

The invention relates to an aerated filter cigarette with a predominant "American-blend" taste and its aim is to propose a cigarette of this kind based exclusively on Virginia tobacco, the mainstream smoke of which has a condensate/nicotine ratio of 5:1 to 9:1 with a condensate value according to DIN 10240 of no more than 10 mg, a pH value of more than 6.0 and a harmful substances index according to Herzfeld of less than 35.

Cigarettes with the typical "American-blend" taste are preferred by certain consumer groups, although, on account of the Burley tobacco used, these have the disadvantage that there are more undesirable factors with respect to the aroma on account of the relatively high protein content and, in addition, they have a significantly higher nitrate content. This leads to a relatively high harmful substances index according to Herzfeld.

Although it is possible to blend Virginia tobacco with Burley tobacco in order to obtain the desired "American-blend" taste, or even to increase it by the addition of non-tobacco additives, this last method is limited, particularly with respect to tobacco laws, particularly as undesired harmful substances may be produced by incomplete combustion or pyrolysis of non-tobacco additives of this kind, leading to a higher harmful substances index.

Furthermore, it is known that dilution of the mainstream smoke can be obtained by a high degree of filter aeration, to such an extent that the values determined according to the standards give low condensate and nicotine values and a low harmful substances index. However, cigarettes of this kind have the disadvantage of a low tobacco taste and an aroma deficit, they

have a low degree of saturation and consequently find little acceptance among consumers.

It is also known, e.g. according to EP-A-0 255 114, to provide special filter designs, especially those having cavity filters, which are supposed to give improved taste properties and an advantageous nicotine/condensate ratio with a maximum of 8 mg of condensate. Furthermore, aerated mono filter cigarettes according to DE-A-30 11 959 are supposed to lead to cigarettes having a strong aroma with relatively low nicotine and condensate values by means of specially designed grooved filters and a consequent lashing movement of the mainstream smoke emerging from the filter body. Apart from the fact that these results can hardly be reproduced or are at least debatable, in the case of filter cigarettes of this kind with an expensive design, the nature of the taste is not altered, but is at most weakened.

In all cases, the taste type of the tobacco mixture present is of course also present again in a form weakened to a greater or lesser extent in the mainstream smoke and, in the opinion of the average expert, cannot be converted into another taste type.

In addition to the object mentioned at the outset, it is also desired to obtain an aerated filter cigarette with low condensate values and especially a low harmful substances index without having to accept the disadvantages known to the expert, such as low tobacco taste, aroma deficit, low degree of saturation and therefore little acceptance among consumers, with relatively high manufacturing costs.

In order to solve this problem, an aerated filter cigarette is proposed, characterised by the given combination of the different features according to the claim.

An aerated filter cigarette with a predominant "American-blend" taste with completely atypical condensate/nicotine values or harmful substance values for this taste is obtained in a surprising manner by the combination of features known per se, although partially at the limit of or outside the ranges of the parameters by a fortunate selection, by a partially (maximum of 75 %) volume activated tobacco blend with appropriately adapted rod design and rod density, by the use of an inexpensive filter with high draw resistance and preferably a monoacetate filter with a high retention capacity with the resulting high cigarette final draw resistance, and by the selection of high quality natural Virginia tobacco with a high nicotine and sugar content, this itself giving a low harmful substances index with a simultaneously high degree of saturation with a relatively low degree of filter aeration, a strong "American-blend" taste being obtained by the exclusive use of pure Virginia tobacco, this being completely unexpected for the expert.

The following should be noted with respect to the individual parameters or features of the combination used in the aerated filter cigarette according to the invention:

With respect to the taste, the nicotine content of natural Virginia tobacco influences the taste constituents "reaction" or "strength" and in the case of cigarettes commonly found on the market is in a range of 1.7 to 2.3 % with respect to the dry matter. In the case of the cigarette according to the invention, a high to unusually high nicotine content of 2 to

3.5 % by weight is intentionally provided for.

In the case of cigarettes commonly found on the market, the packing density of the filler tobacco is in a range of 220 to 280 mg/cm³, corresponding to a cigarette hardness range of approximately 2.5 to 1.9 mm ET (test punch depth of penetration) according to a Reemtsma durometer, corresponding in principle to the digital densimeter DD-30 (with cigarette fittings) by Heinrich Borgwaldt of Hamburg. In the case of a low packing density in the lower range of 150 mg/cm³, there is generally a "sharp" taste, while in the conventional range of 220 to 280 mg the rod sorption increases and the "sharp" taste is therefore reduced or levelled out by virtually additional filter action. This may also apply to other tastes.

In the case of cigarettes commonly found on the market, the air permeability of the cigarette paper in CORESTA values according to DIN/ISO 2965 is in a range of 25 to 70, low CORESTA values giving only low smoulderability and only low aeration, and consequently also only low dilution of the smoke by the cigarette paper, while in the case of high CORESTA values it is possible to achieve a high smouldering speed with a high degree of aeration. In the case of the cigarettes according to the invention, this parameter is adjusted to below the range of cigarettes commonly found on the market of at least 25 CORESTA. i.e. to a value of 3 to 20.

