



Reference Standard Technical Manual & Laboratory Handling Guidebook

Comprehensive Standard Operating Procedures
for Reference Standards, Analytical Protocols,
Bioassays, and In Vivo Administration

For Research and/or Laboratory Use Only

Not intended for human therapeutic
or diagnostic applications



Table of Contents

01	Product Handling Instructions	
	Package Contents	01
	Obtaining Documentation	01
	Handling Products Upon Receipt	02
02	Transport and Storage Guidelines	
	General Storage Conditions	03
	Important Storage Considerations	03
03	Preparation of Reference Standard Solutions	
	Standard Preparation Procedure	04
	Troubleshooting	06
04	Application Guidelines	
	Cell-Based Assays & Enzyme Activity Experiments	07
	Animal Experiments	08
	In vivo Experiments Formulation Schemes	11
05	Quality Assurance and Quality Control	
	TLC Profiling of Reference Standards	13
	Quality Policy	15
	Process Control	15
06	FAQ	
	Frequently Asked Question and Safety	16
07	Appendix	
	Solvent Miscibility Guide	17

Package Contents

Upon receiving your MarkHerb® package, please verify the contents. A standard shipment includes:

- Packing box
- Packing list
- Product Handling Instructions
- QA files (Certificate of Analysis [CoA], NMR, and/or HPLC data)
- The ordered compounds

After receiving your shipment, please confirm that all the above items are complete. If there are any missing items or if you have questions, please contact our technical support immediately.

Obtaining Documentation

Product Handling Instructions and QA files are provided with your shipment.

Should you misplace these documents, find information incomplete, or require digital copies, you can request the materials from our customer service team via email at:

Email: info@markherb.com

Handling Products Upon Receipt

Due to the physical dynamics of transportation, product packaging may shift, vibrate, or turn upside down. This movement frequently causes fine powders or viscous liquid compounds to adhere to the neck, inner cap, or upper walls of the vial. Because of the placement of our informational labels, the highly concentrated small quantity of the product, or its physical state, the vial may initially appear empty to the naked eye. Please follow these steps before opening:

Powdered Products:

Carefully take the vial out of its protective packaging. Hold it strictly upright, and gently tap the bottom of the vial against a solid surface, or flick the vial wall with your finger. This allows the statically charged product powder to safely settle at the bottom. Let it stand for a few minutes before cautiously opening the cap in a controlled environment.

Liquid Products:

Allow the vial to stand upright in a rack for a reasonable period to let the viscous liquid flow naturally to the bottom by gravity. For extremely small micro-volumes, it is highly recommended to centrifuge the vial at a low speed of **200 - 500 rpm** for a few seconds to safely gather all the liquid at the very base of the conical vial.



Please handle all glass vials with extreme care to avoid accidental damage, breakage, or cross-contamination of your valuable products.

Transport and Storage Guidelines

To ensure the utmost quality, chemical integrity, and long-term stability of the product, you must strictly adhere to the recommended storage conditions and handling precautions. Specific, compound-tailored instructions are always detailed in the product's individual Certificate of Analysis (CoA), which supersedes general guidelines.

General Storage Conditions

State	Temperature	Duration*
Powder	2-8°C	4 years
	-20°C	4 years
In Solvents	2-8°C	2 weeks
	-20°C	4 weeks
	-80°C	6 months

*Upon exceeding the recommended shelf life, the reference marker must undergo re-testing to verify its quality

Important Storage Considerations

HPLC Analysis Use: If the product is being utilized for high-precision analytical methods such as HPLC analysis (specifically as a quantitative comparison or reference standard), we strongly recommend using it as soon as physically possible after the initial opening. Any unused portions must be immediately sealed tight with parafilm, protected completely from light exposure, and stored under the optimal conditions listed above. Ideally, standard solutions should be freshly prepared and consumed on the exact same day to eliminate any risk of degradation, thereby preserving the product's absolute purity and concentration accuracy.

DMSO Stock Solutions: When dissolving hydrophobic compounds in dimethyl sulfoxide (DMSO), the resulting stock solution exhibits specific shelf-life characteristics. It can generally be stored for 4 weeks at -20°C, and extended up to 6 months if kept deeply frozen at -80°C. However, we highly recommend retesting the solution's integrity after one month of storage to ensure its biological and chemical activity remains entirely uncompromised.

Best Practice: To preserve sample integrity, immediately aliquot the freshly prepared stock solution into routine, single-use microcentrifuge tubes before freezing. You must avoid repeated freeze-thaw cycles at all costs, as this severely degrades complex molecules. Once thawed for an experiment, the dispensed solution remains stable at 2-8°C for a maximum of 2 weeks.

Aqueous vs. Organic Environments: Please be acutely aware that highly-concentrated stock solutions are generally prepared in strong organic reagents (such as DMSO or Methanol), whereas biological subjects (like living bacteria, cell cultures, or enzymes) are strictly cultured in buffered aqueous environments. This sudden transition in solvent polarity can easily cause the rapid precipitation of your compound, which will drastically and negatively affect your experimental results if not managed properly during the dilution phase.

Preparation of Reference Standard Solutions

Standard Preparation Procedure

The proper and meticulous preparation of reference standard solutions is arguably the most critical step for achieving highly accurate, reliable, and reproducible experimental results. Please follow these standardized laboratory steps carefully:

01

Weighing

Accurately weigh the exact required amount of the reference standard according to your specific experimental design and required molarity. Using a recently calibrated analytical balance with a high precision of at least 0.01 mg (10^{-5} g) is highly recommended, and often mandatory, for ensuring the utmost quantitative accuracy in your assays.

