules enabling the consumer to change the taste of a cigarette any time during smoking have been launched in a rising number of countries. Young people are the prime target group of those products.
- The range of products can be expanded to almost any amount because technology makes it possible to use not only menthol but many other flavours and aromatic substances in the capsules.
- Embedding flavour capsules in cigarette filters increases the attractiveness of these unhealthy products and counteracts the objective of health policy to reduce tobacco consumption.

## Spread of menthol cigarettes

- Studies conducted in the USA and Japan show that menthol cigarettes are widely used by young people and that adolescents who start smoking quite often choose menthol cigarettes.
- In many countries where cigarettes with menthol capsules are available their market share increased quickly after their launch.
- Cigarettes with menthol capsules will, in all probability, help spread tobacco consumption further, especially among children and adolescents, and must therefore be banned.

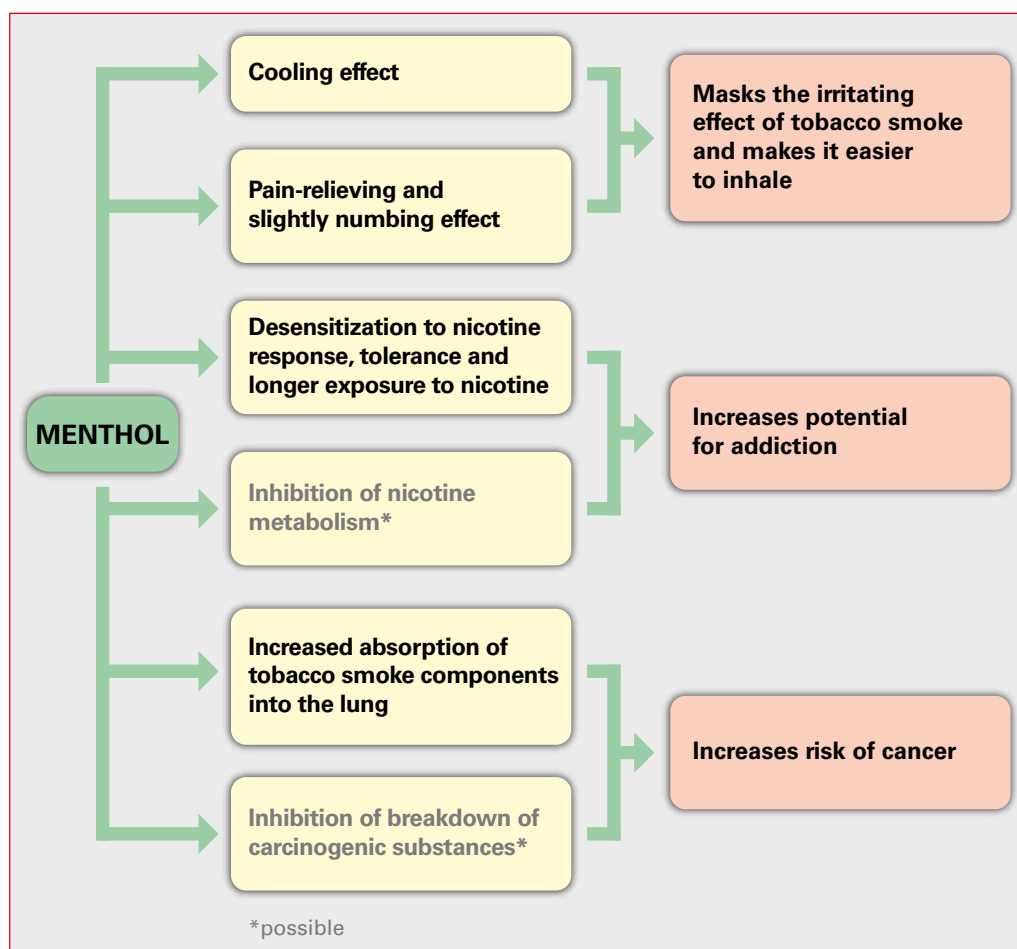


# 1 Menthol and its significance as a cigarette additive

Manufacturers can choose from more than 600 different additives that they can use in tobacco products to alter, for example, the taste of tobacco, to keep it moist or to improve its burning properties<sup>5</sup>. Menthol is the additive most widely used in cigarettes and the tobacco industry uses it for targeted advertising. However, menthol is not only used in cigarettes that have the word “menthol” included in their label but is added to most other cigarettes as well, in quantities small enough that the characteristic menthol taste cannot be detected<sup>25</sup>.

Menthol is not only chosen for its characteristic taste but also because of various pharmacological effects it causes in the human body<sup>1</sup> (Fig. 1.1). In the cigarette production process, menthol is either directly added to the tobacco or other parts of the cigarette, such as the filter or cigarette paper, or it is applied to the packaging. As menthol is a volatile substance, over time it will spread to the whole cigarette and pack, regardless of the place of application<sup>20</sup>.

Menthol has a typical peppermint odour and taste. It has a cooling effect on the



**Fig. 1.1**  
Pharmacological effects of menthol and their impact during the course of smoking<sup>1,14,23,44,48,66,70</sup>.  
Illustration: German Cancer Research Center, Unit Cancer Prevention

skin or mucous membranes<sup>17</sup>. In higher dosages it also shows a pain-relieving and numbing effect<sup>48</sup>. A higher dosage of menthol in the oral cavity can cause irritation. Repeated exposure over a fairly long period of time may cause a desensitisation which reduces the reactivity to other stimuli. This may also affect the perception of other irritating substances such as nicotine<sup>14</sup>. Furthermore, menthol suppresses coughing and prolongs the time you are able to hold your breath<sup>23</sup>. The cooling, pain-relieving and slightly numbing effect of menthol reduces the irritation caused by tobacco smoke and enables the smoker to inhale more deeply<sup>44,70</sup>. Thus, the lung is exposed longer to the poisonous and carcinogenic elements of tobacco smoke<sup>66</sup>. In addition, it is possible that menthol heightens the absorption of tobacco smoke components into the lung, as it can also speed up the absorption of substances through the skin<sup>1</sup>. An increased exposure to carcinogenic substances can thus increase the risk of cancer. It is also possible that menthol inhibits the decomposition of nicotine or carcinogenic substances from tobacco smoke. However, there is no definite proof of that yet<sup>1,66</sup> (Fig. 1.1). Due to its manifold physiological effects, menthol is much more than just a flavouring agent as it masks the unpleasant characteristics of tobacco smoke, makes inhalation of smoke easier and gives the impression that menthol cigarettes are less harmful to your health.

The tobacco industry is fully aware of all the characteristics of menthol. Intensive research is being conducted in this area and the industry uses this additive with a deliberate purpose<sup>20,42,43,76</sup>.

There are a number of studies from the USA showing that the use of menthol cigarettes is particularly wide-spread among new smokers. They also show that it is much harder to quit for smokers of menthol cigarettes than it is for smokers of non-menthol cigarettes. This fact also seems to be connected to an increased addiction potential<sup>4,18,19,21,23,28-31,40,50,63,75</sup>. Presumably it is the physiological characteristics of menthol, such as easier inhalation, that add to the popularity of menthol cigarettes among young people. This is also the case with occasional smokers and women as they are more sensitive to the irritation caused by tobacco smoke than people who have been smoking for years.

The fact that the tobacco industry offers both menthol products with a low concentration of menthol and relatively high menthol concentration seems to show that it tries to adjust the amount of menthol contained in its products to consumers' needs. Apart from the group of menthol smokers that prefer cigarettes with a low concentration of menthol there is another group which prefers this type of cigarettes due to their high menthol concentration: this group comprises particularly African-Americans and male smokers who generally prefer stronger cigarettes<sup>42</sup>.

## 2 Cigarettes with menthol capsules embedded in the filter

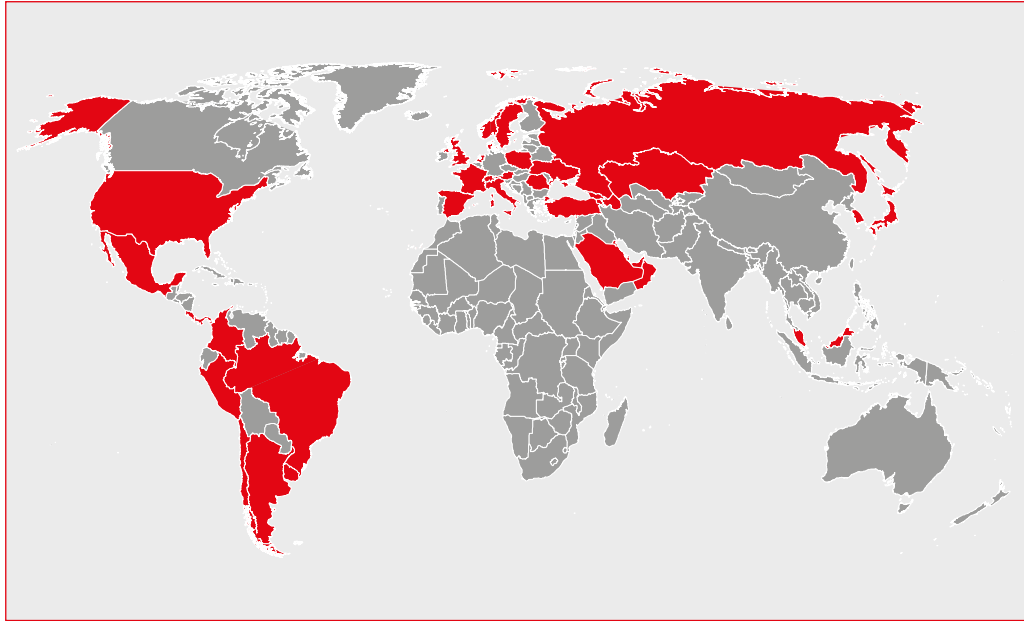
Cigarettes with menthol capsules embedded in the filter were first launched in Japan in 2007. Since then, more brands with capsules are sold there, such as “Kool” and “Kent” by British American Tobacco (BAT) as well as “Marlboro” and “Lark” by Philip Morris (PM). Menthol cigarettes were then introduced in the USA, where the brand “Camel Crush” by R. J. Reynolds (RJR) has been available since 2008<sup>59</sup>. Currently, brands such as “Lucky Strike Click&Roll” by BAT or “Camel Activate” by Japan Tobacco International (JTI) are available in some European countries.