Although the cigarette according to the invention uses fine-denier cellulose acetate filters with conventional hardness values and without additives altering the taste, the parameters to be observed here are also of crucial importance.

In the case of cigarettes commonly found on the market, the filament titre of the filter material is approximately 2.5 to 3.5 denier, wherein it is known that a low filament titre of approximately 1.3 denier gives relatively high sorption and relatively high retention with relatively high draw resistance, while accordingly higher denier numbers with otherwise identical parameters lead to low sorption and low retention and low draw resistance. Compared to the titre range of the filters of cigarettes commonly found on the market of 2.5 to 3.5 denier, in the case of the cigarettes according to the invention, the filament titre is in a range of 1.3 to 2.5 denier, i.e. below the filament titre normally used.

In the case of cigarettes commonly found on the market, the total denier influencing the absolute draw resistance is in a range of 32 000 to 40 000 denier, the absolute sorption or retention or the absolute draw resistance, disregarding the crinkling index, being directly proportional to the total denier. In the case of cigarettes commonly found on the market, the resulting filter draw resistance is in a range of 50 to 70 daPa and in the case of low values results in a correspondingly small variation in taste and in the case of higher values results in a significant variation in taste towards "mild". In the case of the cigarette according to the invention, the draw resistance values to be adjusted above the total denier, which is preferably in the range of 40 000 to 55 000 denier, in the case of the extremely low filament titre values required according to the invention are 95 - 160 daPa, in an intentionally unusually high range.

In the case of cigarettes commonly found on the market, the degree of secondary air, i.e. the ratio of secondary air to

mainstream smoke is in a range of 18 to 50 %. An increase in the secondary air supply, e.g. to 75 %, results in a strong variation in taste towards super-mild. In the case of the cigarette according to the invention, the secondary air supply is in a range of filter aeration of 20 to 45 %, i.e. in an average range.

The final draw resistance of the majority of filter cigarettes commonly found on the market is in a range of 80 to 120 daPa. Relatively high final draw resistance values are considered to be unusual and therefore have a negative effect on the consumers of conventional mild cigarettes. The final draw resistance of 100 to 160 daPa selected in the case of the cigarette according to the invention is intentionally in the upper range in order to influence the harmful substances index. However, it has been found in a surprising manner in internal tests that the unusually high final draw resistance of the cigarette according to the invention does not have a negative effect.

It is surprising that, in the case of an aerated filter cigarette of pure natural Virginia tobacco with a high nicotine content, a change in the taste from Virginia to "American-blend" taste is obtained by the special selection of the packing density of the filler tobacco in the lower range or below the range of those commonly found on the market, selecting a cigarette paper with an unusually low air permeability and in the case of a filter with a likewise unusually low filament titre and an again unusually high draw resistance as a result of the total denier adapted thereto, with a normal degree of secondary air.

Although it is assumed that the unusual condensate/nicotine ratio of 5:1 to 9:1 obtained in the mainstream smoke by varying the abovementioned parameters promotes the comparatively high smoke pH value of more than 6, this again in spite of a maximum of 10 mg of condensate, and in the case of a low harmful substances index of less than 35, this may explain the surprisingly high degree of saturation important to the consumer, it does not explain the "taste inversion".

In view of the complexity of the different parameters of the relevant tobacco constituents, tobacco packing density, air permeability of the cigarette paper and filament titre, total denier and draw resistance of the cellulose acetate filter in association with the final draw resistance, it can only be assumed that the natural Virginia tobacco used, which unlike most tobacco blends commonly found on the market has not been subjected to chemothermal treatment, as a result of the relatively high residual sugar content associated therewith and the additional intentionally selected high nicotine content with a simultaneously low nitrate and NH content, and the increase of the filling power or volume activation effected according to DE-C-34 14 625, has a proportionately high content of then decomposed aromatic substances or precursors thereof. Therefore, when a cigarette paper of relatively low porosity is provided with an air permeability of below 20 CORESTA and is combined with a surprisingly low degree of filter aeration of approximately 20 to 45 %, with respect to the low harmful substances index, it is possible to achieve an apparently optimum glow zone temperature with the blend selected in this manner in combination with a rod density adapted to the tobacco selection and formula, in which a large proportion of the decomposed aromatic substances or precursors thereof are

released or converted. It can be further assumed that the undesirable sensory factors occurring simultaneously, as in the case of any process involving the incomplete combustion of nitrogen-containing organic materials, such as low amines, aldehydes, alcohol acids or esters, which, with respect to the taste, contribute to the typical Virginia character, i.e. cause "sharpness" or "pungency", are suppressed in an apparently overproportional manner by the extremely unusual fine-denier monoacetate filter with a high retention capacity, while the aromatic substances and the desired tobacco constituents such as nicotine and homologues thereof are retained, this providing, with respect to the taste, "volume" or "strength" and "aroma", giving the surprising result that the sidestream smoke of the cigarette according to the invention has a recognisable Virginia odour, although the mainstream smoke of the same cigarette arriving in the mouth of the smoker has a typical "American-blend" taste.