02

Weighing Paper/Bottle Preparation

If utilizing weighing paper, you must ensure it is completely clean, static-free, and devoid of any prior contamination. Crucially, you must re-weigh the paper after transferring the powder and deduct the exact weight of any standard that persistently adheres to the paper to find your true transferred mass.

If using a glass weighing bottle, it must be washed thoroughly with appropriate solvents. Subsequently, dry it completely in a laboratory incubator at 115°C for a minimum of 30 minutes, and allow it to cool down to room temperature inside a desiccator for another 30 minutes prior to use to prevent any moisture accumulation.

03

Handling Small or Oily Quantities

For extremely small microgram quantities, or compounds presenting as sticky/oily films, attempting to physically scrape the compound out will result in significant mass loss. Instead, weigh the entire sealed, intact vial containing the standard first. Carefully remove the cap, and add a precisely metered volume of your chosen solvent (e.g., 1.0 mL) directly into the vial. Agitate until the compound is completely dissolved and extracted into the solvent. Transfer this liquid to your working flask, then dry the empty vial thoroughly and weigh it again alongside its cap. The exact weight difference between the two measurements is the absolute mass of your sample. This allows you to calculate the precise molar concentration of your newly created working solution.

Continued on the next page

04

Initial Dilution

Add the appropriate volume of your selected solvent and actively agitate the mixture (via continuous shaking, vortexing, or magnetic stirring) for a minimum of 5 full minutes. This time is necessary to ensure uniform distribution and complete, homogenous dissolution of the solid standard into the liquid phase.

05

Transfer

Using a calibrated pipette, carefully transfer the dissolved solution into a clean, fixed-volume Class A volumetric flask. To ensure a complete quantitative transfer, you must rinse the initial mixing container several times with small volumes of your pure solvent, transferring all of this residual rinse liquid directly into the volumetric flask.

06

Cooling (If Applicable)

If gentle heating or prolonged ultrasonication (which generates heat) was utilized to aid in the dissolution of a stubborn compound, you must allow the solution to cool entirely back to standard room temperature before transferring it to the volumetric flask or topping it up to the meniscus mark. Liquids expand when heated, which will skew your final volume and concentration calculations if not cooled.

07

Final Mixing

Once topped up to the correct volume mark, securely stopper the volumetric flask. Vigorously oscillate and repeatedly invert the flask to ensure the final solution is mixed completely homogeneously.

08

Storage

To strictly prevent any environmental or microbial contamination, immediately aliquot the prepared standard solutions into tightly sealed, inert vials. Store these vials at -20 °C or below, protected from light, and aim to use them within 1 month. Despite these storage guidelines, fresh, same-day preparation is always the universally preferred standard for critical analytical work.



Preparation of Reference
Standard Solutions



Preparation of Reference Standard Solutions

Special Considerations and Troubleshooting

● Standard Solvents

High-purity Methanol and Acetonitrile are the universally preferred, standard solvents for creating most analytical working solutions.

● Precipitation Issues

If visible precipitation or cloudiness occurs during dissolution, utilize an ultrasonication bath or apply gentle heating (strictly $\leq 50^{\circ}\text{C}$ to prevent thermal degradation of sensitive molecules). Be aware that certain highly crystalline or complex standards may require >1 hour of continuous ultrasonication for complete, unassisted dissolution.

● Difficult-to-Dissolve Compounds (e.g., Flavonoids)

Flavonoids and similar complex structures are notoriously stubborn. The best approach is to dissolve the standard in a very minimal volume of a strong solvent like DMSO or tetrahydrofuran (THF) first, establishing a highly-concentrated core stock. You can then slowly dilute this core stock with methanol or acetonitrile to reach your final volume.

(Important Analytical Note: DMSO absorbs UV light very strongly across a wide spectrum. You must always run a negative blank control using the exact same final concentration of DMSO in your solvent mixture to effectively deduct this background noise from your spectrophotometer readings).

● Low Polarity Compounds

For highly lipophilic compounds that are completely insoluble in polar standard solvents (like Methanol, Acetonitrile, DMSO, or THF), you should first dissolve them in a minimal volume of a non-polar solvent like chloroform or dichloromethane. Once dissolved, you can carefully dilute the mixture with methanol or acetonitrile.

Cell-Based Assays & Enzyme Activity Experiments

01

Solvent Selection

Before physically beginning your delicate cell culture or enzyme activity experiment, you must strategically select an appropriate solvent for your stock solution. This decision must be based strictly on your specific experimental requirements, the tolerance of your biological model, and the inherent chemical properties (especially polarity) of the compound itself.

02

Water-Soluble Compounds

These highly polar samples are the easiest to handle. They can be dissolved directly into an aqueous physiological solvent (such as standard PBS, saline, or Tris-HCl buffer) to seamlessly reach the required working concentration for your experiment without any risk to your cells.

