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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

HEMP, CANNABIS *

UPOV Code(s): CANNB_SAT

Cannabis sativa L.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by an expert from the Netherlands

to be considered by the

the Enlarged Editorial Committee at its meeting
to be held in Geneva, on January 13 and 15, 2025

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Cannabis sativa L., *C. sativa* subsp. *sativa*, C. *indica* (Lam.), *C. sativa* subsp. *indica* (Lam.) E. Small & Cronquist. C. *ruderalis* Janisch.	Cannabis, Hemp	Cannabis, Chanvre	Cannabis, Hanf	Cáñamo, Cannabis

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Cannabis sativa* L.

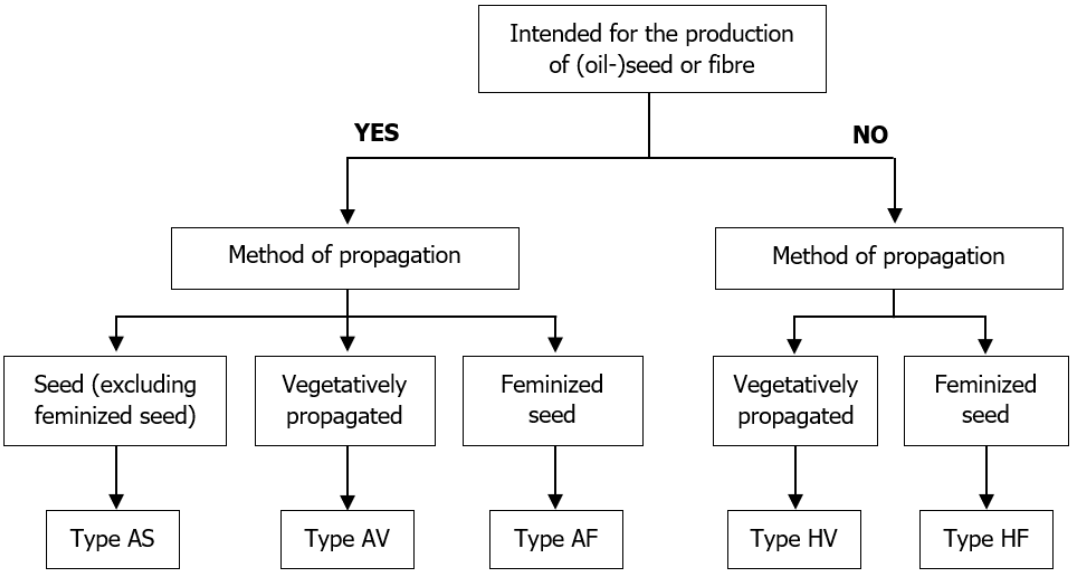
2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of seed, feminized seed, or rooted cuttings.
Feminized seed results from a breeding scheme where female plants have received treatment to obtain functionally male, yet genetically female, pollen which is used to pollinate female plants. This results in seeds that 100% yield female plants.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

Type AS: 500 g seeds
Type AV: 60 rooted cuttings
Type AF: 500 g feminized seeds
Type HV: 15 rooted cuttings
Type HF: 500 feminized seeds



A Arable cultivation practice (large scale, field), varieties grown for fibre and (oil-) seed production
H Horticultural cultivation practice (small scale field or controlled environment), varieties grown for uses other than fibre and (oil-)seed production
S Seed-propagated
V Vegetatively propagated
F Feminized seed propagated

In the case of seed, the seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 Number of Growing Cycles

3.1.1 The minimum duration of tests should normally be two independent growing cycles.

3.1.2 For varieties of types HV and HF, the minimum duration of tests should normally be a single growing cycle when tests are performed in a controlled environment.

3.1.3 In case of doubt to which type a variety belongs, it should be tested under consideration of all relevant types.

3.1.4 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

3.3 Conditions for Conducting the Examination

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The optimum stage of development for the assessment of each characteristic is indicated by a number in the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.3.

3.4 Test Design

3.4.1 In the case of varieties of types AS and AF, each test should be designed to result in a total of at least 200 plants which should be divided between at least 2 replicates.

3.4.2 In the case of varieties of type AV, each test should be designed to result in a total of at least 60 plants which should be divided between at least 2 replicates.

3.4.3 In the case of varieties of type HV, each test should be designed to result in a total of at least 10 plants.

3.4.4 In the case of varieties of type HF, each test should be designed to result in a total of at least 20 plants which should be divided between at least 2 replicates.

3.4.5 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic,

observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.1.4 Number of Plants or Parts of Plants to be Examined

In the case of types AS, AV and AF, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts taken from each of 20 plants and any other observation made on all plants in the test, disregarding any off-type plants.

In the case of varieties of type HV, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 5 plants or parts taken from each of 5 plants and any other observation made on all plants in the test, disregarding any off-type plants.

In the case of type HF, unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 10 plants or parts taken from each of 10 plants and any other observation made on all plants in the test, disregarding any off-type plants.

4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

“Visual” observation (V) is an observation made on the basis of the expert’s judgment. For the purposes of this document, “visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, “G” provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 These Test Guidelines have been developed for the examination of cross-pollinated (type AS), vegetatively propagated (types AV and HV), and feminized seed propagated (types AF and HF) varieties. For varieties with other types of propagation, the recommendations in the General

Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

4.2.3 The assessment of uniformity for varieties of type AS should be according to the recommendations for cross-pollinated varieties in the General Introduction.

In the case of varieties of type AS, for the characteristics Leaf: variegation and Main stem: color, a population standard of 3% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 200 plants, 10 off-types are allowed.

For the assessment of uniformity of varieties of type AV, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 60 plants, 2 off-types are allowed.

For the assessment of uniformity of varieties of type AF, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 200 plants, 7 off-types are allowed.

For the assessment of uniformity of varieties of type HV, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 10 plants, 1 off-type is allowed.

For the assessment of uniformity of varieties of type HF, a population standard of 2% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 20 plants, 2 off-types are allowed.

4.3 Stability

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed or plant stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Leaf: number of leaflets (characteristic 5)
(b) Central leaflet: width (characteristic 7)
(c) Only varieties of type AS: Time of male flowering (characteristic 8)
(d) Only varieties of types AV, AF, HV and HF: Time of female flowering (characteristic 9)
(e) Plant: proportion of monoecious plants (characteristic 12)
(f) Plant: proportion of female plants (characteristic 13)
(g) Plant: proportion of male plants (characteristic 14)
(h) Only varieties of types AS, AV and AF: Plant: natural height (characteristic 18)
(i) Only varieties of types HV and HF: Plant: height (characteristic 19)
(j) Main stem: color (characteristic 20)
(k) Only varieties of types AS, AV and AF: Inflorescence: THC content (characteristic 26)
(l) Only varieties of types HV and HF: Inflorescence: THC content (characteristic 27)
(m) Inflorescence: CBD content (characteristic 28)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 “Examining Distinctness”.