Their names vary according to the country (see Fig. 2.1 for examples of brands with menthol capsules). At the moment, menthol capsule cigarettes are available in at least 40 countries around the globe (Table 2.1, Fig. 2.2).

The menthol capsule is usually placed in the middle of the cigarette filter (Fig. 2.3). It is spherical, about 3.5 or 4 millimetre in diameter and blue to green in colour. The outer shell is made from gelatine or a similar substance. Inside, there is a liquid containing the flavouring agent which might include medium-chain triglycerides<sup>16</sup>.



**Fig. 2.1**  
Examples of cigarette brands containing menthol capsules. Above: cigarette packs of “Camel Crush” (R. J. Reynolds) from the USA (source: Trinkets&Trash<sup>67</sup>), “Lark Hybrid” (Philip Morris) from Japan and “Lucky Strike Click&Roll” (British American Tobacco) from Italy; below: cigarettes containing menthol capsules – the position of the capsule is marked on the filter. Pictures above centre, above right and below: German Cancer Research Center, Unit Cancer Prevention



**Fig. 2.2**  
**Countries where**  
**cigarettes with menthol**  
**capsules were sold in 2011**  
**(possibly incomplete).**  
 Illustration: German  
 Cancer Research Center,  
 Unit Cancer Prevention

Manufacturer	Brand	Type	Countries of distribution
British American Tobacco (BAT)	Dunhill	Boost	Malaysia
		Switch	Bahrain, Kuwait, Malaysia, Oman, Qatar, Republic of Korea, Saudi Arabia, United Arab Emirates
	Kent	Convertibles	Armenia, Azerbaijan, Brazil, Georgia, Kazakhstan, the Netherlands, Republic of Korea, Romania, Russian Federation, Switzerland, Turkey, Ukraine, United Kingdom
		Boost	Japan, Republic of Korea
		Switch	Japan
	Kool	Boost	Colombia, Costa Rica, Japan, Panama
Lucky Strike	Click&Roll	Argentina, Austria, Brazil, Chile, France, Italy, Luxemburg, Peru, Romania, Spain, Uruguay, United Kingdom	
Japan Tobacco International (JTI)	Camel	Activate	Austria, Italy, the Netherlands, Poland, Sweden
		Shift	France
	Silk Cut	Choice	United Kingdom
Philip Morris (PM)	L&M	Forward	Finland, Poland
		Lark	Hybrid
	Marlboro	Mint Splash	Japan
		Beyond	France, the Netherlands, Sweden, Switzerland
		Blue Ice	Romania, USA
		Ice Blast	Japan
Ice Xpress	Mexico		
R. J. Reynolds (RJR)	Camel	Crush	USA
		Crush Bold	USA
		Menthol	USA
		Menthol silver	USA

**Table 2.1**  
**Cigarette types with**  
**menthol capsules,**  
**according to manufacturer**  
**and countries of**  
**distribution in 2011**  
**(possibly incomplete).**  
 Illustration: German  
 Cancer Research Center,  
 Unit Cancer Prevention



**Fig. 2.3**  
**Menthol capsules in filters**  
**of cigarettes of these**  
**brands: "Lucky Strike**  
**Click&Roll" (above and**  
**below left) and "Lark**  
**Hybrid" (below right; with**  
**activated carbon filter).**  
 Pictures: German Cancer  
 Research Center, Unit  
 Cancer Prevention

It is up to the smoker to decide when to release the menthol. Crushing the filter cracks the capsule and the mentholated liquid is thus released into the filter. When the smoker draws on the cigarette the liquid enters the mainstream smoke which he/she inhales.

Currently the cigarette industry markets two types of menthol capsule cigarettes. The first is the regular menthol cigarettes with additional capsules in the filter where the menthol taste is enhanced by crushing the capsule. The word "boost" is used to describe these products because the existing menthol concentration is increased all of a sudden. The second type is the non-mentholated cigarette which does not taste of menthol since the substance is only contained in the capsule. Only when the capsule is crushed does the cigarette get its menthol taste. When pressure is exerted on the filter the cigarette becomes a menthol cigarette. Therefore,

this product category is described with attributes such as "switch" or "convertibles".

There is another type of product where the flavouring agents are located in the filter, but in this case the filter contains a mentholated "thread" in the middle<sup>61</sup>. However, this thread does not need to be crushed and thus the consumer cannot influence the taste of the cigarette. Several brands of this type of cigarette are available in Japan, such as "Kent Citric Menthol" (BAT) and "Salem Alaska Menthol" but also "Seven Stars Cutting Menthol" (JTI, Fig. 2.4) or "Silver Mint" and "Ice Mint" by Marlboro (PM).

Unlike the above, in Germany, the brand "West Ice" containing menthol in the filter is sold by Reemtsma, part of the Imperial Tobacco Group.

The first menthol capsule cigarettes were introduced in 2007. However, the principle was used for other flavouring agents than menthol as early as 2002

**Fig. 2.4**  
Examples of cigarette types with a “thread” containing menthol in the filter: “Salem Alaska Menthol” and “Seven Stars Cutting Menthol” (JTI) from Japan.

Pictures: Dr. Yumiko Mochizuki-Kobayashi, National Cancer Center, Japan



when R. J. Reynolds launched “Camel Exotic Flavors” in the USA. The filter of these cigarettes contained a polyethylene capsule with flavouring agents. The year they were launched the sales of Camel cigarettes increased by 4 per cent<sup>11</sup>.

## 2.1 Menthol content and possible influence on tobacco smoke composition

There are hardly any publications reporting the menthol content of capsule cigarettes as yet. However, there is a report by Altria Client Services<sup>2</sup>, a subsidiary of the Altria Group (which is also the parent company to Philip Morris), which includes the results of an unpublished study by Philip Morris on the menthol market in 2008/2009 in the USA. This study looked at selected American menthol brands that, together, constituted about 80 per cent of the total market for menthol cigarettes in the USA, amongst them various “Camel” menthol capsule types.

Figure 2.5 shows the menthol levels in tobacco smoke as a function of the menthol level of the cigarettes examined. While “Camel Menthol” and “Camel Menthol Silver” are menthol cigarettes that also contain a menthol capsule, the “Camel Crush” brand contains menthol solely in the capsule and is converted from a “regular” into a menthol cigarette only when the capsule is crushed.

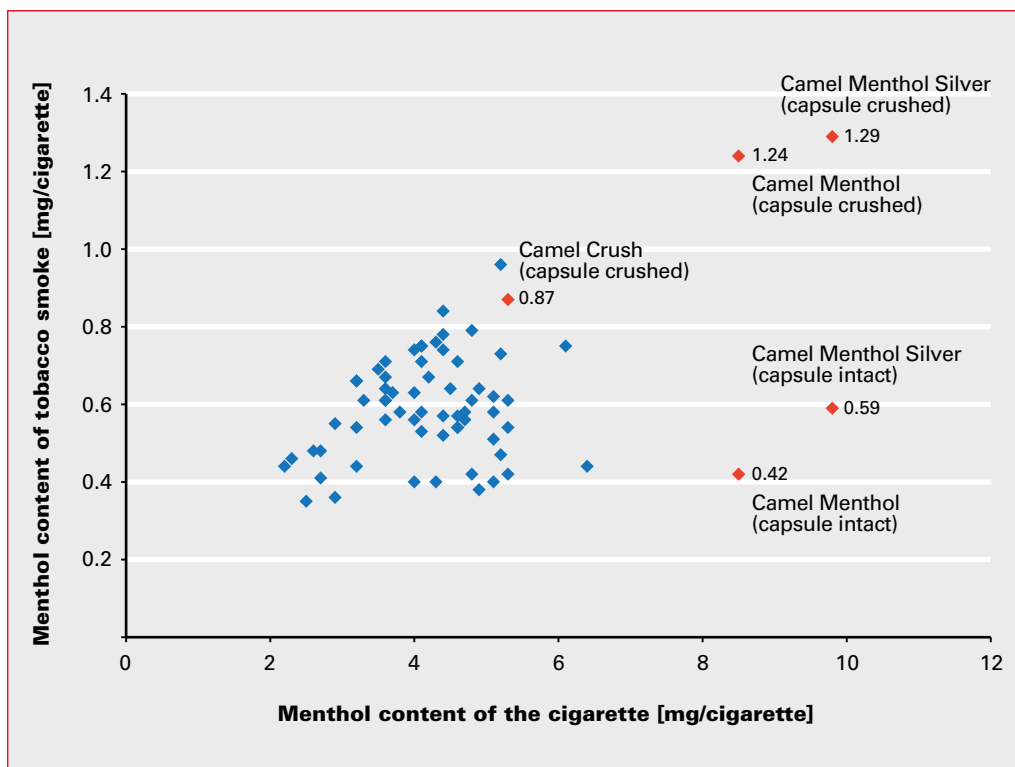
Measurements show that the menthol level per cigarette in most brands is

two to five milligram. Between 10 and 20 per cent of this menthol blends into the tobacco smoke, which will then contain about 0.4-0.8 milligram of menthol. Measurements for the “Camel Crush” brand are quite high: the cigarette has a menthol content of 5.3 milligram and the smoke contains 0.87 milligram of menthol. However, the menthol level of the two “Camel Menthol” types are much higher than that. Measurements showed a menthol content of 8.5 and 9.8 milligram of menthol per cigarette where the capsule had not been crushed – levels that are quite high. However, the transfer efficiency into the tobacco smoke is only five or six per cent. When the capsule was crushed, menthol contents in the tobacco smoke increased drastically in both brand types. The “Camel Menthol” cigarettes showed 1.24 milligram of menthol, the “Camel Menthol Silver” type contained a menthol level of 1.29 milligram in the tobacco smoke – being the “lighter” type of them both, according to nicotine and tar content<sup>2</sup>.

