CERTIFICATE OF ANALYSIS

PRODUCT NAME: WS04 - 20% Full Spectrum Water Soluble Powder, Food Starch/Maltodextrin Carrier

LOT/BATCH NUMBER: 200006FSWS

BOTANICAL SOURCE: USA originated Industrial Hemp

SHELF LIFE AND STORAGE: 12 Months when stored below 85°F protected from UV light.

MANUFACTURING DATE: 8/14/2020 **EXPIRATION DATE:** 8/14/2021

QUALITATIVE ANALYSIS

ORGANOLEPTIC ANALYSIS

OBSERVATION	METHOD	SPECIFICATION
Foreign Matter	Visual	Absent
Color	Visual	White to Pale Yellow
Smell	Olfactory	Neutral to Sweet
Product Feel	Tactile	Powdery, Fine
Taste	Manual Taste Analysis	Neutral to Slightly Bitter

QUANTITATIVE ANALYSIS

CANNABINOID ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	Result (on Dry Basis) (WT/WT%)
Cannabidiolic Acid (CBDA)	UPLC-DAD	As Reported	0.0191%
Cannabidiol (CBD)	UPLC-DAD	20% Minimum	20.5%
Cannabidivarin (CBDV)	UPLC-DAD	As Reported	0.115%
Tetrahydrocannabinolic Acid (THCA)	UPLC-DAD	As Reported	<LOQ
Δ-9-Tetrahydrocannabinol (Δ-9-THC)	UPLC-DAD	</= 0.3%	0.0638%
Cannabinol (CBN)	UPLC-DAD	>0.1%	0.4%
Cannabichromene (CBC)	UPLC-DAD	>0.1%	0.571%
Cannabigerol (CBG)	UPLC-DAD	>0.1%	0.178%
Cannabigerolic Acid (CBGA)	UPLC-DAD	As Reported	0.0203%
Δ-8-Tetrahydrocannabinol (Δ-8-THC)	UPLC-DAD	As Reported	<LOQ
Maximum THC	UPLC-DAD	</= 0.2%	0.06%
Maximum CBD	UPLC-DAD	Minimum 20%	20.52%

HEAVY METAL ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	RESULT (ppb)
Arsenic	ICP-MS	<200 ppb	<10
Cadmium	ICP-MS	<200 ppb	<5
Mercury	ICP-MS	<100 ppb	<5
Lead	ICP-MS	<500 ppb	<5

CERTIFICATE OF ANALYSIS

MICROBIAL ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	RESULT (CFU/g)
Aerobic Plate Count	BAM-3 (or equivalent)	<1,000 CFU/g	<100
Total Yeast & Mold	BAM-18 (or equivalent)	<1,000 CFU/g	<100
Enterobacteriaceae	BAM-18 (or equivalent)	<10 CFU/g	<10
E. coli	BAM-4 (or equivalent)	<10 CFU/g	Absent/ 10g

MULTI-RESIDUE LEVEL (MRL) ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	RESULT
Multi-Residue Level (MRL) Analysis	LC-MS/MS GC-MS/MS	<Action Level per Analyte	<Action Level per Analyte

RESIDUAL SOLVENT ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	RESULT (ppm)
Hexanes	GC/MS HEADSPACE	<290 ppm	<30
Acetone	GC/MS HEADSPACE	<5,000 ppm	<200
Ethanol	GC/MS HEADSPACE	<5,000 ppm	<1000
Methanol	GC/MS HEADSPACE	<3,000 ppm	<500
Isopropyl Alcohol	GC/MS HEADSPACE	<5,000 ppm	<500
Heptane	GC/MS HEADSPACE	<5,000 ppm	<50
Pentane	GC/MS HEADSPACE	<5,000 ppm	26.8

MOISTURE ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	RESULT (%)
Moisture Analysis	Karl Fischer Titration	<10%	7.49

PARTICLE SIZE ANALYSIS**

OBSERVATION	METHOD	SPECIFICATION	RESULT (µm)
Relative Particle Size	Sieve Analysis	TBD	TBD

** Denotes third party analysis. Source data available upon request.

N/D – Not Detectable

LOQ - Limit of Quantification

LOD - Limit of Detection

Maximum CBD=CBD+(CBDA*0.877)

Maximum THC=THC+(THCA*0.877)

COA generated by (signature)

9/23/2020

Date

PRODUCT DETAILS
WATER SOLUBLE POWDER

PRODUCT NAME:
THC Free Water Soluble Powder, 20% CBD

PRODUCT DESCRIPTION:
This product is hemp derived crystalline cannabidiol, isolated through CO_2 extraction and crystal precipitation, blended with all natural GRAS emulsifiers at 200mg per gram.

Bioavailability claims backed by clinical studies.
See page 2 for reference.

CAN BE USED IN:
- Ready-to-Drink beverages
- Stick packs
- Fruit chews
- Confections
- Dry capsules
- Topicals
- Aqueous based droppers

BOTANICAL SOURCE:
Industrial Hemp, grown and processed in Kentucky, USA in compliance with Section 7415 of the 2018 Farm Bill, applicable Kentucky State Law and State Department of Agriculture regulations. Our facility is registered and inspected by the Kentucky Food Safety Branch and registered with the FDA.