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 All relevant states of expression are presented in the characteristic.

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1 **2**	**3** **4**	**5** **6**	**7**			
	Name of characteristics in English	**Nom du caractère en français**	**Name des Merkmals auf Deutsch**	**Nombre del carácter en español**		
	states of expression	types d'expression	Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

5 (+) See Explanations on the Table of Characteristics in Chapter 8.2

6 (a)-(d) See Explanations on the Table of Characteristics in Chapter 8.1

7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3

Variety types AS, AV, AF, HV and HF See Chapter 2.3

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QL VG**	**(a)**				
		Leaf: variegation	**Feuilles : panachure**	**Blatt: Panaschierung**	**Hoja: variegación**		
		absent	absente	fehlend	ausente	Aida (HV), Futura 75 (AS)	1
		present	présente	vorhanden	presente	Divina (HV)	9
2.		**QN VG**	**(a)**				
		Only varieties with leaf variegation: absent: Leaf: intensity of green color	**Seulement les variétés avec panachure : absente : Feuille : intensité de la couleur verte**	**Nur Sorten mit Blatt: Panaschierung : fehlend: Blatt: Intensität der Grünfärbung**	**Sólo variedades con variegación : ausente: Hoja: intensidad del color verde**		
		light	claire	hell	clara	Aida (HV), Fibror 79 (AS)	1
		medium	moyenne	mittel	media	Fedora 17 (AS), Theresa (HV)	2
		dark	foncée	dunkel	oscura	Finola (AS), Gill (HV)	3
3.		**QN MS/VG**	**(a), (b)**				
		Leaf: length of petiole	**Feuille : longueur du pétiole**	**Blatt: Länge des Blattstiels**	**Hoja: longitud del peciolo**		
		short	courte	kurz	corta	Fibrol (AS), MGC 1013 (HV)	1
		medium	moyenne	mittel	media	Bedrolite (HV), Divina (HV), Fedora 17 (AS)	2
		long	longue	lang	larga	Carmagnola (AS)	3
4.	**(*)**	**QN VG**	**(a), (b)**				
		Leaf: anthocyanin coloration of petiole	**Feuille : pigmentation anthocyanique du pétiole**	**Blatt: Anthocyanfärbung des Blattstiels**	**Hoja: pigmentación antociánica del peciolo**		
		absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Fibrol (AS), Gill (HV)	1
		weak	faible	gering	débil	Ruby (AS), Theresa (HV)	2
		medium	moyenne	mittel	media	Dioica 88 (AS), Gayle (HV)	3
		strong	forte	stark	fuerte	M-1337 (HV)	4
		very strong	très forte	sehr stark	muy fuerte	EVLS 113 (HV), Finola (AS)	5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. (*) QN MS/VG		**(+) (a), (b)**				
	Leaf: number of leaflets	**Feuille : nombre de folioles**	**Blatt: Anzahl Blattfiedern**	**Hoja: número de foliolos**		
	three or less	trois ou moins	drei oder weniger	tres o menos	Bedrolite (HV), MGC 1013 (HV)	1
	five	cinq	fünf	cinco	Aida (HV), Finola (AS)	2
	seven	sept	sieben	siete	GRX53 (HF), Uso 31 (AS)	3
	nine	neuf	neun	nueve	Fibror 79 (AS)	4
	eleven or more	onze ou plus	elf oder mehr	once o más		5
6. QN MS/VG		**(a), (b)**				
	Central leaflet: length	**Foliole centrale : longueur**	**Zentrale Blattfieder: Länge**	**Foliolo central: longitud**		
	very short	très courte	sehr kurz	muy corta	Damato Red (HV)	1
	very short to short	très courte à courte	sehr kurz bis kurz	muy corta a corta	MGC 1013 (HV)	2
	short	courte	kurz	corta	Divina (HV)	3
	short to medium	courte à moyenne	kurz bis mittel	corta a media		4
	medium	moyenne	mittel	media	Aida (HV)	5
	medium to long	moyenne à longue	mittel bis lang	media a larga		6
	long	longue	lang	larga	Felina 32 (AS)	7
	long to very long	longue à très longue	lang bis sehr lang	larga a muy larga		8
	very long	très longue	sehr lang	muy larga	Carmagnola (AS)	9
7. (*) QN MS/VG		**(a), (b)**				
	Central leaflet: width	**Foliole centrale : largeur**	**Zentrale Blattfieder: Breite**	**Foliolo central: anchura**		
	very narrow	très étroite	sehr schmal	muy estrecha		1
	very narrow to narrow	très étroite à étroite	sehr schmal bis schmal	muy estrecha a estrecha	Celeste (HV)	2
	narrow	étroite	schmal	estrecha	MGC 1013 (HV)	3
	narrow to medium	étroite à moyenne	schmal bis mittel	estrecha a media		4
	medium	moyenne	mittel	media	Fibrol (AS), Theresa (HV)	5
	medium to broad	moyenne à large	mittel bis breit	media a ancha	Hulkberry (HV)	6
	broad	large	breit	ancha	Gill (HV), Uso 31 (AS)	7
	broad to very broad	large à très large	breit bis sehr breit	ancha muy ancha		8
	very broad	très large	sehr breit	muy ancha	Carmagnola (AS), Enectabis (HF)	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8. (*) QN MG/VG		**(+)**				
	<u>Only varieties of type AS:</u> Time of male flowering	**<u>Seulement les variétés de type AS :</u> Époque de floraison mâle**	**<u>Nur Sorten des Typs AS:</u> Zeitpunkt der männlichen Blüte**	**<u>Sólo variedades de tipo AS:</u> Época de floración masculina**		
	very early	très précoce	sehr früh	muy temprana	Uso 31 (AS)	1
	very early to early	très précoce à précoce	sehr früh bis früh	muy temprana a temprana		2
	early	précoce	früh	temprana		3
	early to medium	précoce à moyenne	früh bis mittel	temprana a media		4
	medium	moyenne	mittel	media	Fibrol (AS)	5
	medium to late	moyenne à tardive	mittel bis spät	media a tardía		6
	late	tardive	spät	tardía	Felina 32 (AS)	7
	late to very late	tardive à très tardive	spät bis sehr spät	tardía a muy tardía		8
	very late	très tardive	sehr spät	muy tardía	Dioica 88 (AS)	9
9. (*) QN MG/VG		**(+)**				