The function of a filter, even if only possible to a limited extent, is to reduce the concentration of substances that are carcinogenic and dangerous to your health in tobacco smoke. This function of a filter could be impaired by either crushing the filter to crack the capsule or by the liquid released. However, there are no studies yet that prove a possible interference with the filter function.

An independent study examined the effect of menthol content on the concentration of substances in the tobacco smoke. This study also included “Camel





**Fig. 2.5**  
**Menthol content of tobacco smoke as a function of the menthol content of the cigarette in different brand types and in menthol capsule cigarettes of “Camel” (Data: Altria Client Services 2010<sup>2</sup>).**  
 Illustration: German Cancer Research Center, Unit Cancer Prevention

Crush” brand cigarettes with menthol capsules<sup>26</sup>. Various volatile organic compounds (VOCs) were measured, such as acetaldehyde, 1,3-butadiene, acrylonitrile and other substances, for example nicotine or carcinogenic tobacco-specific nitrosamines and polycyclic aromatic hydrocarbons. An increased VOC concentration was measured in those “Camel Crush” cigarettes where the capsule had been cracked<sup>26</sup>. These first results are alarming because they imply that menthol in capsule cigarettes increases the carcinogenicity and toxicity of cigarettes even further.

## 2.2 Development of capsule cigarette filters

Various patents acquired and documents issued by the tobacco industry prove that for many years the industry has been developing procedures to embed flavouring agents in the cigarette filter. A comprehensive list of those patents can be found, for example, in the patent by Dube et al.<sup>16</sup>.

As early as in the 1960s patent applications were filed for different types of cigarette filters incorporating a capsule (see Fig. 2.6 for examples). However,

these capsules were not designed to hold flavouring agents; rather they contained water that was generally intended to moisten a certain filter material when smoking. This was done to filter out more harmful substances from the cigarette smoke and make the tobacco smoke more pleasant and cooler<sup>8,9,34,45</sup>. In 1967, a patent was granted which included a capsule filled with vitamin A in the form of an aqueous solution, which was to enter the respiratory tract in aerosol form during smoking<sup>69</sup>.

In 1968, a scientist who worked for R. J. Reynolds reported that it was possible to encapsulate flavouring agents in a tube embedded in the filter, whereby the tube was made of e.g. polyethylene and had impermeable membranes on the sides<sup>71</sup>. The membranes were designed to be destroyed during the process of drawing on the cigarette, thus releasing the flavouring agents in the tube. This principle was designed to avoid the loss of flavouring agents in the cigarette over time, as many of these substances are volatile.

Another reason why flavouring agents are embedded in the filter is to compensate for the loss in taste which occurs

Jan. 30, 1968

M. F. CARTY

3,366,121

FILTER CIGARETTES

Filed Dec. 15, 1964

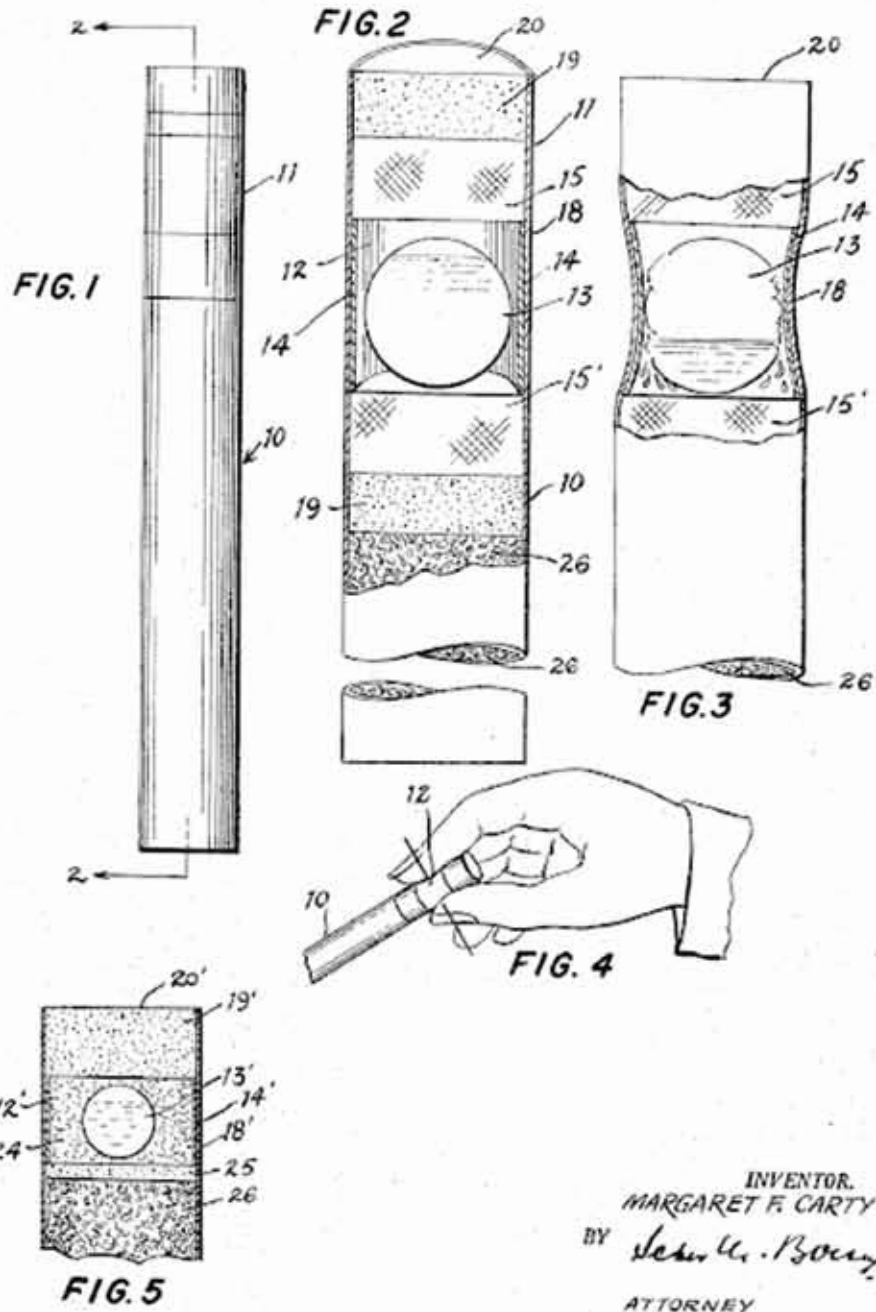


Fig. 2.6  
Schematic drawing of  
a filter capsule from a  
patent applied for in  
1964<sup>8</sup>.

when adsorbing filter material is used. An example of such a material is activated carbon. It retains substances and thus reduces the amount of harmful elements in tobacco smoke<sup>24</sup>. Cigarettes with activated carbon filters are particularly popular in Japan (e.g. in cigarette brands such as "Seven Stars", "Mild Seven" or "Lark"<sup>51</sup>, Figs. 2.1 and 2.3). Since the use of adsorbing material also has a negative effect on taste, this is to be compensated for by additional filter segments releasing flavouring agents<sup>35,36,74</sup>. In 2004, Philip Morris tested cigarettes whose crushable menthol capsules were located between the part of the filter containing activated carbon and the filter end the smoker draws on, so that the menthol is not held back by the activated carbon during smoking. Test subjects rated this as a pleasant product. They showed even more interest in the product when they were told that this innovation was designed mainly to filter harmful substances out of the tobacco smoke<sup>58</sup>.

In 1994, BAT applied for a patent for another technology that used flavouring agents encapsulated in the filter<sup>47</sup>. The technology was based on the principle that the aromatic agents encapsulated in a filter element were released when stubbing out the cigarette. This would help masking the noxious smell of cigarette stubs.

For years, there has also been research in products which enable the consumer to influence the taste of the cigarette. In 1985, Philip Morris introduced the brand "Concord" with its two types "Regular" and "Menthol" where it was possible to vary the tar and menthol content by rotating the filter (Fig. 2.7). Adjusting the filter influenced the degree of ventilation of the smoke and therefore the intensity of the cigarette. The patents Philip Morris applied for in 1986 and 1987 include a description of technologies with rotatable filter segments, allowing for a variation of the taste by the consumer<sup>37,55</sup>.

The first patent on the capsule technology that is used in today's cigarettes was filed by R. J. Reynolds in 2003 (Fig. 2.8)<sup>16</sup>. According to this patent, a cigarette may include more than one capsule in the filter (Fig. 2.9). It is obvious that the filter volume decreases with each additional capsule, i.e. non-filter object, embedded in it. Especially in cigarettes that contain several or larger non-filter objects it must be assumed that the function of the cigarette filter, i.e. to retain substances which are dangerous to your health, is impaired.

Furthermore, this patent by R. J. Reynolds shows that menthol is not the only substance in terms of flavourings or agents that capsules may contain: "*Flavorings [...] may be natural or synthetic, and the character of these flavors can be described, without*



Fig. 2.7  
"Concord" cigarettes where the consumer was able to individually adjust the intensity of the cigarettes by rotating the filter<sup>56,57</sup>.



