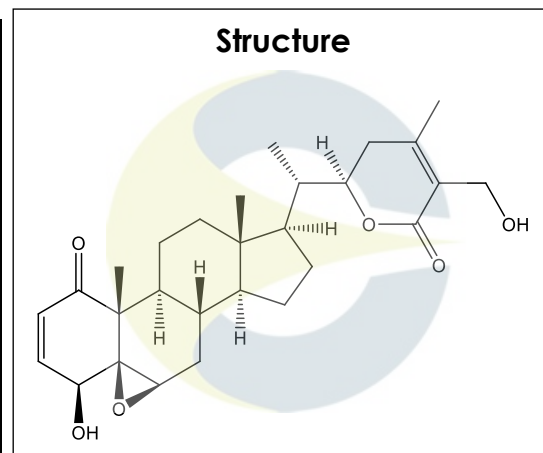


Certificate of Analysis
For Laboratory Use Only

PRODUCT NAME	Withaferin A
PART NUMBER	00023250
STANDARD TYPE	Primary (P)
LOT NUMBER	00023250-004
REPORT NUMBER	CDXA-RSS-9041-00
SAMPLE NUMBER	CDXP-20-00401
DATE OF SAMPLE	06/09/2020
DATE OF REPORT	07/17/2020



CHEMICAL NAMES	(4β,5β,6β,22R)-5,6-Epoxy-4,22,27-trihydroxy-1-oxo-ergosta-2,24-dien-26-oic acid δ-lactone; Withaferine
CHEMICAL FORMULA	C ₂₈ H ₃₈ O ₆
MOLECULAR WEIGHT (MW)	470.60
CHEMICAL FAMILY	Terpenes
CAS NUMBER	[5119-48-2]
EC#(EINECS)	NA
RTECS	KE7288500

ANALYTICAL RESULTS

TEST	METHOD	SPECIFICATION	RESULT
Adjusted Purity	NA	NA	94.8%
HPLC	0.700.10.2.METH22	NA	96.0%
NMR	0.700.12.4	Conforms to structure	Conforms to structure
Mass Spectrum	0.700.12.27	Conforms	Conforms
Residual Solvent*	USP <467>	NA	MeOH – 0.2%
Water	0.700.12.37	NA	1.1%
Appearance	NA	NA	White powder

*Testing performed at an ISO 17025 accredited subcontracted laboratory.

ADJUSTED PURITY: 94.8% IS BASED ON (100 - 0.2 SOLVENTS - 1.1 WATER) X 96.0% HPLC

STORAGE CONDITIONS

STORAGE	+4 °C in a dry place.
EXPIRATION DATE	06/2025 under the above conditions.