Example:

Test cigarettes of pure Virginia tobacco without additives altering the taste and without aromatic substances, although with conventional proportions of a moistening agent, were produced. The tobacco weight, including manufacturing losses, of the rods produced in the standard format was 690 mg. The cigarette paper used had a permeability of 20 CORESTA units. The packing density of the filler tobacco was adjusted to 220 mg/cm^3 , the rod having a well packed filling degree with a conventional hardness value of 2.2 mm ET. The hardness values of cigarettes commonly found on the market measured with the same durometer are between 1.9 and 2.5 mm in a standard operating environment.

The filter used was a monoacetate filter with a titre of 1.5 Y/46 000 SK denier, its draw resistance for a length of 21 mm and a diameter of approximately 7.8 mm being approximately 118 daPa. The dimensions of the filter cigarette produced were 7.9 mm in diameter by 84 mm in length. The degree of secondary air was 37 % and the final draw resistance was 130 daPa.

The cigarette smoked according to DIN 10240, with a puff number of 10 puffs, produced 7.95 mg of condensate and 1.0 mg of nicotine, this corresponding to a condensate/nicotine ratio of approximately 8:1. The pH value of this cigarette was 6.4. This value is extremely high compared to the typical smoke pH value of a Virginia cigarette of no more than 5.5.

In internal tests, the taste of these cigarettes was constantly shown to be "typically American-blend" with a "high degree of saturation" (corresponding to the values of aroma and enjoyment), from the first puff onwards. It was found in particular that the specific "undesirable factors" to be expected for Virginia tobacco such as "sharpness" and "pungency" were not present.

Sensory comparative tests showed that the cigarettes according to the invention were comparable with strong "American-blend" filter cigarettes with DIN values in the smoke of 15 mg of condensate and 1 mg of nicotine.

The harmful substances index determined according to Herzfeld in the case of these cigarettes was approximately 31 and was calculated according to the following formula:

Harmful substances index according to Herzfeld	Values according to the example
Smoke condensate (mg/Cig.) x 3.333	7.95 mg 26.50
Smoke nicotine (mg/Cig.) x 50.00	1.00 mg 50.00
CO (in the HSR) (mg/Cig.) x 4.17	9.98 mg 41.62
NO (in the HSR) (mg/Cig.) x 156.25	0.038 mg 5.94
Total x 0.25	124.06
Harmful substances index according to the example: 31.02 =====	

Comparative example:

A tobacco stick of the same natural Virginia tobacco mixture with the same packing density having a cigarette paper with the same low air permeability of 20 CORESTA was used, although with a conventional aerated cellulose acetate filter with average filament titre and total denier and a corresponding average draw resistance and a consequent average filter retention, although with a comparatively high degree of filter aeration, i.e. high smoke dilution. This cigarette smoked according to DIN 10240 gave comparable condensate values to the filter

cigarette according to Example 1. However, in the case of a cigarette of this kind, there was no typical "American-blend" taste as actually expected. It tasted significantly of Virginia tobacco, although fuller and more aromatic than a conventional Virginia cigarette.

In a further sensory comparative test, a filter according to Example 1 was combined with a conventional virginia rod, a clear Virginia taste being achieved, the taste power of which, however, was unsatisfactory and weak.



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CLAIM

Aerated filter cigarette with a predominant "American-blend" taste based exclusively on Virginia tobacco, the mainstream smoke of which has a condensate/nicotine ratio of 5:1 to 9:1 with a condensate value according to DIN 10240 of no more than 10 mg, a pH value of more than 6.0 and a harmful substances index according to Herzfeld of less than 35, characterised by the combination of the features that

- a) the filler tobacco consists of virtually pure natural Virginia tobacco without additives altering the taste and having a high nicotine content with respect to the dry matter of 2 to 3.5 % by weight,
- b) the packing density of the filler tobacco is 150 to 250 mg/cm³,
- c) the cigarette paper has an air permeability of 3 to 20 CORESTA units according to DIN/ISO 2965,

features a) to c) being selected in such a manner that the rod produced is in the conventional hardness/haptic range of 1.9 to 2.5 mm ET and that

- d) the filter is a fine-denier cellulose acetate filter with conventional hardness values and without additives altering the taste and
 - i) has a filament titre of 1.3 to 2.5 denier or 1.44



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to 2.77 dtex,

- ii) has a total denier adapted thereto of preferably 40 000 to 55 000 denier, in particular in order to give a draw resistance of 95 to 160 daPa with a length of 21 mm and a diameter of 7.8 mm, and
- iii) the secondary air supply is adjusted to a degree of filter aeration of 20 to 45 %, and that
- e) the filter cigarette has a final draw resistance of 100 to 160 daPa.