	<u>Only varieties of types AV, AF, HV and HF:</u> Time of female flowering	**<u>Seulement les variétés de types AV, AF, HV et HF :</u> Époque de floraison femelle**	**<u>Nur Sorten der Typen AV, AF, HV und HF:</u> Zeitpunkt der weiblichen Blüte**	**<u>Sólo variedades de los tipos AV, AF, HV y HF:</u> Época de floración femenina**		
	very early	très précoce	sehr früh	muy temprana	Celeste (HV)	1
	very early to early	très précoce à précoce	sehr früh bis früh	muy temprana a temprana		2
	early	précoce	früh	temprana	Theresa (HV)	3
	early to medium	précoce à moyenne	früh bis mittel	temprana a media		4
	medium	moyenne	mittel	media	M-1337 (HV)	5
	medium to late	moyenne à tardive	mittel bis spät	media a tardía		6
	late	tardive	spät	tardía	Goya (HV)	7
	late to very late	tardive à très tardive	spät bis sehr spät	tardía a muy tardía		8
	very late	très tardive	sehr spät	muy tardía	HURV2019PL (HF)	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10.		**QN VG**		**2102 2304**			
		<u>Only varieties of type AS:</u> Inflorescence: anthocyanin coloration of male flowers	**<u>Seulement les variétés de type AS :</u> Inflorescence : pigmentation anthocyanique des fleurs mâles**	**<u>Nur Sorten des Typs AS:</u> Blütenstand: Anthocyanfärbung der männlichen Blüten**	**<u>Sólo variedades de tipo AS:</u> Inflorescencia: pigmentación antociánica de las flores masculinas**		
		absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Santhica 27 (AS)	1
		very weak to weak	très faible à faible	sehr gering bis gering	muy débil a débil		2
		weak	faible	gering	débil	Uso 31 (AS)	3
		weak to medium	faible à moyenne	gering bis mittel	débil a media		4
		medium	moyenne	mittel	media	Felina 32 (AS)	5
		medium to strong	moyenne à forte	mittel bis stark	media a fuerte		6
		strong	forte	stark	fuerte	Adzelviesi (AS)	7
		strong to very strong	forte à très forte	stark bis sehr stark	fuerte a muy fuerte	Finola (AS)	8
		very strong	très forte	sehr stark	muy fuerte		9
11.		**QN VG**	**(+)**	**2202b 2302b**			
		<u>Only varieties of types AV, AF, HV and HF:</u> Female inflorescence: anthocyanin coloration	**<u>Seulement les variétés de types AV, AF, HV et HF :</u> Inflorescence femelle : pigmentation anthocyanique**	**<u>Nur Sorten der Typen AV, AF, HV und HF:</u> Weiblicher Blütenstand Anthocyanfärbung**	**<u>Sólo variedades de los tipos AV, AF, HV y HF:</u> Inflorescencia femenina: pigmentación antociánica**		
		absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Aida (HV)	1
		medium	moyenne	mittel	media	Stromboli (HV)	2
		strong	forte	stark	fuerte	HURV2019PL (HF)	3
12.	**(*)**	**QN MS/VG**	**(+)**	**2102 2202 2302 2304**			
		Plant: proportion of monoecious plants	**Plante : proportion de plantes monoïques**	**Pflanze: Anteil einhäusiger Pflanzen**	**Planta: proporción de plantas monoicas**		
		absent or low	absente ou faible	fehlend oder gering	ausente o baja		1
		low to medium	faible à moyenne	gering bis mittel	baja a media		2
		medium	moyenne	mittel	media		3
		medium to high	moyenne à élevée	mittel bis hoch	media a alta		4
		high	élevée	hoch	alta		5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. (*) QN MS/VG		**(+)**	**2102 2202 2302 2304**			
	Plant: proportion of female plants	**Plante : proportion de plantes femelles**	**Pflanze: Anteil weiblicher Pflanzen**	**Planta: proporción de plantas femeninas**		
	absent or low	absente ou faible	fehlend oder gering	ausente o baja		1
	low to medium	faible à moyenne	gering bis mittel	baja a media		2
	medium	moyenne	mittel	media		3
	medium to high	moyenne à élevée	mittel bis hoch	media a alta		4
	high	élevée	hoch	alta		5
14. (*) QN MS/VG		**(+)**	**2102 2202 2302 2304**			
	Plant: proportion of male plants	**Plante : proportion de plantes mâles**	**Pflanze: Anteil männlicher Pflanzen**	**Planta: proporción de plantas masculinas**		
	absent or low	absente ou faible	fehlend oder gering	ausente o baja		1
	low to medium	faible à moyenne	gering bis mittel	baja a media		2
	medium	moyenne	mittel	media		3
	medium to high	moyenne à élevée	mittel bis hoch	media a alta		4
15. QN VG		**(+)**	**2202b 2302b**			
	Only varieties of types HV and HF: Female flower: length of stigmas	**Seulement les variétés de types HV et HF : Fleur femelle : longueur des stigmates**	**Nur Sorten der Typen HV und HF: Weibliche Blüte: Länge der Narben**	**Sólo variedades de los tipos HV y HF: Flor femenina: longitud de los estigmas**		
	short	courte	kurz	corta	EVLS 113 (HV)	1
	medium	moyenne	mittel	media	Divina (HV)	2
	long	longue	lang	larga	Bedrobinol (HV), HURV2019PL (HF)	3
16. QN VG			**2202b 2302b**			
	Only varieties of types HV and HF: Female flower: thickness of stigmas	**Seulement les variétés de types HV et HF : Fleur femelle : épaisseur des stigmates**	**Nur Sorten der Typen HV und HF: Weibliche Blüte: Dicke der Narben**	**Sólo variedades de los tipos HV y HF: Flor femenina: grosor de los estigmas**		
	thin	mince	dünn	delgado	HURV2019CBG (HV)	1
	medium	moyenne	mittel	medio	Divina (HV)	2
	thick	épaisse	dick	grueso	HURV2019PL (HF)	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17.	**QN VG**	**(+)**	**2202b 2302b**			
	<u>Only varieties of types HV and HF:</u> Female flower: contortion of stigmas	**<u>Seulement les variétés de types HV et HF :</u> Fleur femelle : contorsion des stigmates**	**<u>Nur Sorten der Typen HV und HF:</u> Weibliche Blüte: Verdrehung der Narben**	**<u>Sólo variedades de los tipos HV y HF:</u> Flor femenina: contorsión de los estigmas**		