03

Organic (Water-Insoluble Compounds)

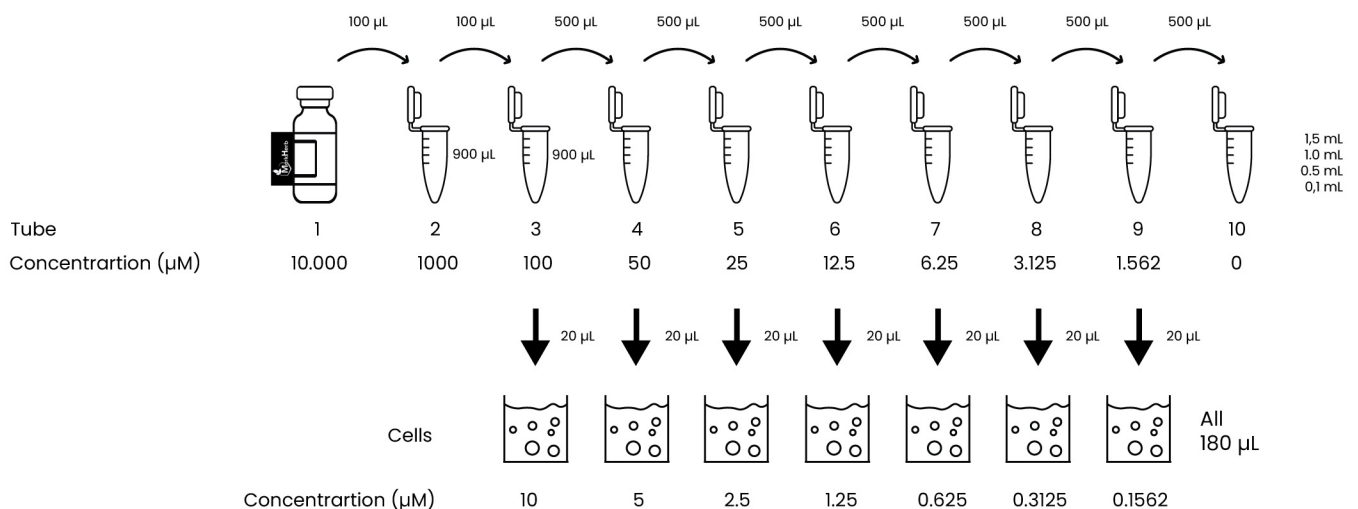
The vast majority of complex organic compounds, particularly secondary plant metabolites, are inherently water-insoluble due to their non-polar structures. Direct, rapid dilution of these compounds into aqueous biological solvents will almost typically cause immediate crystallization and precipitation. It is completely normal and expected for these organic samples to be initially insoluble in pure water.

04

DMSO Dilution Protocol

When utilizing DMSO as the primary vehicle to prepare a stock solution for organic compounds:

- First, formulate a highly concentrated master stock solution utilizing 100% sterile, cell-culture grade DMSO.
- When creating your working solution, slowly and methodically add your chosen diluent (e.g., warmed cell culture medium) drop-by-drop to the DMSO stock while gently swirling.
- Dilute in a carefully controlled, stepwise manner. This prevents the rapid, localized changes in solvent concentration that physically force the compound out of solution and cause sudden precipitation.
- If precipitation still occurs during this careful dilution process, you may use gentle ultrasonication or mild heating ($\leq 50^\circ\text{C}$) to coax the compound back into solution before applying it to your cells.



05

Critical Safety Note for Cells (Cytotoxicity)

DMSO is an incredibly potent solvent that can easily disrupt delicate cellular membranes. You must rigorously ensure that the absolute final concentration of DMSO introduced into the cell culture environment is strictly <0.5% by volume. Exceeding this threshold will almost certainly lead to severe cytotoxicity, effectively poisoning your cells and invalidating your experimental data.

06

Establishing Negative Controls

Always conduct preliminary vehicle-toxicity tests with varying concentrations of blank DMSO on your specific cell lines or enzyme systems to determine their maximum safe tolerance threshold. A proper negative control in your final experiment should always consist of the pure culture medium containing blank DMSO at the exact same volumetric concentration as your highest test sample dose.

07

Solvent Purity and Moisture

Always verify that your chosen solvent is fresh and uncontaminated. DMSO is highly hygroscopic, meaning it rapidly absorbs moisture directly from the ambient air when opened. Absorbed water significantly alters the polarity of the DMSO, which can severely and negatively impact the dissolution of highly hydrophobic compounds. Always cap DMSO bottles immediately after use.

08

Alternative Organic Solvents

In specific cell or enzyme activity experiments, compounds can sometimes be dissolved in alternative organic solvents (like pure ethanol). You must consult relevant, peer-reviewed scientific literature to select a suitable organic solvent based on the specific compound's solubility profile and the known tolerance of your specific cell line or enzyme type. For sensitive enzyme assays, the inhibitory or denaturing effect of organic reagents is highly unpredictable and heavily dependent on the specific structural nature of the enzyme being tested.

09

Molarity Calculations

To calculate precise dilution ratios and ensure accurate dosing, we strongly recommend utilizing the dedicated Molarity Calculator tool, which is freely available on the MarkHerb official website for your convenience.

Standard Calculation Equation:

$$\text{Mass (mg)} = \text{Concentration (mM)} \times \text{Volume (mL)} \times \text{Molecular Weight (g/mol)}$$



Application
Guidelines

Animal Experiments

When transitioning your research from isolated in vitro cellular models to complex in vivo animal models, proper drug formulation becomes absolutely crucial. Accurate formulation ensures precise, repeatable dosing and minimizes vehicle-induced toxicity or distress to the animal.

01

Aqueous Stocks

Stock solutions that are easily prepared with highly purified ddH₂O are straightforward. They can be diluted directly with physiological Saline (0.9% NaCl) or standard PBS buffer to create a ready-to-use, biocompatible working solution for injection or oral gavage.

02

DMSO Stocks in Animals

When utilizing DMSO to dissolve stubborn hydrophobic drugs for animal experiments, the initial stock solution can theoretically be diluted with Saline or PBS buffer. However, extreme caution is required. To minimize severe tissue irritation and systemic toxicity to the animals, the absolute final concentration of DMSO in the injected working solution should ideally be kept at 2% or strictly lower.