This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

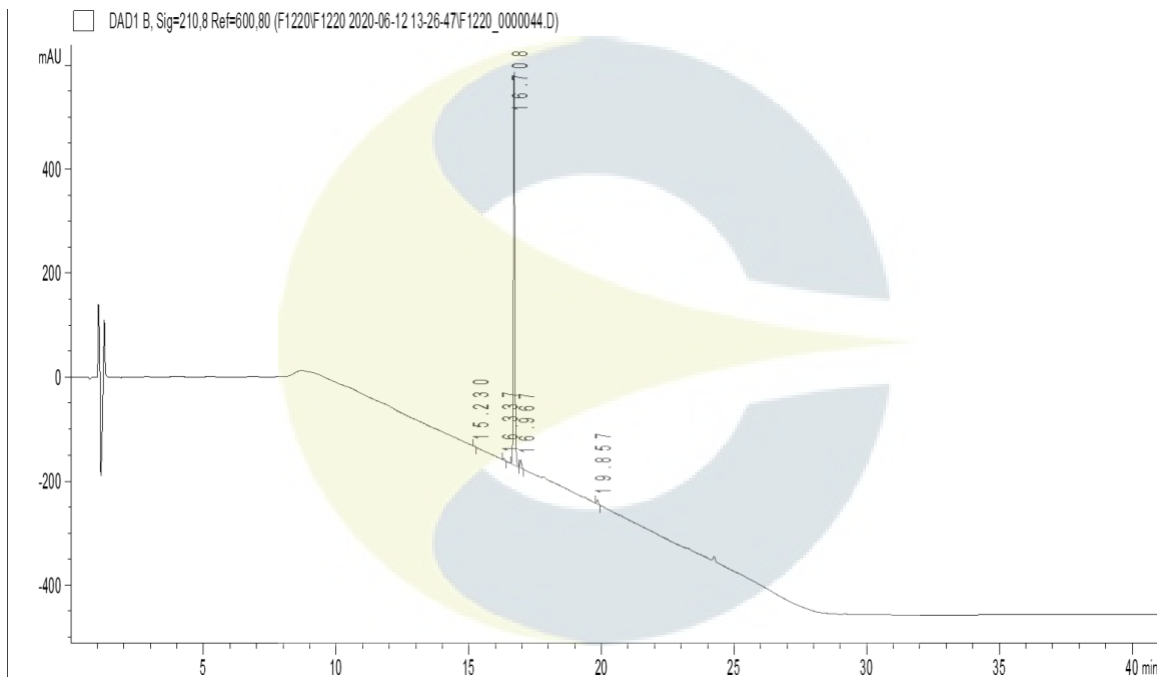
Certificate of Analysis

For Laboratory Use Only

ANALYTICAL CONDITIONS

INSTRUMENT	AGILENT 1260 HPLC UV-VIS (DAD); AB-SCIEX 6600 TRIPLE TOF
COLUMN	Phenomenex Luna C18(2) 150 x 2.00 mm, 5 µm particle size
MOBILE PHASE	A - 0.1% Trifluoroacetic acid in Ultrapure water, B - Acetonitrile; Isocratic 5% B for 5 minutes, then increasing to 95% B over 20 minutes. Hold at 95% B for 15 minutes, then decreasing to 5% B over 1 minute.
COLUMN TEMP.	60 °C
FLOW RATE	0.4 mL/minute
INJECTION VOL.	0.8 µL
INJECTION CONC.	0.84 mg/mL in Methanol
DETECTION	210 ± 4 nm

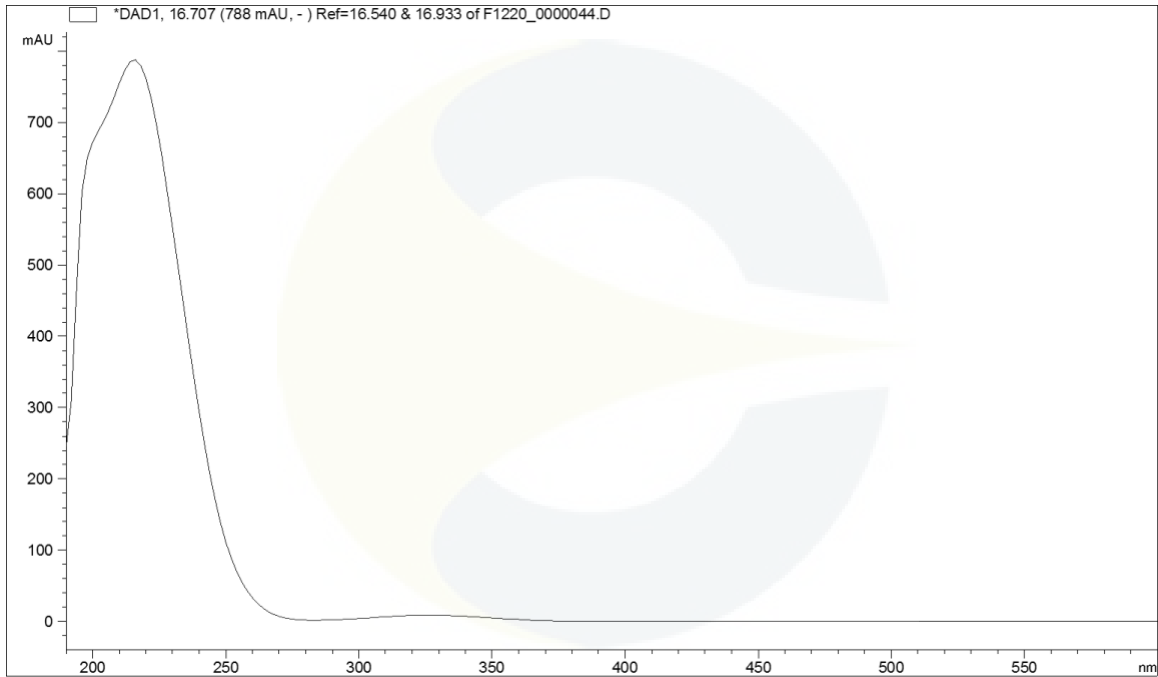
HPLC CHROMATOGRAM OF WITHAFERIN A (CDXP-20-00401)



