

Botanical Reference Material Product Grades

ChromaDex™ offers a wide range of Botanical Reference Materials (BRMs™) to fit your project development and quality management needs. Below is a listing of Botanical Reference Material (BRMs™) types offered by ChromaDex™ with examples of intended uses for each product. We make your Botanical Reference Material (BRM™) selection easy. Please contact us with any specific questions related to your project.

Vouchered Botanical Reference Materials (VBRMs™)

VBRMs™ are highly characterized Botanical Reference Materials. The Certificate of Analysis for ChromaDex™ VBRMs™ includes macroscopic and microscopic images with HP-TLC fingerprints. In addition, a voucher is collected at the time of harvest and the plant is visually identified. ChromaDex™ retains access to the full vouchered specimen that can be used for authentication at a later date. Upon request, an image of the voucher and/or at an additional cost full botanical authentication can be supplied. Vouchered Botanical Reference Materials (VBRMs™) are useful for:

- Raw material comparison
- Identity verification
- TLC/HPLC analysis
- Method development/validation
- Quality control of “in-house” or “working” reference material

Botanical Reference Materials (BRMs™)

BRMs™ are well characterized Botanical Reference Materials. The Certificate of Analysis for ChromaDex™ BRMs™ includes both macroscopic and microscopic images with HP-TLC fingerprints. Although BRMs™ do not have a corresponding voucher, they are a quality value choice and are suitable for:

- Raw material comparison
- Identity support
- TLC/HPLC analysis
- Method development/validation

Reagent Grade Botanical Reference Materials (RGBRMs™)

RGBRMs™ are Botanical Reference Materials characterized only by HP-TLC fingerprint analysis detailed on their Certificates of Analysis. RGBRM's™ are an economical value and are best used for the following applications:

- Basic research
- Early stage method development/validation

American Herbal Pharmacopoeia (AHP-BRMs™)

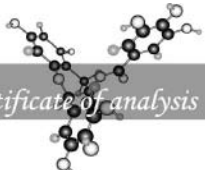
All AHP grade reference materials are VBRM™ grade reference materials that have been independently verified by the American Herbal Pharmacopoeia and will bear the AHP Verified logo. The certificate of analysis will also bear the AHP verified statement.





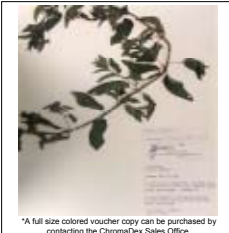
Botanical Reference Material Product Grades

Example: VBRM™ Certificate of Analysis



ChromaDex™
certificate of analysis

PRODUCT	<i>Mentha piperita</i> (Peppermint) Leaf
PART NUMBER	00030777
REFERENCE TYPE	Biomass Reference Material (V)*
LOT NUMBER	30777-048
CDXA NUMBER	CDXA-BRM-048
LATIN NAME	<i>Mentha piperita</i> L. [Lamiaceae]
COMMON NAME	Peppermint
PLANT PART	Leaf
VOUCHER NUMBER	Kurt Amoth 200301
REPORT NUMBER	CDXA-VBRM-053-00
DATE OF SAMPLE	14 July 2003
DATE OF REPORT	22 May 2007



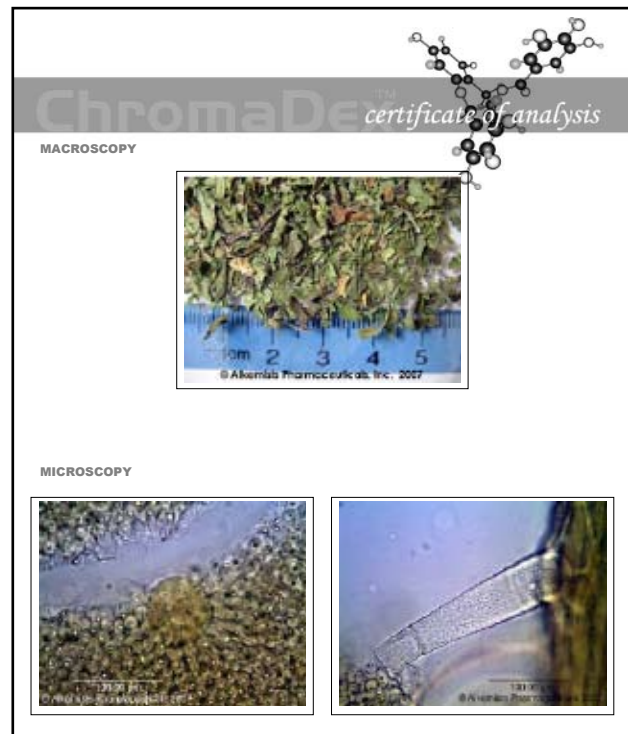
*A full size colored voucher copy can be purchased by contacting the ChromaDex Sales Office.