US007836895B2

(12) **United States Patent**  
**Dube et al.**

(10) **Patent No.:** **US 7,836,895 B2**  
(45) **Date of Patent:** **Nov. 23, 2010**

(54) **FILTERED CIGARETTE INCORPORATING A BREAKABLE CAPSULE**

(75) Inventors: **Michael Francis Dube**, Winston-Salem, NC (US); **Kenneth Wayne Smith**, Winston-Salem, NC (US); **Vernon Brent Barnes**, Advance, NC (US)

(73) Assignee: **R. J. Reynolds Tobacco Company**, Winston-Salem, NC (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 257 days.

(21) Appl. No.: **10/600,712**

(22) Filed: **Jun. 23, 2003**

(65) **Prior Publication Data**

US 2004/0261807 A1 Dec. 30, 2004

3,339,558 A	9/1967	Waterbury
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(Continued)

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(Continued)

Primary Examiner—Philip C Tucker

cigarette is inserted. Smoke from the cigarette that is drawn through the holder reportedly passes through filter material impregnated with water. A disposable filter adapted to be attachable to the mouth end of a cigarette has been proposed in U.S. Pat. No. 5,724,997 to Smith et al. Flavor containing capsules contained within the disposable filter reportedly may be squeezed in order to release the flavor within those capsules.

Cigarettes incorporating distinctive flavors that provide a pleasurable sensory experience are clearly of interest to smokers. Some smokers may prefer a cigarette that is capable of selectively providing a variety of different flavors, depending upon the smoker's immediate desire. The flavor of such a cigarette might be selected based on the smoker's desire for a particular flavor at that time, or a desire to change flavors during the smoking experience. For example, changing flavors during the smoking experience may enable a smoker to end the cigarette with a breath freshening flavor, such as menthol or spearmint. Accordingly, it is desirable to provide a cigarette that is capable of providing different sensory experiences at the discretion of a smoker.

Some smokers may also desire a cigarette that is capable of selectively releasing a deodorizing agent upon completion of a smoking experience. Such agents may be used to ensure that the remaining portion of a smoked cigarette yields a pleasant aroma after the smoker has finished smoking that cigarette.

element 200 to the smoker. Most preferably, the overall character or nature of the drawn smoke is virtually unaffected to any significant degree as a result of the presence of the intact capsule 220 within the filter element 200. If desired, the smoker may rupture the capsule 220 at any time before, during, or even after, the smoking experience. Breakage of the capsule 220 acts to release the contents that are contained and sealed therewithin. Release of the contents of the capsule into the filter element thus enables the smoker to achieve the intended benefit of action of certain of those contents, whether that benefit results from flavoring or scenting the smoke, cooling or moistening the smoke, freshening the scent of the cigarette butt, or achieving some other goal associated with modifying the overall composition of the smoke or altering the performance characteristics of the cigarette. That is, in highly preferred embodiments, a portion of the payload (e.g., portions of a flavoring agent) that has been released into the filter element is incorporated into each subsequent puff of mainstream smoke that is received through that filter element.

Preferred cigarettes of the present invention exhibit desirable resistance to draw, whether or not the capsules within their filter elements are broken. For example, an exemplary cigarette exhibits a pressure drop of between about 50 and about 200 mm water pressure drop at 17.5 cc/sec. air flow. Preferred cigarettes exhibit pressure drop values of between about 70 mm and about 180, more preferably between about

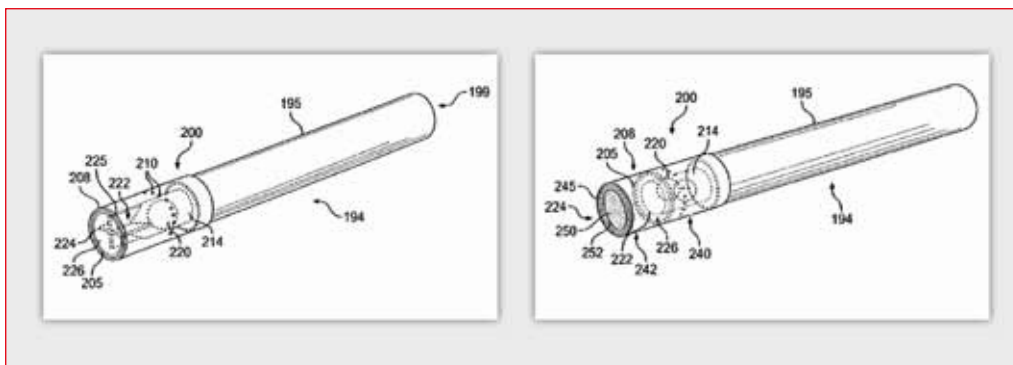
In the preferred embodiment, the payload is a mixture of a flavoring and a diluting agent or carrier. The preferred diluting agent is a triglyceride, such as a medium chain triglyceride, and more particularly a food grade mixture of medium chain triglycerides. See, for example, Radzuan et al., *Porin Bulletin*, 39, 33-38 (1999). Flavorings of the payload may be natural or synthetic, and the character of these flavors can be described, without limitation, as fresh, sweet, herbal, confectionary, floral, fruity or spice. Specific types of flavors include, but are not limited to, vanilla, coffee, chocolate, cream, mint, spearmint, menthol, peppermint, wintergreen, lavender, cardamon, nutmeg, cinnamon, clove, cascarilla, sandalwood, honey, jasmine, ginger, anise, sage, licorice, lemon, orange, apple, peach, lime, cherry, and strawberry. See also, Leffingwill et al., *Tobacco Flavoring for Smoking Products*, R.J. Reynolds Tobacco Company (1972). Flavorings also can include components that are considered moistening, cooling or smoothening agents, such as eucalyptus. These flavors may be provided neat (i.e., alone) or in a composite (e.g., spearmint and menthol, or orange and cinnamon). Composite flavors may be combined in a single capsule as a mixture, or as components of multiple capsules positioned within the filter element.

The amount of flavoring and diluting agent within the capsule may vary. The relative amounts of flavoring and diluting agent selected, as well as the overall amount of the mix-

remain intact throughout the smoking experience, and in the other case, capsules are broken immediately prior to the first puff. In either case, the cigarettes are smoked under FTC smoking conditions. The overall smoke chemistries of the cigarettes smoked under those two types of conditions are quite similar. Spearmint flavor is observed to transfer into the mainstream smoke cigarette possessing the broken capsule. A representative cigarette possessing the unbroken capsule yields about 11.1 mg FTC "tar," about 0.89 mg FTC nicotine, and about 12 mg FTC carbon monoxide. A representative cigarette possessing the unbroken capsule yields about 12.3 mg FTC "tar," about 0.95 mg FTC nicotine, and about 12.8 mg FTC carbon monoxide.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing description; and it will be apparent to those skilled in the art that variations and modifications of the present invention can be made without departing from the scope or spirit of the invention. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

**Fig. 2.8**  
**Excerpts from US patent**  
**No. 7836895 (Dube et al.,**  
**R.J. Reynolds)<sup>16</sup>.**  
Illustration: German  
Cancer Research Center,  
Unit Cancer Prevention



**Fig. 2.9**  
**Schematic drawing**  
**of cigarettes with one**  
**(left) and two (right)**  
**capsules in the filter (from**  
**patent No. 7793665 by**  
**R. J. Reynolds)<sup>16</sup>.**

limitation, as fresh, sweet, herbal, confectionary, floral, fruity or spice. Specific types of flavors include, but are not limited to, vanilla, coffee, chocolate, cream, mint, spearmint, menthol, peppermint, wintergreen, lavender, cardamon, nutmeg, cinnamon, clove, cascarilla, sandalwood, honey, jasmine, ginger, anise, sage, licorice, lemon, orange, apple, peach, lime, cherry, and strawberry. [...] Flavorings also can include components that are considered moistening, cooling or soothing agents, such as eucalyptus. These flavors may be provided neat (i.e., alone) or in a composite (e.g., spearmint and menthol, or orange and cinnamon). Composite flavors may be combined in a single capsule as a mixture, or as components of multiple capsules positioned within the filter element." "Release of the contents of the capsule into the filter element thus enables the smoker to achieve the intended benefit of action of certain of those contents, whether that benefit results from flavoring or scenting the smoke, cooling or moistening the smoke, freshening the scent of the cigarette butt, or achieving some other goal associated with modifying the overall composition of the smoke or altering the performance characteristics of the cigarette." Furthermore, the patent is not to be "limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope [...]"<sup>16</sup>.

Apart from various potential uses it becomes obvious from reading the patent that the capsule technology is intended to make cigarettes more attractive for smokers, since "cigarettes incorporating distinctive flavors that provide a pleasurable sensory experience are

clearly of interest to smokers. Some smokers may prefer a cigarette that is capable of selectively providing a variety of different flavors, depending upon the smoker's immediate desire. The flavor of such a cigarette might be selected based on the smoker's desire for a particular flavor at that time, or a desire to change flavors during the smoking experience. For example, changing flavors during the smoking experience may enable a smoker to end the cigarette with a breath freshening flavor, such as menthol or spearmint. Accordingly, it is desirable to provide a cigarette that is capable of providing different sensory experiences at the discretion of a smoker"<sup>16</sup>.