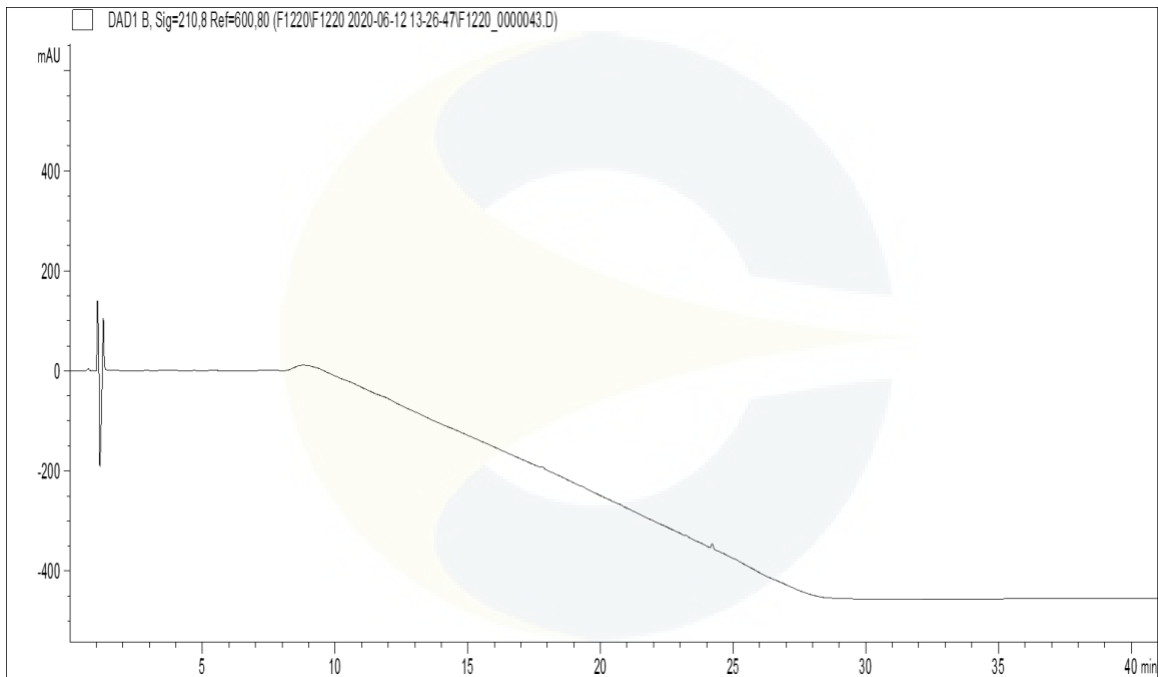
This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