03

Utilizing Co-solvents

If a safe, low level of DMSO (under 2%) cannot physically dissolve a sufficient, therapeutically relevant amount of the drug, or if rapid precipitation occurs upon dilution with saline due to extremely low water solubility, you must employ a formulated co-solvent system. Common, biologically safe co-solvents that help bridge the polarity gap include:

- Tween-80 (a polysorbate surfactant)
- Glycerol
- Sodium carboxymethylcellulose (CMC-Na, great for suspensions)
- Cyclodextrins (creates water-soluble inclusion complexes)

04

Suspensions vs. Clear Solutions

or specific administration routes like oral gavage (PO) or intraperitoneal (IP) injection, achieving a perfectly clear, transparent solution is not always strictly necessary, especially given the severe solubility limitations of many natural products. Formulating the drug into a fine, homogenous suspension or a stable emulsion is often highly effective. The compound will still be absorbed adequately in the GI tract or peritoneal cavity without diminishing its overall biological efficacy.

05

Highly Lipid-Soluble Drugs

For relatively small, highly non-polar and lipophilic drugs that absolutely cannot be safely dissolved in tolerable amounts of DMSO or aqueous buffers, an alternative vehicle must be used. Dissolve the compound thoroughly in a biologically inert, sterile vehicle such as standard edible oil, pharmaceutical-grade corn oil, or castor oil prior to injection or oral administration.

06

Literature Review

Before beginning any in vivo study, you must always comprehensively reference relevant, peer-reviewed scientific literature. This is essential to verify known compound solubility profiles, preferred and safest administration routes, and accurate baseline dosages for your specific animal model.

Animal Experiments:

Dose Conversion

When extrapolating therapeutic dosages between different mammalian species (e.g., from a mouse model to a rat model, or from animals to humans), it is an established, standardized pharmacological practice to base these critical calculations on Body Surface Area (BSA) rather than utilizing simple, linear body weight. BSA provides a much more accurate correlation to the basal metabolic rate and physiological drug clearance across different species.

Standardized Dose Conversion Factors (K_m)

Species	Weight (kg)	Body Surface Area (m ²)	K_m factor
Baboon	12	0.6	20
Dog	10	0.5	20
Monkey	3	0.24	12
Rabbit	1.8	0.15	12
Guinea Pig	0.4	0.05	8
Rat	0.15	0.025	6
Hamster	0.08	0.02	5
Mouse	0.02	0.007	3

Note: These specific values are based on established data published in the FDA Draft Guidelines: Center for Drug Evaluation and Research (2002).

General Conversion Formula:

To find the appropriate dose for your target animal, multiply the known dose by the ratio of their respective K_m factors.

$$\text{Dose}_{\text{Animal A}} (\text{mg/kg}) = \text{Dose}_{\text{Animal B}} (\text{mg/kg}) \times \frac{K_{m, \text{Animal B}}}{K_{m, \text{Animal A}}}$$

Practical Calculation Example:

Let's assume you want to convert an established dose of resveratrol that was successfully used in a mouse model (22.4 mg/kg) to a safe, equivalent dose based on body surface area for a larger rat model:

- First, multiply the known mouse dose by the mouse's specific K_m factor.
- Next, divide that resulting number by the target rat's specific K_m factor.

$$\text{Rat Dose} = 22.4 \text{ mg/kg} \times \frac{3 (\text{Mouse } K_m)}{6 (\text{Rat } K_m)} = 11.2 \text{ mg/kg}$$

In this example, the physiologically equivalent dose for the rat is exactly half the mg/kg dose of the mouse, demonstrating why simple weight-based conversion is often dangerously inaccurate.



In vivo Experiments Formulation Schemes

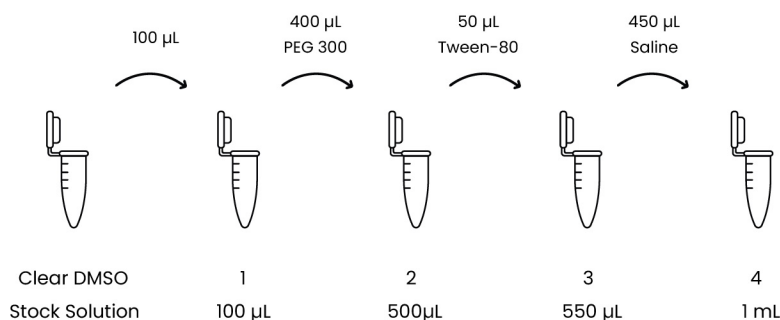
Choosing an appropriate, biocompatible dissolution plan is essential and should be tailored according to your specific experimental animals and their intended administration method. Ensure that the initial mixing step yields a perfectly clear, homogenous stock solution before attempting to add any subsequent co-solvents in the outlined sequence. To guarantee formulation stability and avoid unobserved drug precipitation, fresh, same-day preparation of these working solutions is strongly recommended.

(Note: The percentages listed below denote final volume fractions. Utilize gentle heating or a brief ultrasound bath if any precipitation is observed during the mixing steps).

01 Scheme 1: Standard Co-solvent Mixture

This scheme utilizes a cascading polarity gradient, using PEG and Tween to stabilize the hydrophobic drug as water (saline) is introduced.