Philip Morris, too, had patented methods of productions of several versions of cigarette filters with rupturable capsules. (Fig. 2.10)<sup>38,39</sup>. The advantages of capsules mentioned here are that this technology allows the production of cigarettes with consistent taste, as flavouring agents do not volatilize. Moreover, the removal of flavouring agents from tobacco smoke by adsorbing filter material can be prevented. Furthermore, an unwanted migration of flavouring agents into other parts of the cigarette during storage can be prevented, and flavouring agents are not burned during the course of smoking. Suitable flavours are, just to name a few, "menthol, mint, such as peppermint and spearmint, chocolate, licorice, citrus and other fruit flavors, gamma octalactone, vanillin, ethyl vanillin, breath freshener flavors, spice flavors such as cinnamon, methyl salicylate, linalool, bergamot oil, geranium oil, lemon oil, ginger oil, and tobacco flavor." In addition, the capsule may have a variety of physical formations,



US007878962B2

(12) **United States Patent**  
**Karles et al.**

(10) **Patent No.:** **US 7,878,962 B2**  
(45) **Date of Patent:** **Feb. 1, 2011**

(54) **CIGARETTES AND FILTER  
SUBASSEMBLIES WITH SQUEEZABLE  
FLAVOR CAPSULE AND METHODS OF  
MANUFACTURE**

3,599,646 A 8/1971 Berger  
3,635,226 A \* 1/1972 Horsewell et al. .... 131/336

(75) Inventors: **Georgios D. Karles**, Richmond, VA  
(US); **Jeffrey Allen**, Midlothian, VA  
(US); **Jose Nepomuceno**, Beaverdam,  
VA (US)

(Continued)

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CN 2193654(Y) 4/1995

(73) Assignee: **Philip Morris USA Inc.**, Richmond, VA  
(US)

(Continued)

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(\* ) Notice: Subject to any disclaimer, the term of this  
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International Preliminary Report on Patentability dated Nov. 6, 2007  
for PCT/IB2006/001840.

(21) Appl. No.: **11/415,107**

Primary Examiner—Philip C Tucker  
Assistant Examiner—Michael J Felton

(22) Filed: **May 2, 2006**

(74) Attorney, Agent, or Firm—Buchanan Ingersoll &  
Rooney PC

(65) **Prior Publication Data**

US 2007/0012327 A1 Jan. 18, 2007

include diluents, solvents or processing aids that may or may not impact the sensorial attributes of the mainstream smoke but aid in processing of an additive and its encapsulation and presentation in a cigarette.

In a preferred embodiment, the additive materials may include one or more flavors, such as liquid or solid flavors and flavor formulations or flavor-containing materials. The term "flavor" or "tobacco flavor" may include any flavor compound or tobacco extract suitable for being releasably disposed in liquid form within one or more capsules such as one-piece capsules, two-part capsules, macrocapsules or microcapsules to enhance the taste of mainstream smoke produced, for example, by a cigarette.

Suitable flavors or flavorings include, but are not limited to, menthol, mint, such as peppermint and spearmint, chocolate, licorice, citrus and other fruit flavors, gamma octalactone, vanillin, ethyl vanillin, breath freshener flavors, spice flavors such as cinnamon, methyl salicylate, linalool, bergamot oil, geranium oil, lemon oil, ginger oil, and tobacco flavor. Other suitable flavors may include flavor compounds selected from the group consisting of an acid, an alcohol, an ester, an aldehyde, a ketone, a pyrazine, combinations or blends thereof and the like. Suitable flavor compounds may be selected, for example, from the group consisting of phenylacetic acid, solanone, megastigmatrienone, 2-heptanone, benzylalcohol, cis-3-hexenyl acetate, valeric acid, valeric aldehyde, ester, terpene, sesquiterpene, nootkatone, maltol, damascenone, pyrazine, lactone, anethole, iso-valeric acid, combinations thereof and the like.

In one embodiment, the additive material may serve as a chemical reagent for one or more constituents of mainstream smoke. Such an additive material may include, by way of example, a chemical additive which interacts with the one or more constituents in mainstream smoke. For example, see commonly assigned U.S. Pat. Nos. 6,209,547 and 6,595,218, which discuss reagents which can interact with and can remove gaseous constituents of a smoke stream, and are expressly incorporated herein by reference in their entireties.

#### F. Capsules

The capsules in the filter arrangement provide advantages particularly for cigarettes containing activated carbon. By placing the sealed capsules in the filter downstream from activated carbon in cigarettes containing activated carbon in the filter, adsorption of released additive material by the activated carbon and consequent deactivation of the carbon is substantially prevented. Thus, where the additive material is a flavor component, flavor adsorption by the activated carbon during storage of cigarettes and during smoking is substantially prevented.

example, the capsule is broken or opened by mechanical force. For example, the capsule may be broken by squeezing a portion of a cigarette filter containing the capsule, thus releasing the additive material from within the capsule.

The capsule may be formed in a variety of physical formations including singular part or multipart capsules, large capsules, small capsules, microcapsules, etc. One preferred formation comprises a generally spherical capsule, while other preferred embodiments include macrocapsules or microcapsules. These preferred embodiments may include liquid additives and the additives may be released similarly by mechanical action. The capsules may be present in the filter section of a cigarette in a dispersed arrangement if small macrocapsules or microcapsules are provided, or may be present in a plug or cavity within a filter for one more capsules, preferably a single generally spherical capsule. However, the capsule or capsules are preferably present downstream from any sorbents in a cigarette, such as activated carbon.

The microcapsules may be formed by any suitable technique including encapsulation techniques, such as spin coating, coacervation, interfacial polymerization, solvent evaporation, annular jet forming, which uses two concentric jets to eject an inner jet of liquid core material and an outer jet of liquid wall material where the fluid stream breaks into droplets and the liquid wall material solidifies by phase transition induced by the presence of cross-linking ions, pH differences, temperature changes, etc.

Macrocapsules can be provided in a plug or cavity, and can be further encapsulated in a sheath or the like, or can be provided in a subassembly with an outer cover and one or more absorbent members if desired. By providing the macrocapsules in a sheath, within plug material, or within a subassembly with an outer cover and one or more absorbent members, the macrocapsules can be protected from accidental or incidental breakage or leakage, and the capsules can be made larger and weaker if desired.

Additionally, single wall or multi-wall capsules may be used to tailor capsule stability, strength, rupture resistance, processing ease in filter making, etc. The capsules may be made of any suitable material, such as those used in capsules for drug delivery, liquid encapsulated capsules, or other encapsulated materials. By way of example, capsules typically utilized in the pharmaceutical industry may be used. Such capsules may be gelatin based, for example, or may be formed from a polymeric material, such as modified cellulose. One type of modified cellulose which may be used is hydroxypropylmethyl cellulose.

#### G. Preferred Embodiments

**Fig. 2.10**  
**Excerpts from US patent**  
**No. 7878962 (Karles et al.,**  
**Philip Morris)<sup>39</sup>.**  
Illustration: German  
Cancer Research Center,  
Unit Cancer Prevention

such as “one-piece capsules, two-part capsules, macrocapsules or microcapsules to enhance the taste of mainstream smoke produced”<sup>39</sup>.

In summary it can thus be noted that the use of capsules in cigarettes includes various aspects that enhance the attractiveness, which, in turn, will lead to an additional danger to a person's health:

- Capsules have a cooling and moistening effect on tobacco smoke and change its pungency. Thus, the consumer can inhale more deeply.
- Capsules with the additives mentioned above are designed to make cigarettes more flavoursome and create pleasant sensory perceptions. This further increases the attractiveness of a dangerous product.
- The capsule is intended to change the cigarette smoke and cigarette stub in such a way as to mask their harsh odour.

### 2.3 Marketing of cigarettes with menthol capsules: target group young consumers

The new products containing menthol capsules are designed to appeal mainly to young consumers, because the target group mentioned again and again in documents of the tobacco industry are “adult smokers under 30” (ASU30)<sup>10,59</sup>. Advertising for menthol capsule cigarettes is colourful, dynamic and

innovative (Figs. 2.11 to 2.14), whether on posters or cigarette vending machines, in magazines, on websites or at promotion events. The slogans used to advertise these products are, for example, “Click. Switch. Refresh.” (“Kent Convertibles”) or “Squeeze, Click, Change!” (“Camel Crush”) (Table 2.2). On the one hand, advertising focuses on the experience of freshness that menthol causes and, on the other, on the opportunity to individually change and decide on the taste. The advertising addresses the need for individuality and “doing your own thing”, which is particularly strong in young people. Slogans of this kind probably make the product mainly attractive for curious young people who like to try new things out, as they are more open towards innovations and want to be independent and make their own decisions. A general manager of British American Tobacco Austria comments on this: “We are making large investments in market research. Our findings conclude that this innovation – Click&Roll – appeals to our customers. There is a tendency towards more freedom of decision, a tendency that can also be found in other consumer goods: I am doing what I want whenever I want it. It is my own decision whether I want more taste or less. Click&Roll addresses this very target group, which is a quite broad one and includes mainly 20-to-35-year-olds. [...] In any case, this technology can also be applied in other cigarettes”<sup>52</sup>.

Cigarette brand and type	Advertising slogan
Kent Convertibles	Click. Switch. Refresh.
Camel crush	Squeeze, Click, Change!
Camel crush bold	Bold how you like it, Fresh when you want it.
Camel Activate	Press – Activate – Fresh
Camel Activate	Activate Freshness
Lucky Strike Click&Roll	A Small Big Change
Marlboro Blue Ice	Press Activate Liberate

**Table 2.2**  
Examples of advertising slogans for menthol capsule cigarettes. Illustration: German Cancer Research Center, Unit Cancer Prevention



Fig. 2.11  
 Advertising for menthol  
 capsule cigarettes in  
 Japan.  
 Pictures: Dr. Yumiko  
 Mochizuki-Kobayashi,  
 National Cancer Center,  
 Japan



**SQUEEZE, CLICK, CHANGE!**

Menthol freshness at your fingertips.

SQUEEZE THE CAPSULE. HEAR THE CLICK. CHANGE THE TASTE.

**FREEDOM AT YOUR FINGERTIPS**

DISCOVER HOW REFRESHING A LITTLE **CHANGE** CAN BE

"I LOVE THE OPTION TO **CHANGE TO MENTHOL!**"

squeeze - click - change the taste

3712 VIEWS | 24 COMMENTS | 82 LIKES | BOOKMARK IT

**CAMEL CRUSH BOLD HAS ARRIVED**

bold how you like it, fresh when you want it.