	absent or weak	absente ou faible	fehlend oder gering	ausente o débil	Aida (HV)	1
	medium	moyenne	mittel	media	HURV2019PL (HF), MGC 1008 (HV)	2
	strong	forte	stark	fuerte	MGC 1009 (HV)	3
18.	**(*) QN MG/VG**	**(+)**	**2202 2202b 2302 2302b**			
	<u>Only varieties of types AS, AV and AF:</u> Plant: natural height	**<u>Seulement les variétés de types AS, AV et AF :</u> Plante : hauteur naturelle**	**<u>Nur Sorten der Typen AS, AV und AF:</u> Pflanze: natürliche Höhe**	**<u>Sólo variedades de los tipos AS, AV y AF:</u> Planta: altura natural**		
	very short	très basse	sehr niedrig	muy baja	Adzelviesi (AS), Finola (AS)	1
	very short to short	très basse à basse	sehr niedrig bis niedrig	muy baja a baja		2
	short	basse	niedrig	baja		3
	short to medium	basse à moyenne	niedrig bis mittel	baja a media		4
	medium	moyenne	mittel	media	Uso 31 (AS)	5
	medium to long	moyenne à haute	mittel bis hoch	media a alta	Fibrol (AS)	6
	long	haute	hoch	alta	Felina 32 (AS)	7
	long to very long	haute à très haute	hoch bis sehr hoch	alta a muy alta	Fibror 79 (AS)	8
	very long	très haute	sehr hoch	muy alta	Dioica 88 (AS)	9
19.	**(*) QN MG/VG**	**(+)**	**2202b 2302b**			
	<u>Only varieties of types HV and HF:</u> Plant: height	**<u>Seulement les variétés de types HV et HF :</u> Plante : hauteur**	**<u>Nur Sorten der Typen HV und HF:</u> Pflanze: Höhe**	**<u>Sólo variedades de los tipos HV y HF:</u> Planta: altura**		
	very short	très basse	sehr niedrig	muy baja	MGC 1027 (HV)	1
	very short to short	très basse à basse	sehr niedrig bis niedrig	muy baja a baja		2
	short	basse	niedrig	baja	Chuy (HV)	3
	short to medium	basse à moyenne	niedrig bis mittel	baja a media		4
	medium	moyenne	mittel	media	Aida (HV)	5
	medium to long	moyenne à haute	mittel bis hoch	media a alta		6
	long	haute	hoch	alta	Bedrolite (HV), EVLS 113 (HV)	7
	long to very long	haute à très haute	hoch bis sehr hoch	alta a muy alta	Obi (HF)	8
	very long	très haute	sehr hoch	muy alta		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20. (*) PQ VG		**(c)**	**2202 2202b 2302 2302b**			
	Main stem: color	**Tige principale : couleur**	**Haupttrieb: Farbe**	**Tallo principal: color**		
	yellow	jaune	gelb	amarillo	Fibror 79 (AS)	1
	medium green	vert moyen	mittelgrün	verde medio	Bedrobinol (HV), Felina 32 (AS), Theresa (HV)	2
	dark green	vert foncé	dunkelgrün	verde oscuro	Aida (HV), Dioica 88 (AS)	3
	purple	pourpre	purpurn	marrón	EVLS 113 (HV), Fibranova (AS)	4
21. QN MS/VG		**(c)**	**2202 2202b 2302 2302b**			
	Only varieties of types AS, AV and AF: Main stem: length of internode	**Seulement les variétés de types AS, AV et AF : Tige principale : longueur de l'entre-nœud**	**Nur Sorten der Typen AS, AV und AF: Haupttrieb: Internodienlänge**	**Sólo variedades de los tipos AS, AV y AF: Tallo principal: longitud del entrenudo**		
	very short	très courte	sehr kurz	muy corta	Finola (AS)	1
	very short to short	très courte à courte	sehr kurz bis kurz	muy corta a corta		2
	short	courte	kurz	corta		3
	short to medium	courte à moyenne	kurz bis mittel	corta a media		4
	medium	moyenne	mittel	media	Uso 31 (AS)	5
	medium to long	moyenne à longue	mittel bis lang	media a larga		6
	long	longue	lang	larga	Futura 75 (AS)	7
	long to very long	longue à très longue	lang bis sehr lang	larga a muy larga		8
	very long	très longue	sehr lang	muy larga		9
22. QN MS/VG		**(c)**	**2202b 2302b**			
	Only varieties of types HV and HF: Main stem: length of internode	**Seulement les variétés de types HV et HF : Tige principale : longueur de l'entre-nœud**	**Nur Sorten der Typen HV und HF: Haupttrieb: Internodienlänge**	**Sólo variedades de los tipos HV y HF: Tallo principal: longitud del entrenudo**		
	very short	très courte	sehr kurz	muy corta		1
	very short to short	très courte à courte	sehr kurz bis kurz	muy corta a corta	MGC 1027 (HV)	2
	short	courte	kurz	corta	Beatriz (HV), Divina (HV)	3
	short to medium	courte à moyenne	kurz bis mittel	corta a media		4
	medium	moyenne	mittel	media	Aida (HV), HURV2019PL (HF)	5
	medium to long	moyenne à longue	mittel bis lang	media a larga	EVLS 113 (HV)	6
	long	longue	lang	larga		7
	long to very long	longue à très longue	lang bis sehr lang	larga a muy larga		8
	very long	très longue	sehr lang	muy larga	Enectitaca (HF), Obi (HF)	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.	**QN MS/VG**		**(c)**	**2202 2202b 2302 2302b**			
	Only varieties of types AS, AV and AF: Main stem: thickness		**Seulement les variétés de types AS, AV et AF : Tige principale : épaisseur**	**Nur Sorten der Typen AS, AV und AF: Haupttrieb: Dicke**	**Sólo variedades de los tipos AS, AV y AF: Tallo principal: grosor**		
	thin		mince	dünn	delgado	Finola (AS)	1
	medium		moyenne	mittel	medio	Futura 75 (AS)	2
	thick		épaisse	dick	grueso	Dioica 88 (AS)	3
24.	**QN MS/VG**		**(c)**	**2202b 2302b**			
	Only varieties of types HV and AF: Main stem: thickness		**Seulement les variétés de types HV et AF : Tige principale : épaisseur**	**Nur Sorten der Typen HV und AF: Haupttrieb: Dicke**	**Sólo variedades de los tipos HV y AF: Tallo principal: grosor**		
	thin		mince	dünn	delgado	Celeste (HV)	1
	medium		moyenne	mittel	medio	Aida (HV)	2
	thick		épaisse	dick	grueso	Obi (HF)	3
25.	**QN VG**		**(c)**	**2202 2202b 2302 2302b**			