- **Formulation Sequence:** 10% DMSO → 40% PEG300 → 5% Tween-80 → 45% Saline
- **Target Solubilization:** Expected solubility $\geq 2.5\text{mg/mL}$ (5.62 mM); yields a clear solution.
- **Protocol for a 1 mL working solution:**
 1. Carefully add 100 μL of a 2.5 mg/mL clear DMSO master stock to 400 μL of PEG300 and mix thoroughly.
 2. Next, add 50 μL of Tween-80 surfactant to the system and vortex well.
 3. Finally, slowly add 450 μL of physiological saline to bring the total volume to exactly 1 mL

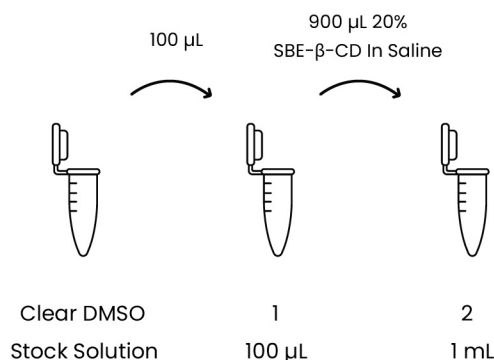


02

Scheme 2: Cyclodextrin Inclusion Complex

This scheme uses cyclodextrins, which are cyclic oligosaccharides that feature a hydrophobic cavity and a hydrophilic exterior, effectively encapsulating the drug to make it water-soluble.

- **Formulation Sequence:** 10% DMSO → 90% (20% SBE- β -CD formulated in saline)
- **Target Solubilization:** Expected solubility ≥ 2.5 mg/mL (5.62 mM); yields a clear solution.
- **Protocol for a 1 mL working solution:**
 - Carefully add 100 μ L of a 2.5 mg/mL clear DMSO master stock to 900 μ L of a pre-prepared 20% SBE- β -CD saline solution and vortex vigorously to mix well.

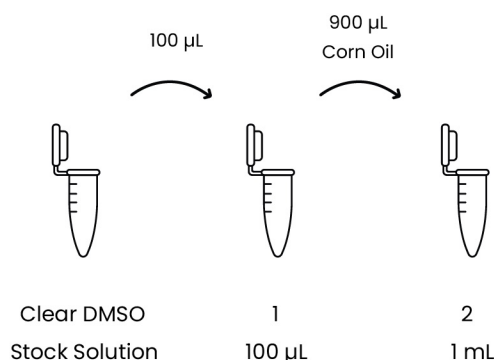


03

Scheme 3: Oil-Based Suspension / Solution

Ideal for highly lipophilic compounds where aqueous environments are entirely unsuitable.

- **Formulation Sequence:** 10% DMSO → 90% Corn oil (*Important Note: Due to the potential for lipid oxidation and degradation over time, this specific formulation scheme is NOT suitable for long-term chronic experiments lasting more than 15 consecutive days*).
- **Protocol for a 1 mL working solution:**
 - Carefully add 100 μ L of a 2.5 mg/mL clear DMSO master stock to 900 μ L of pharmaceutical-grade corn oil and mix exceptionally well, ensuring homogenous distribution.



Application
Guidelines

Quality Assurance

TLC Profiling of Reference Standards

Scientific Purpose: To definitively confirm the identity, purity, and establish the distinct chromatographic fingerprint profile of a specific reference standard utilizing Thin-Layer Chromatography (TLC), a foundational and highly effective analytical technique.

Detailed Procedure:

01

Plate Preparation:

Carefully cut the silica gel TLC plate to a standardized height of 5 cm. Adjust the overall width of the plate based on the total number of samples you intend to analyze simultaneously. You must maintain a strict minimum of 0.5 cm horizontal distance between each sample application point to prevent cross-contamination or spot merging during the run.

02

Precise Marking:

Using a soft graphite pencil (never a pen, as ink will run), draw a faint sample application line (the lower boundary or origin) exactly 0.7 cm from the bottom edge of the plate. Next, draw an elution endpoint line (the upper boundary or solvent front) exactly 0.3 cm from the top edge. This specific geometry creates a perfectly standardized, reproducible elution travel distance of 4.0 cm. Clearly label each sample spot directly below the origin line.

03

Sample Application:

Using a glass capillary tube, carefully and precisely spot a micro-volume of each sample directly onto the designated application points on the origin line. Keep the spots as small and tight as possible for the best resolution.

04

Chamber Saturation:

Prepare precisely 5 mL of your required, pre-determined mobile phase (the solvent mixture). Pour it carefully into the glass developing chamber. Swirl the liquid gently to coat the walls, then seal the chamber tightly with its heavy glass lid. Allow it to sit for several minutes to completely saturate the internal atmosphere with solvent vapor, which is critical for an even, straight elution run.

05

Development Phase

Using forceps, carefully place the spotted TLC plate completely upright into the saturated chamber. Ensure the lower boundary line is resting above the liquid level; the solvent must never submerge the sample spots directly. Seal the lid and allow the plate to develop undisturbed until the rising solvent front perfectly reaches your penciled upper boundary line.

06

Visualization Techniques

Remove the plate, mark the exact solvent front immediately if it didn't reach the line, and let it dry in a fume hood. First, non-destructively examine the plate under a UV lamp (at both 254 nm and 366 nm wavelengths) and lightly pencil circle any visible quenching or fluorescent spots. Next, permanently visualize the spots by carefully spraying the plate with a 10% sulfuric acid staining reagent. Apply even heat via a heat gun or hot plate until distinct colored spots develop, and observe the plate again under UV 366 nm.