Certificate of Analysis For Laboratory Use Only

UV SPECTRUM AT RT = 16.7 MINUTES



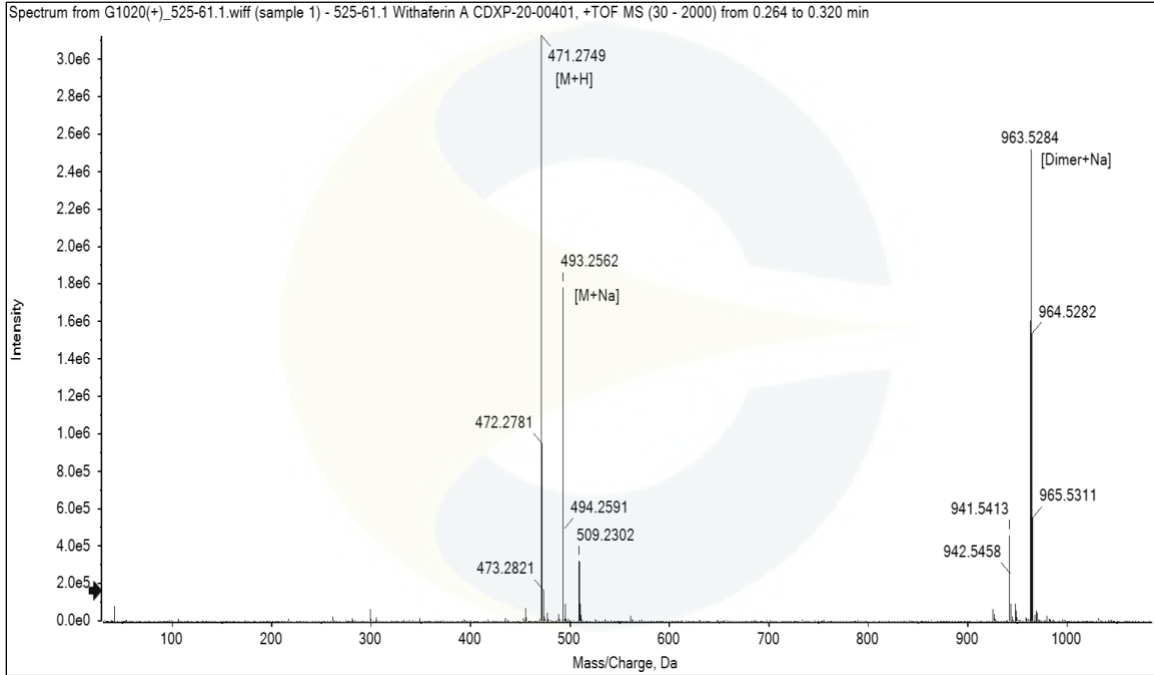
HPLC CHROMATOGRAM OF DILUENT BLANK



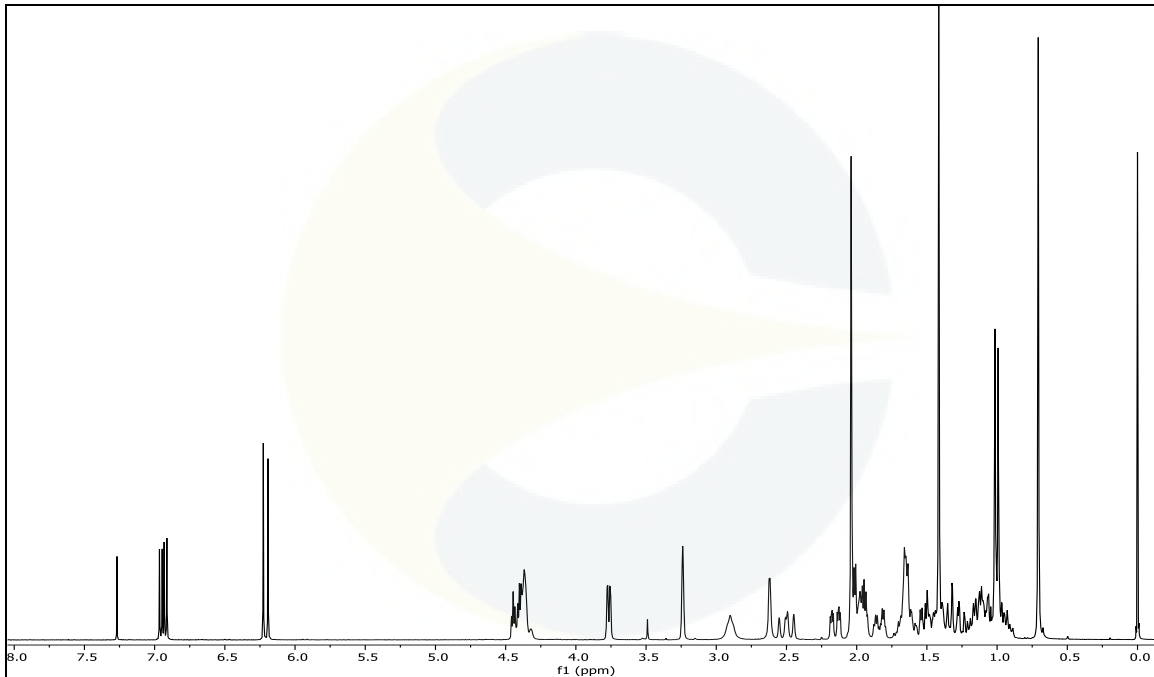
This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