Now there are even more ways to get the freshness you want, when you want it.

Introducing Camel Crush Bold - full tobacco flavor - with the same burst of freshness. Just squeeze the filter, click the capsule and change the taste from bold to fresh.

**CRUSH BOLD**  
A bolder, full flavor smoke with capsule technology.

GO TO COUPON ME » AND CHOOSE FROM YOUR FAVORITE CAMEL PRODUCTS, INCLUDING CAMEL CRUSH BOLD FOR TWO COUPONS EVERY MONTH

COUPON ME

**YOUR TASTE. YOUR STYLE.**

AREAS FREE

HAVE IT BOTH WAYS. PLEASEUSE LIKE NO OTHER. SMOOTH & FRESH TASTING.

GET MORE OF WHAT YOU WANT...

WHEN YOU WANT IT. COOL BURST.

» NEW « CAMEL MENTHOL MORE MENTHOL REFRESHMENT

» FRESH «

Fig. 2.12 Advertising for menthol capsule cigarettes of "Camel" from the USA (source: Trinkets&Trash<sup>67</sup>).

**HAT ES BEI IHNEN SCHON  
CLICK GEMACHT?**



**CLICKEN SIE MIT  
DEM ORIGINAL!**



Fig. 2.13  
Advertising for menthol  
capsule cigarettes of  
"Lucky Strike Click&Roll"  
from Austria (slogan  
above: "Has it already  
clicked with you?";  
slogan below: "Click with  
the original!"; source:  
Trafikanten Zeitung<sup>53,54</sup>).



Fig. 2.14 Advertising for menthol capsule cigarettes of “Camel Activate” from Austria (source: Trafikanten Zeitung<sup>54</sup>).



### **3 The market for menthol cigarettes and the target group of adolescents**

In most countries, cigarettes with menthol capsules embedded in the filter have only been available for a short period of time, therefore there is hardly any data on the market share of these products and just as little information on their consumers. However, regular menthol cigarettes have been established in the markets in several countries for a long time and their market share is quite high. Thus, sufficient data is available on these mentholated products.

While the market shares of menthol cigarettes are quite high in some countries, there is very little consumption in others. This makes the global market for menthol cigarettes very heterogeneous. In the Philippines, menthol cigarettes have the largest market share of 60 per cent, followed by Cameroon of about 40 per cent and the USA and Hong Kong each of about 25 per cent<sup>25</sup>. This data was collected in 1999 and 2001.

In Europe, the consumption of menthol cigarettes is lower. The largest market shares of about 15 per cent can be found in Estonia, Finland and Romania. In most other European countries their share is significantly less than ten per cent<sup>25</sup>. In Germany, the market share of menthol cigarettes in 2011 was around three per cent<sup>65</sup>; as compared to about ten years ago when it was only 1.3 per cent<sup>25</sup>. Thus in Germany too, the use of menthol cigarettes is now increasing.

Due to the relatively small market share of menthol cigarettes there are no studies available for most countries on smoking prevalences, especially among certain groups of the population. Therefore, most of the studies on this topic are from the USA. Some data is also available on the Japanese menthol market.

#### **3.1 The market for menthol cigarettes in the USA**

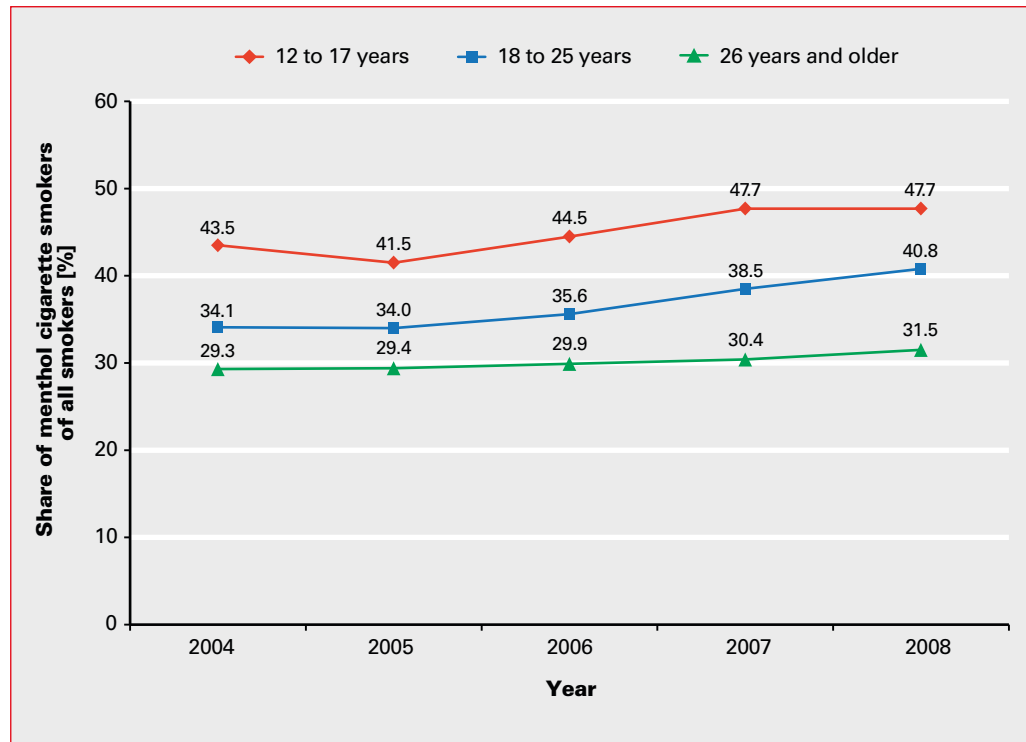
As in the other industrialized countries, there is a downward trend in cigarette consumption in the USA. However, despite the fact that cigarette sales decreased in the USA by 22 per cent between 2000 and 2005, the menthol cigarette sales remained stable during this period<sup>42</sup>.

Moreover, between 2004 and 2008, the share of smokers stating they had consumed menthol cigarettes during the past month actually increased from 31 per cent to almost 34 per cent, the largest increases being among younger people, with whom menthol cigarette consumption is very popular<sup>64</sup>. These figures include those smokers who only occasionally consume menthol cigarettes. The share of regular smokers of menthol cigarettes is just under 27 per cent, according to a survey from 2006/2007<sup>49</sup>.

Among American adolescents while the overall share of smokers decreased, the share of smokers of menthol cigarettes increased. According to a study from the year 2000 the share of menthol cigarette smokers among 12-to-18-year-old smokers was 40 per cent, this rose to 47 per cent in 2002. This represents an increase by 18.5 per cent within this menthol group<sup>28</sup>. Taking the period between 2004 and 2008 as a reference, there is an increase among the 12-to-17-year-olds from 43.5 per cent to 47.7 per cent<sup>64</sup>. Generally speaking, the share of menthol brand smokers was lower among higher age groups than among adolescents and younger age groups<sup>49</sup>. Correspondingly, the increase was also less in the higher age group compared to the lower age group<sup>64</sup> (Fig. 3.1).

This tendency is also reflected by brand preference: the menthol variation of the

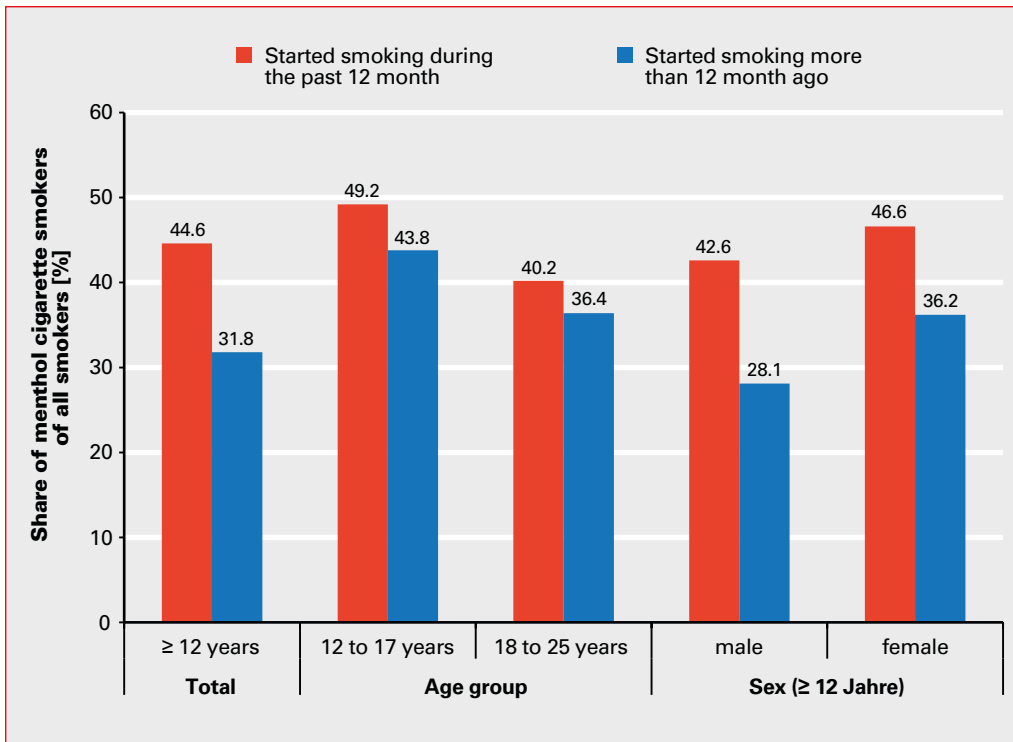
**Fig. 3.1**  
**Share of menthol cigarette smokers of all smokers according to age in the USA (smoker = “have consumed cigarettes during the past month”; smoker of menthol cigarettes = “have consumed menthol cigarettes during the past month”; Data: SAMHSA 2009<sup>64</sup>).**  
 Illustration: German Cancer Research Center, Unit Cancer Prevention



“Camel” brand is very popular among American adolescent smokers. These cigarettes were consumed by just under a third of 12-to-17-year-olds in 2006. In comparison, it was only 13 per cent among 18-to-25-year-olds and only six per cent among persons older than 35 years<sup>42</sup>. Other menthol brands which are quite popular in the USA, not only among adolescents, are “Newport” (an American brand) and “Marlboro Menthol”; that have both been able to increase their market share of less than two per cent to more than 15 per cent since the 1990s. At the same time, the market shares of other menthol brands with a long history in the USA, such as “Kool” and “Salem”; show a decline. In 2000, almost seven per cent of all adolescent smokers consumed “Marlboro Menthol” cigarettes, almost every fifth adolescent smoked “Newport” cigarettes. In comparison: “Kool” and “Salem” only had a market share of 1 or 0.3 per cent<sup>42</sup>. Furthermore, the share of menthol brands is higher among adolescent new smokers, who have been smoking for not more than one year, than in those who have smoked for more than one year<sup>28,64</sup> (Fig. 3.2). This implies that menthol cigarettes could be gateway products for smoking.