07

R_f Calculation

Using a ruler, measure the exact vertical distance traveled by the dense center of each developed spot starting from the origin line. Also, measure the total distance traveled by the solvent front from the origin. Calculate the Retention Factor (R_f) for each visible component:

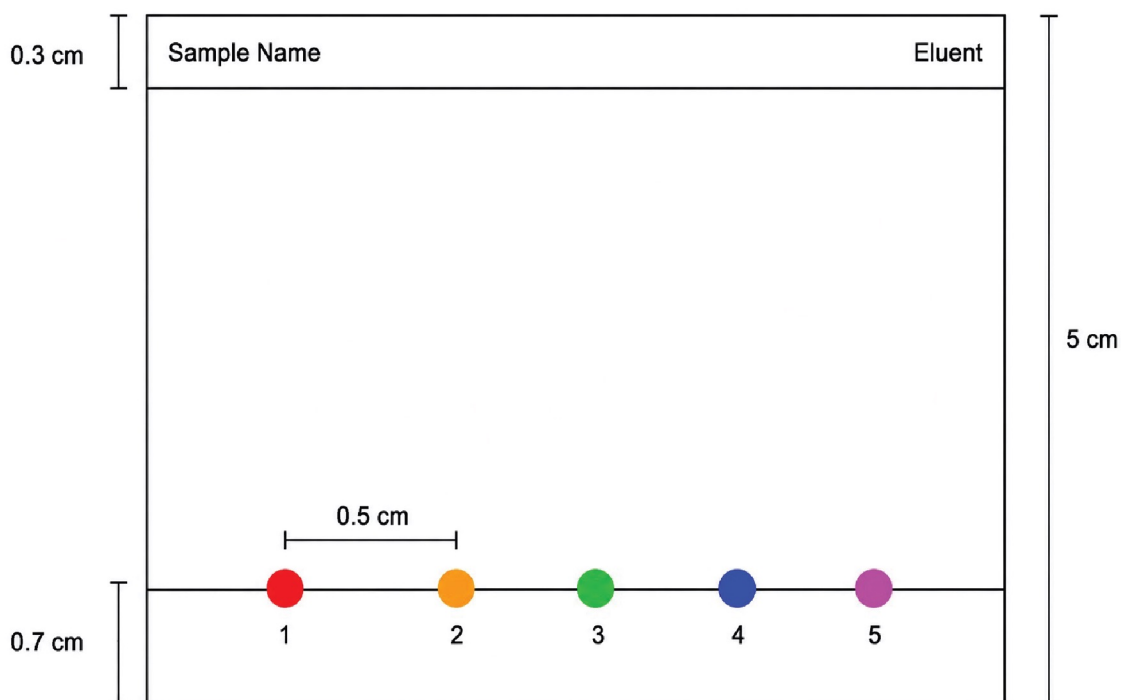
$$\text{Retention Factor } (R_f) = \frac{\text{Distance traveled by specific compound spot}}{\text{Distance traveled by the overall solvent front}}$$

08

Comparative Analysis

Critically compare the calculated R_f value, color, and spot shape of your unknown sample with the authenticated MarkHerb reference standard analyzed under the exact identical TLC conditions on the same plate.

TLC Scheme:



Quality Control

MarkHerb Quality Policy

MarkHerb is widely recognized as a professional, premier global manufacturer of high-purity natural products and analytical reference standards. To continuously achieve our strategic vision of scientific excellence, we are committed to consistently meeting and routinely exceeding our customers' stringent expectations. We actively realize this ambitious goal by establishing, rigorously implementing, and strictly maintaining outstanding Quality Control (QC) and Quality Assurance (QA) standards across every single facet of our manufacturing operation.

Process Control and Documentation

01

Solvent Selection:

Rigorous, multi-tiered documentation exists to provide highly specific, appropriate instructions for both producing and analytically testing all final products. If any changes to the established manufacturing or testing process are scientifically warranted, the official work instruction document(s) will be formally reviewed, approved, and updated to accurately reflect the procedural change, ensuring complete operational transparency.

02

Water-Soluble Compounds:

All critical laboratory equipment—strictly defined as equipment where environmental monitoring and analytical output are directly controlled and systematically recorded (e.g., HPLC machines, analytical balances, NMR spectrometers)—is maintained under a highly strict, documented calibration and preventative testing program. Internationally traceable standards are utilized wherever applicable. Highly detailed, documented procedures govern every aspect of equipment operation, calibration frequency, routine maintenance, and required cleaning protocols. Visible equipment tags are actively employed on all machinery to clearly indicate its current calibration status to all lab personnel.

03

Organic (Water-Insoluble Compounds):

Exhaustive quality records detailing a product's entire lifecycle within MarkHerb facilities are securely maintained. This vast database includes customer inquiries, specific batch orders, in-process manufacturing metrics, raw testing data, packaging environment logs, final qualitative/quantitative analysis, final batch disposition, and employee training logs. A sophisticated, digitized batch numbering system ensures complete, uncompromised end-to-end traceability from raw material to the vial on your bench.

04

DMSO Dilution Protocol:

When an internal QC batch is definitively determined to be nonconforming to our exact, uncompromising product specifications, the batch is immediately and automatically "flagged" in our centralized electronic inventory systems. Simultaneously, it is physically labeled with high-visibility markers and physically segregated in a locked area to reflect a rigid "blocked" status, effectively and completely preventing any possibility of accidental shipment to researchers.

Legal Disclaimer: All MarkHerb products are manufactured strictly for laboratory and/or research use only. They are absolutely not intended for human consumption, therapeutic application, or diagnostic use. We strictly do not sell our products directly to patients.

Frequently Asked Questions (FAQ) & Safety

Are MarkHerb natural products and standards sterile?

Generally speaking, MarkHerb products that are completely dissolved in 100% pure DMSO are considered practically free of viable bacterial contamination. This is because highly concentrated DMSO itself is a strongly bactericidal organic solvent, meaning it inherently destroys bacteria and will not act as a vector to introduce bacterial growth to your sensitive drugs.