TEST	METHOD	RESULT
Macroscopy	Digital Image	Green and beige fragments of leaf
Microscopy	Digital image (400X)	(1) Surface of the leaf shows glandular trichomes with 8 secretory cells (2) Fragment of large covering trichomes with striated cuticle (3) Conforms (See Below)
HP-TLC	CDXA-TLCM-014-00	
Appearance	Visual (Milled)	Green fluffy powder

STORAGE CONDITIONS

STORAGE 20-30 °C; Dry storage area; Insect free; Volatile free

EXPIRATION DATE 05/2012 under the above conditions.



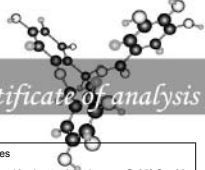
General Overview of Our Terms and Procedures

Voucher: An intact specimen (aerial and underground plant) that is associated with the lot or batch of biomass and serves to document the authenticity of the bulk material. Information recorded with the voucher specimen contains collection data associated with the material (where, when, who) and who verified the material.

Authentication: Is an in-depth process performed by a highly trained botanist who uses experience, literature, and reference material to identify the material.

Macroscopy and microscopy: Samples are analyzed by an experienced scientist who compares the macroscopic and microscopic features of the test sample to voucher or authentic specimens using the verbal descriptions and drawings found in various compendia as an aid.

HP-TLC: High Performance-Thin Layer Chromatography Provides a chemical profile of the sample, which is compared to a reference material of the same species, at least one reference standard, and literature sources.



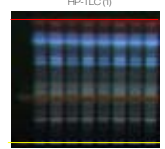
ChromaDex™
certificate of analysis

HP-TLC CONDITIONS

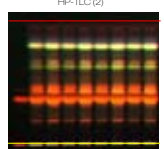
STATIONARY PHASE	Silica gel 60, F ₂₅₄ , 10 x 10 cm HP-TLC plates
SAMPLE PREPARATION	0.5 g + 5 ml CH ₂ OH sonicated in hot water ~ 10 minutes, heat in oven @ 65° C ~ 30 min.
MOBILE PHASE	Ethyl acetate/ Acetic acid/ Formic acid/ Water [10/1.1/1.1/2.6]
CHAMBER TEMPERATURE	Ambient
DETECTION	(1) UV 365 nm (2) Natural Products spray reagent → UV 365 nm (3) Vanillin/H ₂ SO ₄ spray reagent → visible light

HP-TLC CHROMATOGRAMS


HP-TLC (1)



HP-TLC (2)



HP-TLC (3)



YELLOW LINE = SAMPLE ORIGIN
 RED LINE = SOLVENT FRONT @ 60MM

HP-TLC APPLICATIONS

Lane	ID	Lane	ID
1	Rutin	6	<i>Mentha piperita</i> Leaf VBRM
2	<i>Mentha piperita</i> Leaf VBRM	7	<i>Mentha piperita</i> Leaf VBRM
3	<i>Mentha piperita</i> Leaf VBRM	8	<i>Mentha piperita</i> Leaf VBRM
4	<i>Mentha piperita</i> Leaf VBRM	9	<i>Mentha piperita</i> Leaf VBRM
5	<i>Mentha piperita</i> Leaf VBRM		

Botanical Reference Material Product Grades

Representative Botanical Reference Materials (rBRMs™)