	Only types AS, AF and HF: Main stem: depth of grooves		**Seulement les variétés de types AS, AF et HF : Tige principale : profondeur des cannelures**	**Nur Sorten der Typen AS, AF und HF: Haupttrieb: Tiefe der Furchen**	**Sólo tipos AS, AF y HF: Tallo principal: profundidad de los surcos**		
	shallow		peu profonde	flach	poco profunda	Finola (AS)	1
	medium		moyenne	mittel	media	Fedora 17 (AS)	2
	deep		profonde	tief	profunda	Dioica 88 (AS), HURV2019PL (HF)	3
26.	**(*) QN MG**		**(+) (d)**	**2204 2204b 2305 2305b**			
	Only varieties of types AS, AV and AF: Inflorescence: THC content		**Seulement les variétés de types AS, AV et AF : Inflorescence : teneur en THC**	**Nur Sorten der Typen AS, AV und AF: Blütenstand: THC-Gehalt**	**Sólo variedades de los tipos AS, AV y AF: Inflorescencia: contenido en THC**		
	absent or very low		absente ou très bas à bas	fehlend oder sehr gering	ausente o muy bajo	Santhica 27 (AS)	1
	very low to low		très bas à bas	sehr gering bis gering	muy bajo a bajo	Fedora 17 (AS)	2
	low		bas	gering	bajo	Futura 75 (AS)	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27. (*) QN MG		**(+) (d)**	**2204b 2305b**			
	<u>Only varieties of types HV and HF:</u> Inflorescence: THC content	**<u>Seules variétés de types HV et HF:</u> Inflorescence : teneur en THC**	**<u>Nur Sorten der Typen HV und HF:</u> Blütenstand: THC-Gehalt**	**<u>Sólo variedades de los tipos HV y HF:</u> Inflorescencia: contenido en THC**		
	absent or very low	absente ou très faible	fehlend oder sehr gering	ausente o muy bajo	Aida (HV), HURV2019CBG (HV), Octavia (HV)	1
	very low to low	très faible à faible	sehr gering bis gering	muy bajo a bajo	A1 Philadelphia (HV), Sara (HV)	2
	low	faible	gering	bajo		3
	low to medium	faible à moyenne	gering bis mittel	bajo a medio	Beatriz (HV), Bediol (HV)	4
	medium	moyenne	mittel	medio	HURV2019PL (HF), Toluca (HV)	5
	medium to high	moyenne à élevée	mittel bis hoch	medio a alto	Bedrobinol (HV), Raquel (HV)	6
	high	élevée	hoch	alto	Bedrocan (HV), GRX53 (HF), Hulkberry (HV)	7
	high to very high	élevée à très élevée	hoch bis sehr hoch	alto a muy alto	Nanda Devi (HV), Original Blitz (HV)	8
	very high	très élevée	sehr hoch	muy alto		9
28. (*) QN MG		**(+) (d)**	**2204 2204b 2305 2305b**			
	Inflorescence: CBD content	**Inflorescence : teneur en CBD**	**Blütenstand: CBD-Gehalt**	**Inflorescencia: contenido en CBD**		
	absent or very low	absente ou très faible	fehlend oder sehr gering	ausente o muy bajo	Bedrobinol (HV), Enectacalm (HF), Raquel (HV), Santhica 27 (AS)	1
	very low to low	très faible à faible	sehr gering bis gering	muy bajo a bajo	Aida (HV), Fedora 17 (AS), Octavia (HV)	2
	low	faible	gering	bajo	Futura 75 (AS), Theresa (HV)	3
	low to medium	faible à moyenne	gering bis mittel	bajo a medio	Beatriz (HV), Toluca (HV)	4
	medium	moyenne	mittel	medio	Bediol (HV), Sara (HV)	5
	medium to high	moyenne à élevée	mittel bis hoch	medio a alto	Sibari (HV)	6
	high	élevée	hoch	alto	Goya (HV)	7
	high to very high	élevée à très élevée	hoch bis sehr hoch	alto a muy alto	A1 Philadelphia (HV), Enectonica (HF)	8
	very high	très élevée	sehr hoch	muy alto		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29.	**QN MG**	**(+) (d)**	**2204b 2305b**			
	Inflorescence: CBG content	**Inflorescence : teneur en CBG**	**Blütenstand: CBG-Gehalt**	**Inflorescencia: contenido en CBG**		
	very low	très faible	sehr gering	muy bajo	A1 Philadelphia (HV), Bedrolite (HV)	1
	low	faible	gering	bajo	Mati (HV), Moniek (HV)	2
	medium	moyenne	mittel	medio	HURV2019CBG (HV), Juani (HV), Octavia (HV)	3
	high	élevée	hoch	alto	Aida (HV)	4
	very high	très élevée	sehr hoch	muy alto		5
30.	**QN VG**	**(+) (c)**	**2204 2202b 2306 2306b**			
	Main stem: pith in cross-section	**Tige principale : moelle en section transversale**	**Haupttrieb: Füllung im Querschnitt**	**Tallo principal: médula en sección transversal**		
	absent or thin	absente ou fine	fehlend oder dünn	ausente o delgada	HURV2019PL (HF), Santhica 27 (AS)	1
	medium	moyenne	mittel	media	Divina (HV), Fedora 17 (AS)	2
	thick	épaisse	dick	gruesa	Finola (AS), Gill (HV), MGC 1009 (HV)	3
31.	**QN MG**		**2205 2307**			
	Seed: 1,000 seed weight	**Graine : poids de 1 000 graines**	**Samen: Tausendkorngewicht**	**Semilla: peso de 1000 semillas**		
	very low	très faible	sehr gering	muy bajo	Finola (AS)	1
	low	faible	gering	bajo	Chamaeleon (AS), Enectitaca (HF)	2
	medium	moyen	mittel	medio	Enectacalm (HF), Felina 32 (AS)	3
	high	élevé	hoch	alto	Santhica 27 (AS)	4
	very high	très élevé	sehr hoch	muy alto	Fibror 79 (AS)	5
32.	**PQ VG**		**2205 2307**			
	Seed: color of testa	**Graine : couleur du tégument**	**Samen: Farbe der Samenschale**	**Semilla: color del tegumento**		
	light grey	gris clair	hellgrau	gris claro	Finola (AS)	1
	medium grey	gris moyen	mittelgrau	gris medio	Enectavio (HF), Uso 31 (AS)	2
	grey brown	brun gris	graubraun	marrón grisáceo	Enectacalm (HF), Fedora 17 (AS)	3
	yellowish brown	brun jaunâtre	gelblichbraun	marrón amarillento	Fibror 79 (AS)	4
	brown	brun	braun	marrón	Dioica 88 (AS), Enectitaca (HF)	5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33.	**QN VG**	**(+)**	**2205 2307**			
	Seed: marbling	**Graine : marbrure**	**Samen: Marmorierung**	**Semilla: veteado**		
	weak	faible	gering	débil	Enectacalm (HF), Finola (AS)	1
	medium	moyenne	mittel	medio	Enectavio (HF), Felina 32 (AS)	2
	strong	forte	stark	fuerte	Dioica 88 (AS)	3