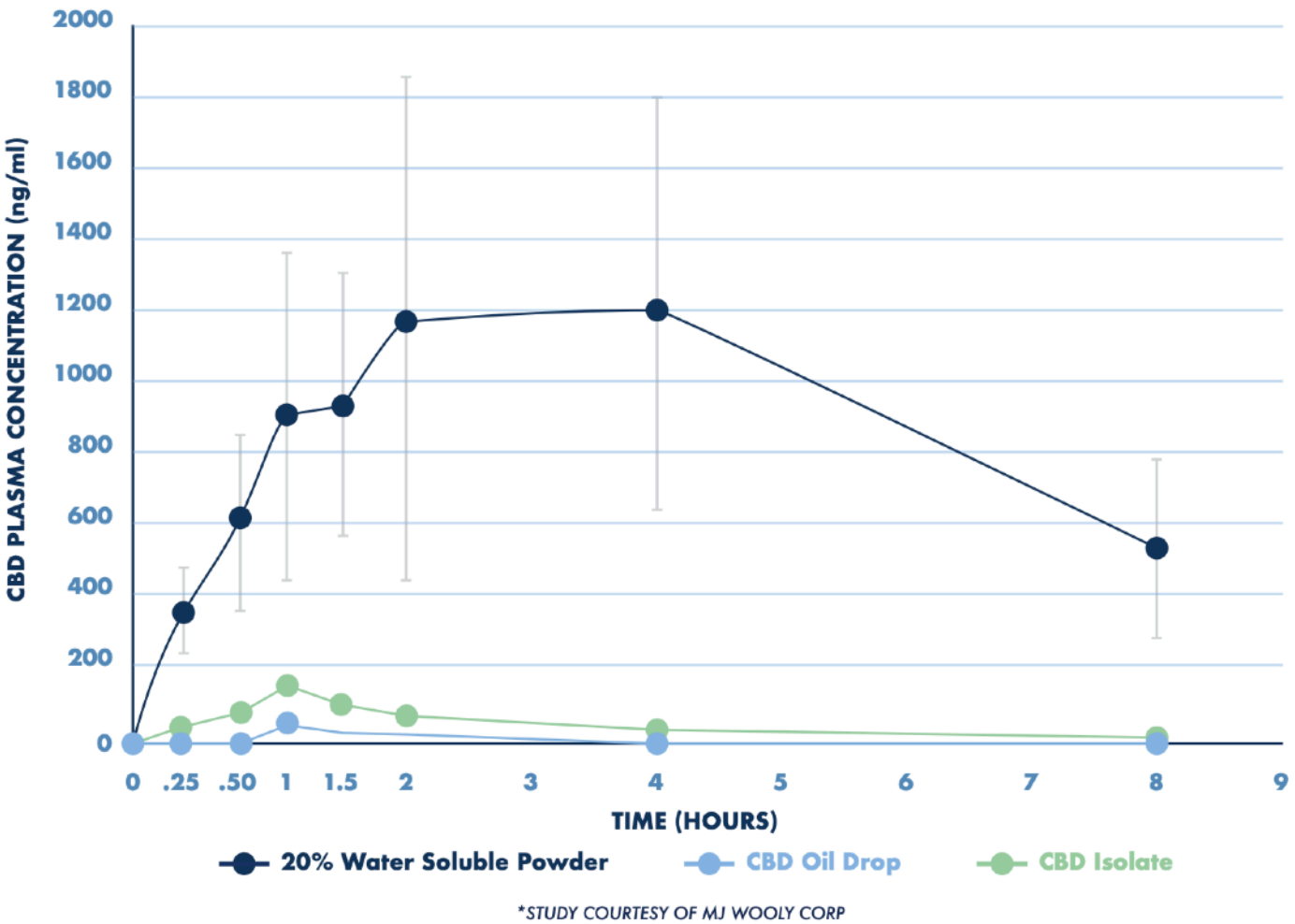
QUALITY/ PARAMETER	SUMMARY
Bioavailability	More bioavailable than conventional CBD isolate. See detail page 2.
Shelf Stability	Up to 24 months in original packaging protected from heat and light.*
Applications	Optimized for powdered applications such as stick packs and bulk drink mixes. Also suitable for ready-to-drink (RTD) applications.
Particle Size	Average particle size of 1.15 μm.
Flavor	Relatively neutral flavor profile compared to existing marketplace competitors. Suitable as a standalone formulation or as a base ingredient in a flavored beverage.

*Preliminary observation; stability studies ongoing.

QUALITY/ PARAMETER CONT.	SUMMARY CONT.
How to Use	For a desired CBD concentration, multiply target mgs by 5 to calculate the amount of powder required. Powder can then be added to bulk formulations of beverages or functional foods.
Appearance	Fine, free-flowing, white to off-white powder.
Recommended Serving Size	5-10mg for optimal clarity in beverages, 25mg for increased efficacy.
Ingredients	All natural, GRAS ingredients.
Label Claims	Clean label, all natural, made in the USA.
Isolate vs. Full Spec	Isolate version currently available, full spectrum under development and coming soon.
Temperature Allowance	Not suitable for processes exceeding 190°F (87C). Hot fill compatible.

BIOAVAILABILITY STUDY

*PLASMA PHARMACOKINETIC (PK) STUDY IN RATS FOLLOWING SINGLE ORAL ADMINISTRATION OF THREE CANNABIDIOL FORMULAE



*STUDY COURTESY OF MJ WOOLY CORP