However, it is crucial to understand that while DMSO is sterile, it will absolutely not sterilize a contaminated ambient environment. It is absolutely critical to maintain strict aseptic techniques, keeping your operating environment (e.g., biological safety cabinets) and all pipettes/instruments completely sterilized prior to any experimental use. Depending on your laboratory's specific in vitro or in vivo experimental requirements, the final drug formulations can also be manually sterilized by passing them through a 0.22 μm syringe filtration membrane immediately prior to use.

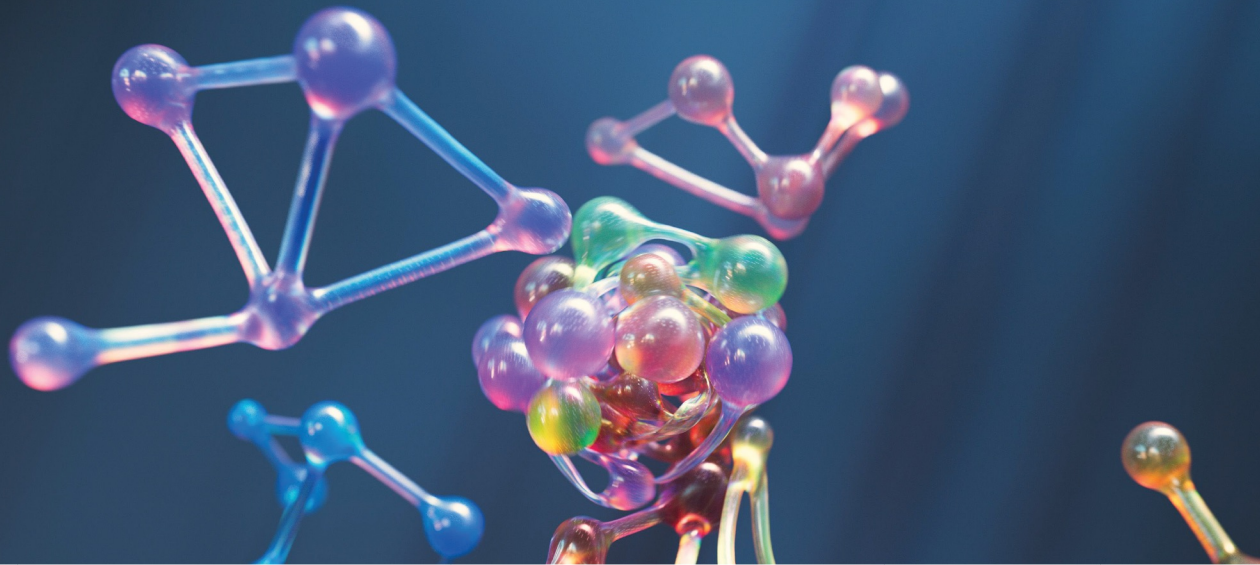
CRITICAL WARNING: Standard high-temperature and high-pressure sterilization laboratory methods (such as steam autoclaving) are strictly NOT recommended under any circumstances for our chemical compounds. The extreme heat and pressure will rapidly alter, denature, or completely destroy the molecular structure of the natural products, rendering them useless.

What essential safety precautions must I take when handling MarkHerb products?

Laboratory safety is paramount. Prior to physically handling, weighing, or opening any MarkHerb product, you must thoroughly review its specific Material Safety Data Sheet (MSDS). You can easily and freely download the comprehensive MSDS directly from the specific product's information page on the MarkHerb official website. The MSDS contains vital, legally mandated information on:

- Detailed hazard identification and toxicity profiles
- Immediate first-aid procedures in case of accidental exposure
- Specific firefighting measures for flammable compounds
- Safe handling, storage, and environmental disposal practices

Lab managers must ensure that all personnel handling these concentrated compounds are rigorously trained and wearing appropriate Personal Protective Equipment (PPE) at all times. This includes securely fastened lab coats, chemically resistant nitrile gloves, and standardized safety goggles. For volatile or highly toxic powders, handling must be conducted within a certified chemical fume hood.



Solvent Miscibility Guide

A thorough understanding of solvent miscibility is absolutely foundational for proper chemical compound formulation, liquid-liquid extraction, and designing effective mobile phases for chromatography.

● Miscible Solvents (Homogenous Systems):

These are liquids featuring compatible polarities that mix completely and uniformly with each other in absolutely any proportion. They seamlessly form a single, uniform, homogeneous liquid phase without any visible boundaries.

● Example 1:

Water (Highly Polar) + Methanol (Polar) → Completely mixed, single clear layer.

● Example 2:

Water (Highly Polar) + Ethanol (Polar) → Completely mixed, single clear layer.

● Example 3:

Methanol (Polar) + Acetonitrile (Polar) → Completely mixed, excellent for HPLC mobile phases.

● Immiscible Solvents (Heterogeneous Systems):

These are liquids with conflicting polarities (typically one highly polar, one highly non-polar) that completely fail to mix. When physically combined and allowed to settle, they aggressively repel each other, distinctly separating into two completely separate physical phases or layers based on their specific gravities (density).

● Example 1:

Water (Polar) + Hexane (Non-polar) → Distinctly separates into two layers (Hexane floats on top due to lower density).