ChromaDex™ is the exclusive supplier of rBRMs™ manufactured by Phyto-Technologies, Inc. rBRMs™ are a mixture of biomass collections from different growing locations. Since chemical markers in a given biomass may vary by growing location due to environmental conditions, harvesting and post collection treatment, rBRMs™ are a more representative Reference Material. rBRMs™ are suitable for:

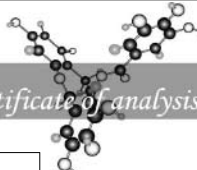
- Raw material comparison
- Identity support
- TLC/HPLC analysis
- Method development/validation

Extract Botanical Reference Materials (XRM™)

XRM™ are powdered extracts of Botanical Reference Materials from a specific plant biomass. The Certificate of Analysis for ChromaDex™ XRM™ includes HP-TLC fingerprints and quantitative HPLC/GC analysis of major chemical markers. As the extraction process cannot be guaranteed, they are not a substitute for actual Botanical Reference Materials. XRM™ should be used along with Reference Standards to provide robust analytical results and are suitable for:

- Proficiency samples to verify test methods
- Research
- Method development/validation
- TLC analysis but should not be used for botanical identity

Example: RGBRM™ Certificate of Analysis



ChromaDex™ certificate of analysis

PRODUCT	Aloe barbadensis (Aloe Vera) Leaves
PART NUMBER	00030822
REFERENCE TYPE	Biomass Reference Material (RG)*
LOT NUMBER	30822-184
CDXA NUMBER	CDXA-BRM-184
LATIN NAME	Aloe barbadensis P. Mill. [Alcoaceae]
COMMON NAME	Aloe Vera
PLANT PART	Leaves
REPORT NUMBER	CDXA-RGBRMR-037-00
DATE OF SAMPLE	07 June 2007
DATE OF REPORT	20 June 2007

*Note – Reagent Grade (RG) BRM is not vouchered and has not been evaluated by microscopy techniques.


TEST	METHOD	RESULT
Macroscopy	Digital Image	Green whole succulent leaves
HP-TLC	CDXA-TLCM-168-00	Conforms (See Below)
Appearance	Visual (Freeze-dried and Milled)	Green fluffy powder

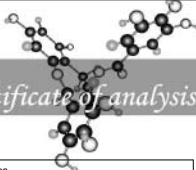
STORAGE CONDITIONS

STORAGE 20-30 °C; Dry storage area; Insect free; Volatile free

EXPIRATION DATE 06/2012 under the above conditions.

MACROSCOPY






ChromaDex™ certificate of analysis

HP-TLC CONDITIONS

STATIONARY PHASE	Silica gel 60, F ₂₅₄ , 10 x 10 cm HP-TLC plates
SAMPLE PREPARATION	0.5 g + 5 ml CH ₃ OH sonicate in hot water ~ 10 minutes.
MOBILE PHASE	Ethyl Acetate: Methanol: Water [10/1.4/1]
CHAMBER TEMPERATURE	Ambient
DETECTION	(1) UV 254 nm (2) KOH spray reagent → 365 nm (3) KOH spray reagent → white light

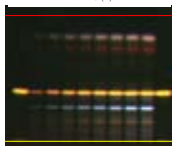
HP-TLC CHROMATOGRAMS

HP-TLC (1)



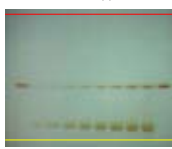
1 2 3 4 5 6 7 8 9 10

HP-TLC (2)



1 2 3 4 5 6 7 8 9 10

HP-TLC (3)



1 2 3 4 5 6 7 8 9 10

YELLOW LINE = SAMPLE ORIGIN
RED LINE = SOLVENT FRONT @ 60MM

HP-TLC APPLICATIONS

Lane	ID	Lane	ID
1	Alain	6	Aloe barbadensis Leaves RGBRM
2	Aloe barbadensis Leaves RGBRM	7	Aloe barbadensis Leaves RGBRM
3	Aloe barbadensis Leaves RGBRM	8	Aloe barbadensis Leaves RGBRM
4	Aloe barbadensis Leaves RGBRM	9	Aloe barbadensis Leaves RGBRM
5	Aloe barbadensis Leaves RGBRM	10	Alain