Certificate of Analysis For Laboratory Use Only

MASS SPECTRUM OF WITHAFERIN A (CDXP-20-00401)

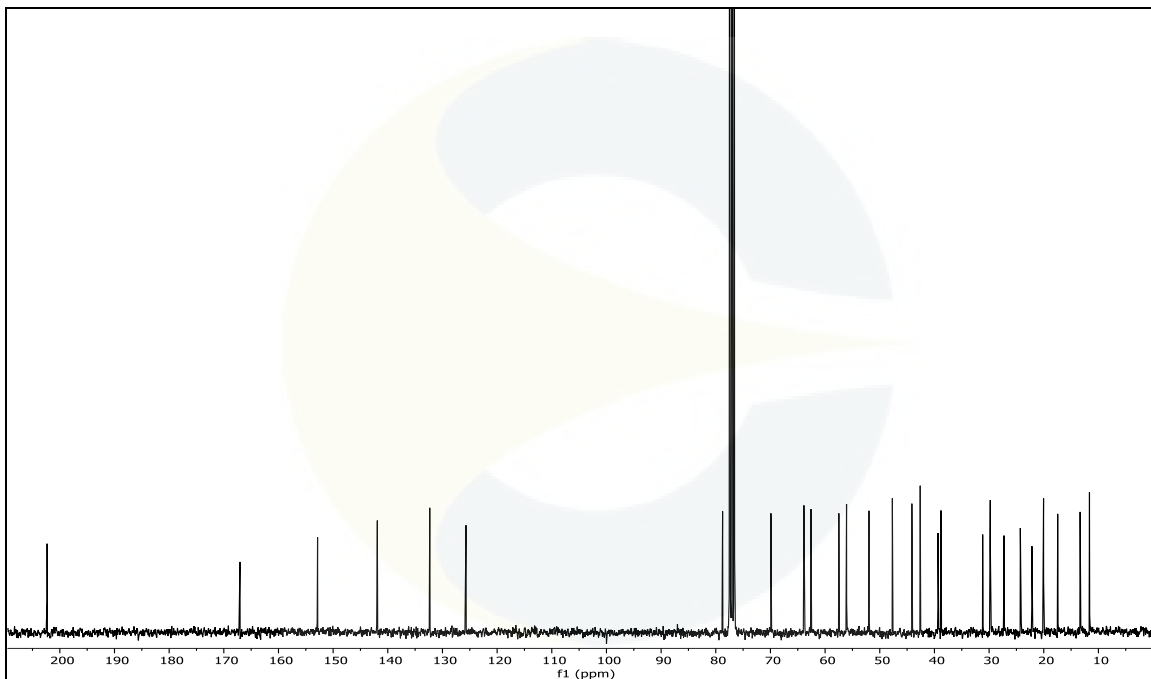


¹H-NMR SPECTRUM OF WITHAFERIN A (CDXP-20-00401) IN CDCl₃ + TMS



This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

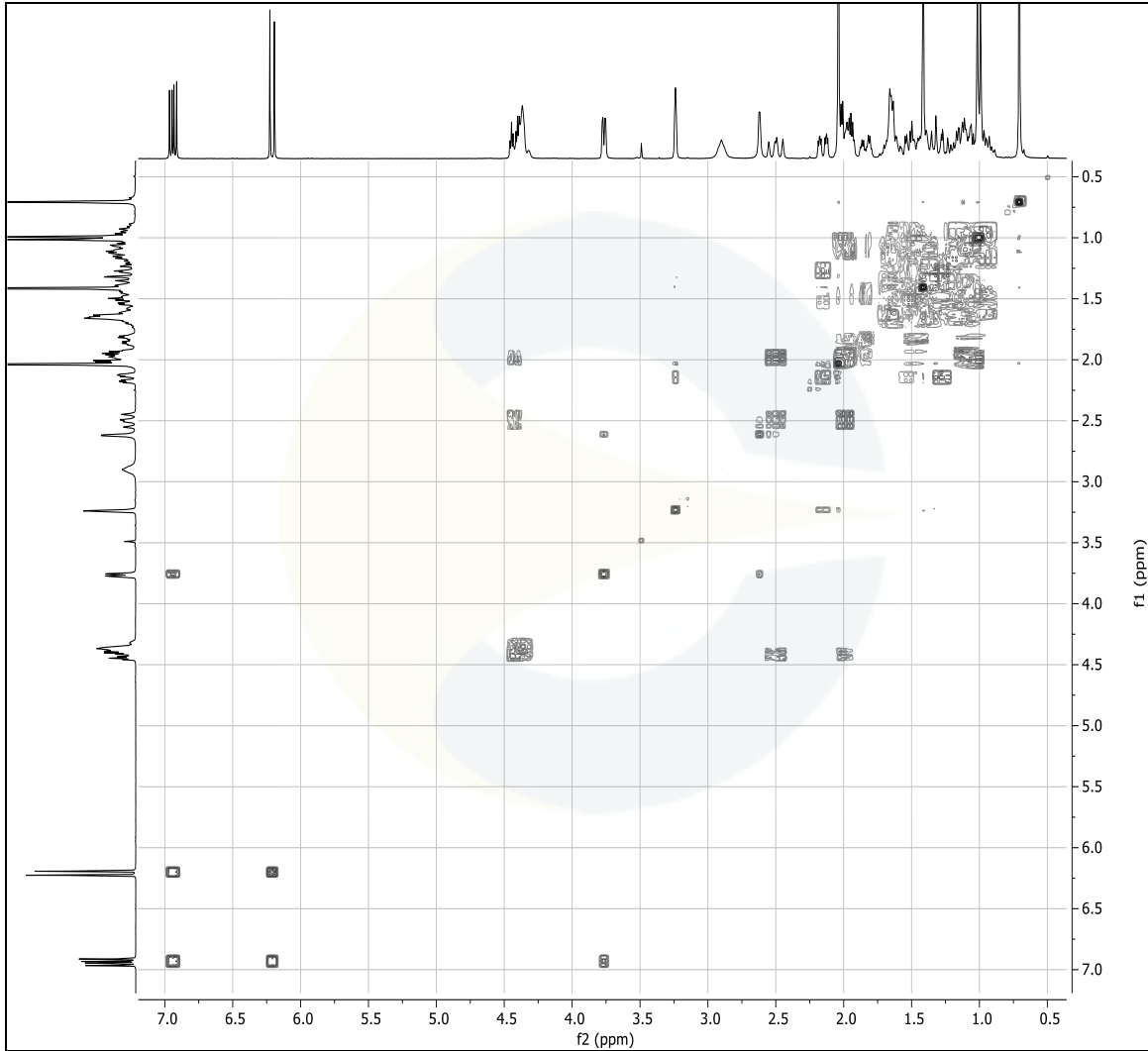
¹³C-NMR SPECTRUM WITHAFERIN A (CDXP-20-00401) IN CDCl₃ + TMS



This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.

Certificate of Analysis For Laboratory Use Only

COSY-NMR SPECTRUM OF WITHAFERIN A (CDXP-20-00401) IN CDCl₃ + TMS



REVISION HISTORY

Revision History	Date of Revision	Document/Changes
00	07/17/2020	New report

This document is the property of ChromaDex, Inc. and/or its relevant affiliates and contains confidential and proprietary material for the sole use of the intended recipient(s). Any review, use, distribution or disclosure by or to others is strictly prohibited.