Apart from adolescents<sup>41</sup>, there is an above-average consumption of menthol brands in the USA by African-Americans and women<sup>7,19,64</sup>. Roughly 32 per cent of American female smokers consume menthol cigarettes, while the share among male smokers is only 22 per cent. Among African-Americans, 70 per cent of smokers normally consume menthol cigarettes<sup>49</sup> (Fig. 3.3).

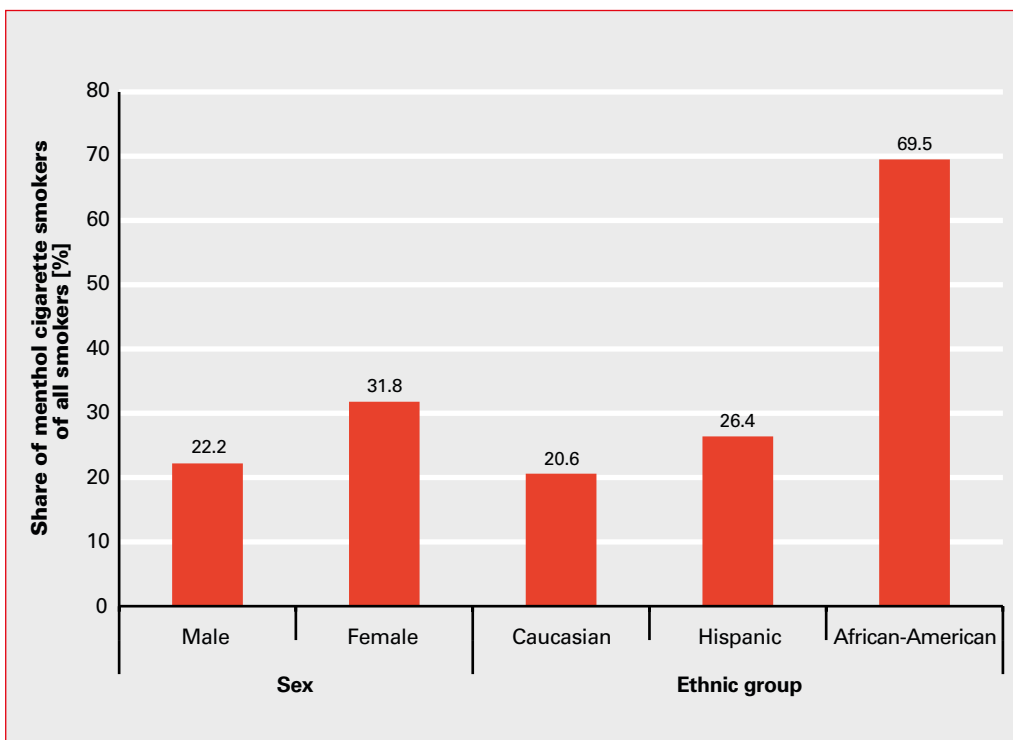
There is possibly a connection between those high prevalences in these groups of society and the form of advertising for menthol cigarettes, as advertising (at least in the USA) for these products was target group-oriented right from the beginning. Furthermore it gave the impression that menthol cigarettes were healthier than other cigarettes. Against this background, new smokers and experienced smokers who are concerned for their health seem to think that the use of menthol will make smoking less harmful, as well as easier and more pleasant<sup>3,62</sup>. In addition, studies were able to find that advertising for certain menthol cigarettes was often addressed particularly to the African-American population as they were often placed, for instance, in magazines with mainly African-American readers or located in those parts of the city where these ethnic groups live<sup>3,13,62</sup>. It is conspicuous that the target group-oriented advertising goes



**Fig. 3.2**  
Share of menthol cigarette smokers of all smokers according to point in time they started smoking in the USA (mean values from 2004 to 2008; Data: SAMHSA 2009<sup>64</sup>).  
Illustration: German Cancer Research Center, Unit Cancer Prevention

hand in hand with a higher prevalence of menthol brands in certain sections of the population. Between 1998 and 2005, the overall spendings of the US tobacco industry for advertising in magazines declined drastically, while spendings for the marketing of menthol cigarettes in

magazines tended to increase: in 1998, overall spendings amounted to almost US\$350 million, ten per cent of which were spent on menthol brands, while in 2005, industry spendings had decreased to roughly US\$80 million, with about half of this amount being spent on advertising for menthol brands<sup>42</sup>.



**Fig. 3.3**  
Share of smokers of menthol cigarettes of all smokers according to sex and ethnic group in the USA (2006/2007; Data: National Cancer Institute<sup>49</sup>).  
Illustration: German Cancer Research Center, Unit Cancer Prevention

### 3.2 The market for menthol cigarettes in Japan

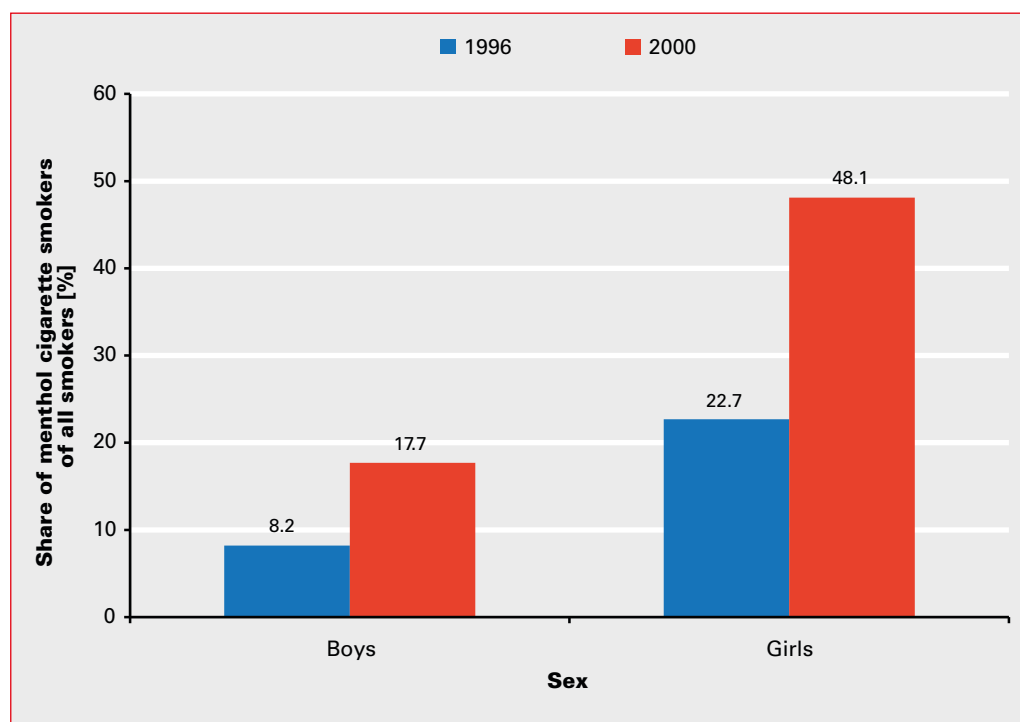
Smoking prevalence among men in Japan is among the highest smoking prevalences world-wide while smoking prevalence among Japanese women is among the lowest<sup>51</sup>. Since the 1990s, when the smoking prevalence among men was higher than 50 per cent, the figures have decreased to just under 37 per cent by 2008. Among women, it was constantly at about ten per cent during this whole period of time<sup>22</sup>. However, the prevalence among young and youthful women (20 to 40 years of age) has increased from 11 per cent in 1990 to 18 per cent in 2005<sup>33</sup>. Here, too, is a possible connection to the specific, women-oriented marketing of menthol cigarettes. In 1986, the Japanese cigarette market was opened to foreign brands, and advertising of the newly introduced menthol brands was specifically directed towards young women. The menthol content in the cigarettes created especially for the Japanese market was much lower than that in US cigarettes. Menthol cigarettes in Japan were mainly smoked because they lacked the tar-like smell of regular cigarettes<sup>12</sup>. Their marketing was based on typically female attributes such as “slim,” “light” or “mild.” Producers also noticed that menthol was not only attractive for young women but

also for new smokers<sup>12</sup>. Between 1996 and 2000, the preference for menthol brands increased among female high school student smokers from roughly 20 to almost 50 per cent, while the increase among male student smokers during the same period of time was from 8 to 18 per cent (Fig. 3.4). The market share of menthol cigarettes, which had been less than one per cent in 1980, reached 20 per cent in 2008<sup>12</sup>. The case study of Japan very clearly shows that menthol cigarettes can serve as a gateway product.

### 3.3 Spread of cigarettes with menthol capsules

There are no independent studies or data collections yet on the development of market shares of menthol capsule cigarettes. However, an overview can be gained thanks to the internet sources of the tobacco industry<sup>6,10,46</sup>.