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

Characteristics containing the following key in the Table of Characteristics should be examined as indicated below:

(a) Observations should be made in the period between the beginning of flowering (growth stage 2101, 2201 or 2301, whichever is earliest) and the beginning of seed maturity (Type AS) or flower senescence (Types AV, AF, HV and HF).

(b) For varieties of type AS, observations should be made on the last opposite, fully expanded leaves. For varieties of types AV, AF, HV and HF observations should be made on fully developed leaves from the centre of the plant.

(c) For varieties of type AS, observations should be made on the internode below the last opposite leaves of female and/or monoecious plants. For varieties of types AV, AF, HV and HF, observations should be made on the internode below a fully developed leaf from the centre of the plant.

(d) Seed formation affects the production of cannabinoids and should therefore be avoided for types HV and HF. If grown in a controlled environment, any male flowers should be removed before pollen is released.

8.2 Explanations for individual characteristics

Ad. 5: Leaf: number of leaflets

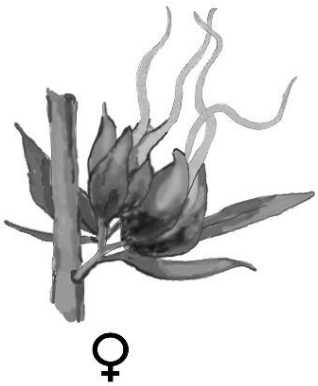
The predominant number of leaflets in the centre of the plant should be observed.

Ad. 8: Only varieties of type AS: Time of male flowering

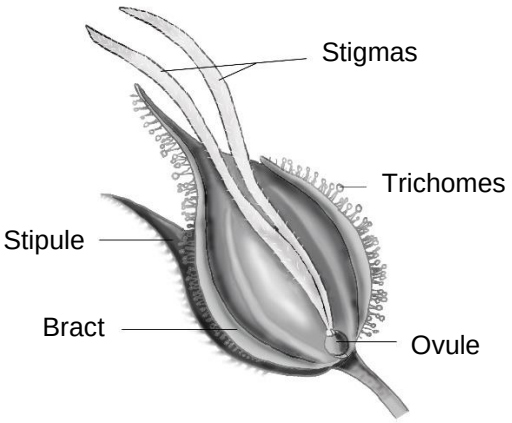
Time of male flowering is reached when at least one male flower is open on 50% of plants with male flowers.

First male flowers mostly appear from the axils of the leaves on the main stem. Male flowers usually appear about 2 weeks before the stigmas of female flowers are visible.

Male flower



Female flower



Longitudinal cross-section of female flower

Ad. 9: Only varieties of types AV, AF, HV and HF: Time of female flowering

Time of female flowering is reached when first stigmas are visible on 50% of plants.

Ad. 11: Only varieties of types AV, AF, HV. and HF: Female inflorescence: anthocyanin coloration

The color of the bracts, stipules and sugarleaves should be observed.
Sugarleaves are the leaves between the clusters of female flowers.

1
absent or weak

3
strong

Ad. 12: Plant: proportion of monoecious plants

Cannabis sativa L. is dioecious by nature and is predominantly controlled by an XY chromosomal system, where XX = female and XY= male. Monoecious plants (male and female flowers on one plant) occasionally occur naturally but are specially developed by breeding activity (Bócsa, 1998). The presence of 'masculinizing' and 'feminizing' genes on the sex chromosomes further regulate sex expression, resulting in varietal variation of the proportion of male/female/monoecious plants.

Monoecious plants: plants with both male and female flowers
Dioecious plants: plants with female or male flowers only

Sex expression may be affected by environmental conditions and stress. The occurrence of a limited number of male flowers on a female flowering plant should therefore not result in labelling such plants as monoecious.

Proportion	Note	Ranges (percentage)
low	1	<= 5 %
low to medium	2	6-35 %
medium	3	36-65 %
medium to high	4	66-95 %
high	5	>= 96 %

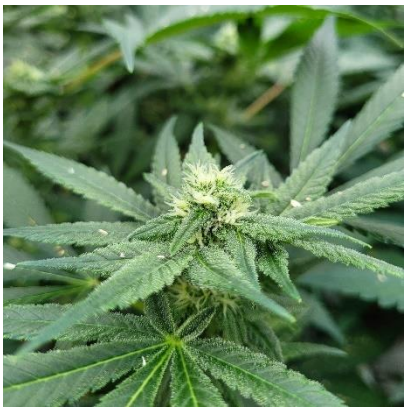
Ad. 13: Plant: proportion of female plants

See Ad. 12

Ad. 14: Plant: proportion of male plants

See Ad. 12

Ad. 15: Only varieties of types HV and HF: Female flower: length of stigmas



1
short

3
long

Ad. 17: Only varieties of types HV and HF: Female flower: contortion of stigmas

1
absent or weak

3
strong

Ad. 18: Only varieties of types AS, AV and AF: Plant: natural height

Observations should be made on female and/or monoecious plants from soil level to the top of the plant including inflorescence.

Ad. 19: Only varieties of types HV and HF: Plant: height

See Ad. 18

Ad. 26: Only varieties of types AS, AV and AF: Inflorescence: THC content

The method to simultaneously determine the THC, CBD, and CBG content is based on a quantitative determination of Δ^9-tetrahydrocannabinol (THC), cannabidiol (CBD), and cannabigerol (CBG) by gas chromatography after extraction with a suitable solvent.

Sampling

The sample should be taken from the upper 30 cm of the main stem, containing well-developed female inflorescences.

Types AS, AV, and AF: a mixture of 20 plants
Type HV: a mixture of 5 plants
Type HF: a mixture of 10 plants

(Sugar-)leaves should be removed as much as possible.

The sample should be dried as soon as possible (within 48 hours) at a temperature below 70º C. Samples should be dried to a constant weight and to a moisture content of 8 – 13 %. After drying, samples can be stored (without crushing) at below 25º C in a dark place.

Determination of THC/CBD/CBG content (Adapted from: Commission Delegated Regulation (EU) No 639/2014 annex II (latest amended version)).

1. Preparation of the test sample

Remove stems and seeds over 2 mm in size from the dried samples.
Grind the dried samples to obtain a semi-fine powder (passing through a 1 mm mesh sieve).
The powder may be stored for 10 weeks at below 25º C in a dark dry place.

2. Reagents and extraction solution

Reagents:
- Δ^9-tetrahydrocannabinol (THC), pure for chromatographic purposes.
- Cannabidiol (CBD), pure for chromatographic purposes
- Cannabigerol (CBG), pure for chromatographic purposes
- squalane, pure for chromatographic purposes, as an internal standard.

Extraction solution:
- 35 mg of squalane per 100 ml hexane.

3. Extraction of cannabinoids

Weigh 100 mg of the powdered test sample, place in a centrifuge tube and add 5 ml of extraction solution containing the internal standard.
Place in an ultrasound bath and leave for 20 minutes. Centrifuge for 5 minutes at 3,000 r.p.m. and then remove the supernatant cannabinoid solution. Inject the solution into the chromatograph and carry out a quantitative analysis.

4. Gas chromatography

(a) Equipment
- gas chromatograph with a flame ionization detector and a split/splitless injector
- column allowing good separation of cannabinoids, for example, a glass capillary column 25 m long and 0.22 mm in diameter impregnated with a 5 % non-polar phenyl-methyl-siloxane phase.