● Example 2:

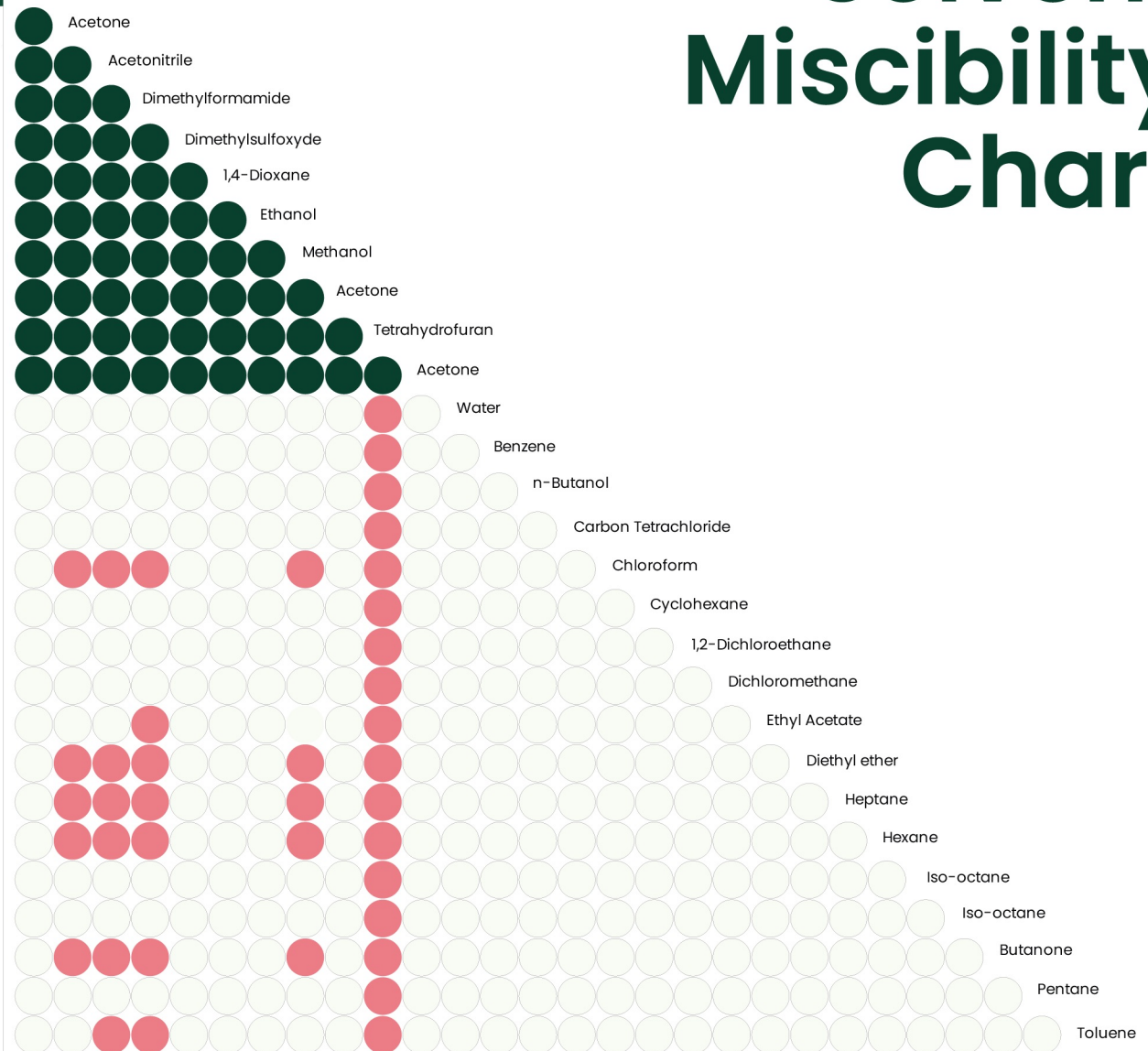
Water (Polar) + Dichloromethane / DCM (Non-polar) → Distinctly separates into two layers (DCM sinks to the bottom due to higher density).

● Example 3:

Water (Polar) + Chloroform (Non-polar) → Distinctly separates into two layers (Chloroform sinks to the bottom).

Solvent Miscibility Chart

UV (nm) Cutoff @1 AU	Viscosity (cPoise) @20°C	Solvent
330	0,36	Acetone
190	0,38 (15°C)	Acetonitrile
268	0,92	Dimethylformamide
268	2,24	Dimethylsulfoxyde
215	1,37	1,4-Dioxane
210	1,20	Ethanol
210	2,30	Isopropanol
205	0,59	Methanol
215	0,55	Tetrahydrofuran
200	1,00	Water
280	0,65	Benzene
254	0,73	n-Butanol
263	0,97	Carbon Tetrachloride
245	0,57	Chloroform
200	1,00	Cyclohexane
225	0,79	1,2-Dichloroethane
235	0,44	Dichloromethane
260	0,45	Ethyl Acetate
220	0,32	Diethyl ether
200	0,42	Heptane
200	0,31	Hexane
215	0,50	Iso-octane
210	0,27	Methyl tert-butyl ether
329	0,45	Butanone
200	0,23	Pentane
285	0,59	Toluene
290	0,61	Xylene



Miscible

Miscible in Water

Not Miscible

Unyielding Dedication to Biodiversity and Scientific Innovation

Born from the rich biodiversity of Indonesia, MarkHerb stands as your trusted partner in premium botanical extracts and isolated natural compounds. We believe that nature holds the answers to modern health challenges. Through advanced extraction technologies and rigorous scientific methodology, we translate nature's potent benefits into safe, standardized, and ready-to-formulate solutions.

Since our inception, we have been committed to bridging traditional botanical knowledge with the precision required by modern industries. Every drop and gram of MarkHerb's products reflects the dedication of our scientists, pharmacists, and botanists working tirelessly to ensure uncompromised efficacy, safety, and batch-to-batch consistency.

Get in Touch

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Bridging the
Purity of
Nature with
Scientific
Precision for a
Healthier
Future