In the USA, where “Camel Crush” cigarettes were launched by R. J. Reynolds in 2008, the brand was at first successfully introduced to a test market and shortly after that, it was already marketed nationally. The share of “Camel Crush” in the national market had already increased to 0.6 per cent at the beginning of 2009<sup>60</sup>. There are presentations by BAT, addressed to investors, in which



**Fig. 3.4**  
Preferences for menthol brands among Japanese high school students (male and female) in 1996 and 2000<sup>12</sup> (Data: Osaki 2006<sup>51</sup>).

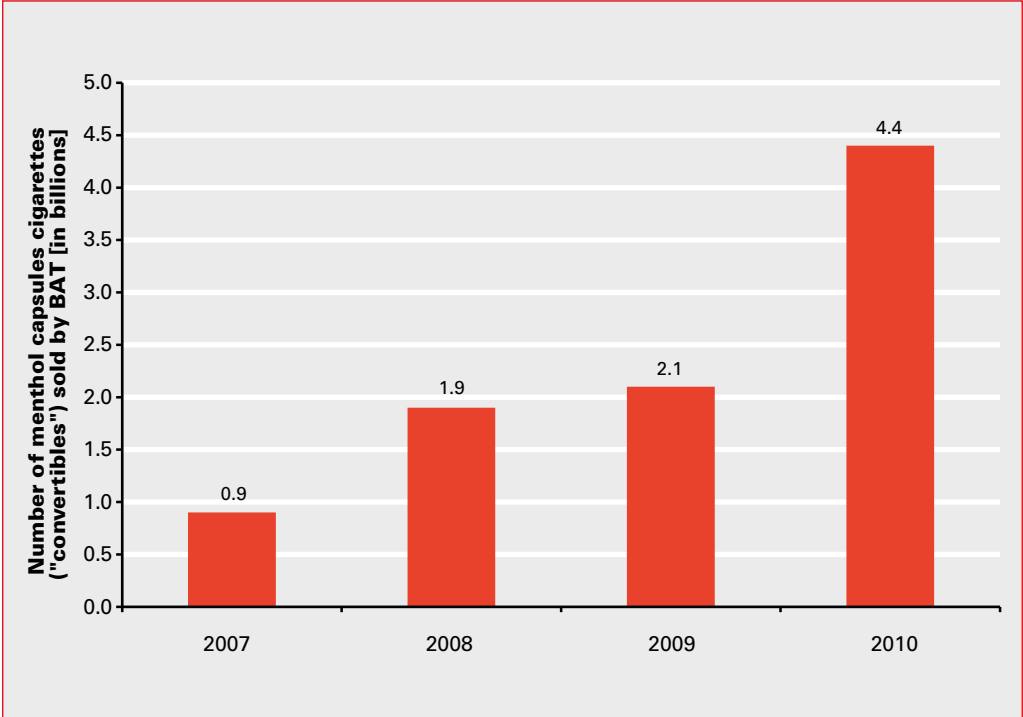
Illustration: German Cancer Research Center, Unit Cancer Prevention



some countries, among them Brazil and Chile, are mentioned where the market share of either the brand type with menthol capsules or the brand itself increased considerably after the new product had been launched. Here, the type "Click&Roll" by "Lucky Strike" had been launched in 2009. In both countries market shares of "Lucky Strike" almost doubled by the first quarter of 2011. While in Chile, for instance, the market share of "Lucky Strike" had been 7.5 per cent at the beginning of 2009, it climbed up to almost 15 per cent over the next two years<sup>10</sup>. In France, the market share of "Click&Roll" cigarettes was 0.72 per cent only twelve weeks after they had been launched<sup>6</sup>.

In Moscow, too, the market share of BAT's brand "Kent Convertibles" increased from 0.1 to 0.7 per cent between September and December 2010<sup>10</sup>. Similar increases are reported for the consumption of "Kent Convertibles" in the Netherlands and Switzerland as the market share increased to 0.65 and 0.79 per cent, respectively, in just three months after their introduction. For Romania, the market share is said to have increased to more than eight per cent just four weeks after the launch<sup>6</sup>.

For 2009, BAT reports an overall amount of roughly two billion menthol capsule cigarettes sold; an amount which more than doubled to over four billion cigarettes by 2010 (Fig. 3.5)<sup>46</sup>.



**Fig. 3.5**  
**Number of menthol capsule cigarettes ("convertibles") sold by BAT worldwide between 2007 and 2010, in billions (Data: Levy 2011<sup>46</sup>).**  
 Illustration: German Cancer Research Center, Unit Cancer Prevention



## 4 Recommendations

Menthol in tobacco products has various effects on the human body and helps increase the attractiveness of already harmful products among consumers, thus making the products even more dangerous to your health. New technologies increase the popularity of cigarettes especially among young people and new smokers. These technologies include embedding capsules in the cigarette filter, which may be filled with menthol or other flavouring agents and allow consumers to adjust the taste of the cigarette individually.

Flavouring agents contained in capsules are protected from volatilisation/loss and are hardly absorbed by filter material. Thus, they retain their full flavour and can make the act of smoking more pleasant and easier than flavouring agents that are added directly to the tobacco and are thus lost or burned.

The attractiveness of toxic tobacco products should not allowed to be increased by novel technologies but rather be decreased as quickly and as far as possible. There is a global consensus on the above through the WHO Framework Convention on Tobacco Control (FCTC)<sup>15,72</sup> international law, which has been already adopted by 174 nations, including Germany.

Article 9 of the FCTC calls for effective measures for the regulation of the contents of tobacco products, and the guidelines to this article state as follows: *“From the perspective of public health, there is no justification for permitting the use of ingredients, such as flavouring agents, which help make tobacco products attractive. [...] Attractiveness and its impact on dependence should be taken into account when considering regulatory measures. [...] Masking tobacco smoke harshness with flavours contributes to promoting and sustaining tobacco use”*<sup>15,73</sup>. The guidelines recommend the

banning of ingredients that improve the taste of tobacco products as they increase the attractiveness of harmful products and thus in the end foster the emergence of addiction. This holds true in particular for menthol and other flavouring agents in capsules which are then embedded in the filter, since the main objective of these products is to improve the flavour. In some countries the use of certain additives in tobacco products has already been banned by law. In the case of the USA, they include additives which give tobacco products specific flavours such as fruits, confectionary, coffee, clove and spices<sup>68</sup>; in Tasmania (Australia) it is prohibited to sell cigarettes with flavours of fruits and confectionary<sup>27</sup>. The most comprehensive ban on additives worldwide is in place in Canada, where numerous flavours are prohibited in cigarettes, small cigars and blunt wraps. However, the bans do not include menthol yet<sup>32</sup>.

In Germany, menthol capsule cigarettes are not approved at present. However, as these products continue to spread around the globe the tobacco industry will try to launch them on the German market as well. As pointed out above, such products are able to maintain and promote tobacco consumption. Furthermore, there is a danger of the product range being expanded even further to include, for instance, other flavours. Also, the technology might be developed even further to continue launching new products in order to win over new, young smokers and to keep long-standing smokers from quitting. Against this background, the prohibition of distributing capsule tobacco products in Germany must be maintained.

In addition to that, ingredients that add to increasing the attractiveness of tobacco products must generally be banned. The

application of the International Guidelines for Implementation of Articles 9 and 10 of the FCTC could mean a ban on the following additives for tobacco products, regardless of their form of use, whether in a capsule, in the tobacco itself, in cigarettes, wrapping paper or the filter:

1. Ingredients that will increase the savouriness and attractiveness of tobacco products. These include, as proven by patent specifications of tobacco companies, the following substances:
  - any type of flavouring agent
  - any type of fruit essence, organic substances
  - any type of sugar or sugar-like substances
  - any type of menthol or menthol-like substances
  - oils
  - alcohol
2. Ingredients with colouring properties:
  - ink
  - pigments
  - other colouring agents
3. Ingredients designed to give the impression that products have healthy benefits:
  - vitamins
  - substances derived from fruits or vegetables or their processing (juices)
  - amino acids such as cysteine and tryptophane

- essential fatty acids such as, among others, omega-3 and omega-6
- slimming agents such as rimonabant

4. Ingredients associated with energy and vitality:
  - caffeine
  - guarana
  - taurine
  - glucuronolactone
  - extracts from energy drinks

Regarding technical changes to tobacco smoke in order to increase the attractiveness of smoking a ban must be placed on any further addition to the cigarette such as capsules, “threads” or others. Any manipulation of the properties of tobacco products or their smoke must be prohibited. Patent specifications from tobacco companies, which are available online, prove the industry's intentions to make tobacco products even more attractive. The patents also include a list of those additives that help make smoking more flavoursome. Patent specifications are thus an essential source of information for regulation measures. Patents reveal at least part of the producers' knowledge. The significant danger to their health to which consumers of tobacco products are exposed justifies the strict regulation of such products. Therefore, a ban on additives is the appropriate and proportionate response.

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# List of authors

## Authors

(in alphabetical order)

Dipl. Biol. Sarah Kahnert  
German Cancer Research Center  
Heidelberg  
Email: s.kahnert@dkfz.de

Ute Mons, M. A.  
German Cancer Research Center  
Heidelberg  
Email: u.mons@dkfz.de

Dr. Urmila Nair  
German Cancer Research Center  
Heidelberg  
Email: u.nair@dkfz.de

Dr. Martina Pötschke-Langer  
German Cancer Research Center  
Heidelberg  
Email: m.poetschke-langer@dkfz.de

Dr. Katrin Schaller  
German Cancer Research Center  
Heidelberg  
Email: k.schaller@dkfz.de

Susanne Schunk  
German Cancer Research Center  
Heidelberg  
Email: susanne.schunk@dkfz.de



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