(b) Calibration ranges
At least three points including points 0.04 and 0.50 mg/ml of each of the cannabinoids in the extraction solution.

(c) Experimental conditions
The following conditions are given as an example for the column referred to in a).
- oven temperature 260º C
- injector temperature 300º C
- detector temperature 300º C

(d) Injection volume: 1 µl

Results

THC, CBD, and CBG should be determined to two decimals places in grams of Δ^9-THC, CBD, and CBG respectively, per 100 grams of analytical sample dried to constant weight. A tolerance of 0.03 g per 100 grams applies.

Alternative methods may be used as long as they yield the same results.

The range of expression of notes 1-3 of char. 26 is within the expression of note 1 of char. 27.

Ad. 27: Only varieties of types HV and HF: Inflorescence: THC content

See Ad. 26

As an indication, the range of expression of notes 1-3 of char. 26 is equivalent to the expression of note 1 of char. 27.

Ad. 28: Inflorescence: CBD content

See Ad. 26

Ad. 29: Inflorescence: CBG content

See Ad. 26

Ad. 30: Main stem: pith in cross-section

1	2	3
absent or thin	medium	thick

Ad. 33: Seed: marbling

Marbling is the black mosaic pattern.

1	2	3
weak	medium	strong

8.3 Growth stages

Growth stages of hemp are recorded by a four-digit code describing the principal growth stages, depending on the sex of the plant followed by detailed developmental stages (Mediavilla, Vito *et al.,* 1998). This growth scale is slightly modified by adding definitions of stages (marked by *) to accommodate types AV, AF, HV and AF when no seed is formed. Seed formation affects the production of cannabinoids and should therefore be avoided for types HV and HF (see par. 8.1 (d)). Stages with the same number indicate the same growth stage, e.g. 1006=1006b.

Principal growth stages

Four principal stages describe the life cycle of a plant and are coded by the first digit of the four-digit code.

First-digit of code	Definition
0	Germination and emergence
1	Vegetative stage
2	Flowering and seed formation
3	Senescence

Secondary growth stages

The secondary growth stages are described by the second digit, which indicates the sex of the plant, and the third and fourth digit indicating the developmental stage of the plant.

Code	Definition	Remarks
Germination and emergence		
0000	Dry seed	
0003	Cotyledons unfolded	
Vegetative stage refers to main stem. Leaves are considered unfolded when leaflets are at least one cm long		
1002	1st leaf pair	1 leaflet
1004	2nd leaf pair	3 leaflets
1006	3rd leaf pair	5 leaflets
10xx	Last opposite leaf pair	xx = 2 times nth leaf pair
Flowering and seed formation refers to the main stem including branches		
2000	GV point (i.e. induction of flowering)	Change of phyllotaxis on the main stem from opposite to alternate. Distance between petioles of alternate leaves at least 0.5 cm
2001	Flower primordia	Sex nearly indistinguishable
	Male Plant	
2100	Flower formation	First closed staminate flowers
2101	Beginning of flowering	First opened staminate flowers
2102	Flowering	50 % opened staminate flowers
2103	End of flowering	95 % of staminate flowers opened or withered
	Female Plant	
2200	Flower formation	First pistillate flowers Bract with no styles
2201	Beginning of flowering	Styles on first female flowers
2202	Flowering	50 % of bracts formed
2203	Beginning of seed maturity	First seeds hard
2204	Seed maturity	50 % of seeds hard
2205	End of seed maturity	95 % of seeds hard or shattered
	Hermaphrodite plant	
2300	Female flower formation	First pistillate flowers Perigonal bracts with no styles
2301	Beginning of female flowering	First styles visible
2302	Female flowering	50 % of bracts formed
2303	Male flower formation	First closed staminate flowers
2304	Male flowering	50 % opened staminate flowers
2305	Beginning of seed maturity	First seeds hard
2306	Seed maturity	50 % of seeds hard
2307	End of seed maturity	95 % of seeds hard or shattered
Senescence		
3001	Leaf dessication	Leaves dry
3002	Stem dessication	Leaves dropped
3003	Stem decomposition	Bast fibers free

9. Literature

Bócsa, I., 1998: Genetic Improvement: Conventional Approaches. In: Advances in Hemp Research. Paolo Ranalli (Ed.). Haworth Food Products Press. New York, US, 272 pp.

Bredemann, G., 1922 : Die Bestimmung des Fasergehaltes in Bastfaserpflanzen bei züchterischen Untersuchungen. Faserforschung 2. Hirzel Verlag. Leipzig, DE, pp. 239 to 258

Clarke, R.C., 1998: Botany of the Genus *Cannabis.* In: Advances in Hemp Research. Paolo Ranalli (Ed.). Haworth Food Products Press. New York, US, 272 pp.

Clarke, R.C. and M.D Merlin, 2016: Cannabis Domestication, Breeding History, Present-day Genetic Diversity, and Future Prospects. In: Critical Reviews in Plant Sciences, 35:5-6, US, pp. 293 to 327

Cole, M.D., 2003: The analysis of controlled substances – a systematic approach. John Wiley and Sons Ltd., Chichester, GB. ISBN 0-471-49252-3.

Mediavilla, V., Jonquera, M., Schmid-Slembrouck, I., Soldati, A., 1998. Decimal code for growth stages of hemp (*Cannabis sativa* L.). Journal of the International Hemp Association 5(2), NL, pp. 67 to 72

Meijer de, E.P.M., 1994: Diversity in Cannabis. Thesis Wageningen University, NL, ISBN 90-5485-338-7: 131 pp.

Meijer de, E.P.M., 1995: Fibre hemp cultivars: A survey of origin, ancestry, availability and brief agronomic characteristics. Journal of the International Hemp Association 2(2), NL, pp. 66 to 73

Meijer de, E.P.M., 1998: Cannabis Germplasm Resources. In: Advances in Hemp Research. Paolo Ranalli (Ed.). Haworth Food Products Press. New York, US, 272 pp.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1	Botanical name	*Cannabis sativa* L.
1.2	Common name	Cannabis, Hemp

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]

(please state parent variety)

(……..……..…) x (……..……..…)

female parent male parent

(b) partially known cross [ ]

(please state known parent variety(ies))

(……..……..…) x (……..……..…)

female parent male parent

(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(Please provide details)

Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Cross-pollination [ ]
(b) Hybrid [ ]
(c) Feminized seed [ ]
(d) Other (please provide details) [ ]

4.2.2 Vegetative propagation

(a) Cuttings [ ]
(b) *In vitro* propagation [ ]
(c) Other (state method) [ ]

4.2.3 Other [ ]
(Please provide details)

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (5)	**Leaf: number of leaflets**		
	three or less	Bedrolite (HV), MGC 1013 (HV)	1 [ ]
	five	Aida (HV), Finola (AS)	2 [ ]
	seven	GRX53 (HF), Uso 31 (AS)	3 [ ]
	nine	Fibror 79 (AS)	4 [ ]
	eleven or more		5 [ ]
5.2 (7)	**Central leaflet: width**		
	very narrow		1 [ ]
	very narrow to narrow	Celeste (HV)	2 [ ]
	narrow	MGC 1013 (HV)	3 [ ]
	narrow to medium		4 [ ]
	medium	Fibrol (AS), Theresa (HV)	5 [ ]
	medium to broad	Hulkberry (HV)	6 [ ]
	broad	Gill (HV), Uso 31 (AS)	7 [ ]
	broad to very broad		8 [ ]
	very broad	Carmagnola (AS), Enectabis (HF)	9 [ ]
5.3 (8)	**Only varieties of type AS: Time of male flowering**		
	very early	Uso 31 (AS)	1 [ ]
	very early to early		2 [ ]
	early		3 [ ]
	early to medium		4 [ ]
	medium	Fibrol (AS)	5 [ ]
	medium to late		6 [ ]
	late	Felina 32 (AS)	7 [ ]
	late to very late		8 [ ]
	very late	Dioica 88 (AS)	9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
5.4 (9)	**<u>Only varieties of types AV, AF, HV and HF:</u> Time of female flowering**		
	very early	Celeste (HV)	1 [ ]
	very early to early		2 [ ]
	early	Theresa (HV)	3 [ ]
	early to medium		4 [ ]
	medium	M-1337 (HV)	5 [ ]
	medium to late		6 [ ]
	late	Goya (HV)	7 [ ]
	late to very late		8 [ ]
	very late	HURV2019PL (HF)	9 [ ]
5.5 (12)	**Plant: proportion of monoecious plants**		
	absent or low		1 [ ]
	low to medium		2 [ ]
	medium		3 [ ]
	medium to high		4 [ ]
	high		5 [ ]
5.6 (13)	**Plant: proportion of female plants**		
	absent or low		1 [ ]
	low to medium		2 [ ]
	medium		3 [ ]
	medium to high		4 [ ]
	high		5 [ ]
5.7 (14)	**Plant: proportion of male plants**		
	absent or low		1 [ ]
	low to medium		2 [ ]
	medium		3 [ ]
	medium to high		4 [ ]
	high		5 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
5.8 (18)	**Only varieties of types AS, AV and AF: Plant: natural height**		
	very short	Adzelviesi (AS), Finola (AS)	1 [ ]
	very short to short		2 [ ]
	short		3 [ ]
	short to medium		4 [ ]
	medium	Uso 31 (AS)	5 [ ]
	medium to long	Fibrol (AS)	6 [ ]
	long	Felina 32 (AS)	7 [ ]
	long to very long	Fibror 79 (AS)	8 [ ]
	very long	Dioica 88 (AS)	9 [ ]
5.9 (19)	**Only varieties of types HV and HF: Plant: height**		
	very short	MGC 1027 (HV)	1 [ ]
	very short to short		2 [ ]
	short	Chuy (HV)	3 [ ]
	short to medium		4 [ ]
	medium	Aida (HV)	5 [ ]
	medium to long		6 [ ]
	long	Bedrolite (HV), EVLS 113 (HV)	7 [ ]
	long to very long	Obi (HF)	8 [ ]
	very long		9 [ ]
5.10 (20)	**Main stem: color**		
	yellow	Fibror 79 (AS)	1 [ ]
	medium green	Bedrobinol (HV), Felina 32 (AS), Theresa (HV)	2 [ ]
	dark green	Aida (HV), Dioica 88 (AS)	3 [ ]
	purple	EVLS 113 (HV), Fibranova (AS)	4 [ ]
5.11 (26)	**Only varieties of types AS, AV and AF: Inflorescence: THC content**		
	absent or very low	Santhica 27 (AS)	1 [ ]
	very low to low	Fedora 17 (AS)	2 [ ]
	low	Futura 75 (AS)	3 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
5.12 (27)	**<u>Only varieties of types HV and HF:</u> Inflorescence: THC content**		
	absent or very low	Aida (HV), HURV2019CBG (HV), Octavia (HV)	1 [ ]
	very low to low	A1 Philadelphia (HV), Sara (HV)	2 [ ]
	low		3 [ ]
	low to medium	Beatriz (HV), Bediol (HV)	4 [ ]
	medium	HURV2019PL (HF), Toluca (HV)	5 [ ]
	medium to high	Bedrobinol (HV), Raquel (HV)	6 [ ]
	high	Bedrocan (HV), GRX53 (HF), Hulkberry (HV)	7 [ ]
	high to very high	Nanda Devi (HV), Original Blitz (HV)	8 [ ]
	very high		9 [ ]
5.13 (28)	**Inflorescence: CBD content**		
	absent or very low	Bedrobinol (HV), Enectacalm (HF), Raquel (HV), Santhica 27 (AS)	1 [ ]
	very low to low	Aida (HV), Fedora 17 (AS), Octavia (HV)	2 [ ]
	low	Futura 75 (AS), Theresa (HV)	3 [ ]
	low to medium	Beatriz (HV), Toluca (HV)	4 [ ]
	medium	Bediol (HV), Sara (HV)	5 [ ]
	medium to high	Sibari (HV)	6 [ ]
	high	Goya (HV)	7 [ ]
	high to very high	A1 Philadelphia (HV), Enectonica (HF)	8 [ ]
	very high		9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Main stem: color (20)*	*yellow*	*medium green*

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

#7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

7.3.1 Photoperiodism regarding the induction of flowering:

(a) day-neutral [ ]
(b) short-day [ ]
(c) other (please specify): [ ]

7.3.2 Main use of the variety:

(a) bast fibre and woody core [ ]
(b) (oil-) seed [ ]
(c) pharmaceuticals [ ]
(d) ornamental [ ]
(e) other [ ]
(please provide details)

7.3.3 Type of variety (see Chapter 2.3 in the Test Guidelines for Hemp (document TG/276/2) for explanations):

Type AS: Arable cultivation, Seed-propagated [ ]
Type AV: Arable Cultivation, Vegetatively propagated [ ]
Type AF: Arable Cultivation, Feminized seed-propagated [ ]
Type HV: Horticultural cultivation, Vegetatively propagated [ ]
Type HF: Horticultural cultivation, Feminized seed propagated [ ]

Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a)	Microorganisms (e.g. virus, bacteria, phytoplasma)	Yes [ ]	No [ ]
(b)	Chemical treatment (e.g. growth retardant, pesticide)	Yes [ ]	No [ ]
(c)	Tissue culture	Yes [ ]	No [ ]
(d)	Other factors	Yes [ ]	No [ ]

Please provide details for where you have indicated “yes”.

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]