FROZEN HAIR GRINDER

Frozen Hair Grinder Ⅰ Product Introduction

DHFSTPRP-HR24 frozen hair grinder utilizes a special vertical up-and-down integrated vibration mode, which achieves the desired grinding effect quickly through the high-frequency reciprocating vibration, impact, and shear of grinding beads (zirconia, steel, glass, ceramic). This results in samples that are more fully ground, more uniform, with better sample repeatability, and no cross-contamination between samples. Combined with the judicial appraisal technical specification SF/Z JD0107025-2018 "Liquid Chromatography-Tandem Mass Spectrometry Method for the Detection of 15 Drugs and Their Metabolites in Hair", it can quickly detect common drugs (such as heroin, methamphetamine, ketamine, ecstasy, marijuana) in hair on-site. The detection limits for various drugs have reached the requirements of the "Specifications for Hair Sample Testing of Drug-Involved Personnel" issued by the Ministry of Public Security. Since its launch, this product has been widely recognized in the industry and has received multiple innovations, as well as the acceptance report of the Key Laboratory of Toxicological Analysis of the Public Security Ministry of Beijing Public Security Bureau.

This instrument is a recommended product in the judicial appraisal technical specification SF/Z JD0107025-2018 "Liquid Chromatography-Tandem Mass Spectrometry Method for the Detection of 15 Drugs and Their Metabolites in Hair".

Frozen Hair Grinder Ⅰ Principle Product

After cleaning and frozen grinding, hair samples are extracted using the methanol ultrasound method and detected using liquid chromatography-tandem mass spectrometry with multiple reaction monitoring (MRM) mode. Qualitative analysis is conducted by comparing the retention time, mass spectral characteristic fragment ion peaks, and relative abundance ratios of the ion pairs with those of the parallel blank samples and spiked samples for control purposes.

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Product Features

○ High efficiency grinding
Simultaneously process 24 hair samples for rapid on-site grinding. The grinding equipment has a built-in program controller, making it easy to operate. It also provides feasible solutions for community drug rehabilitation and special personnel monitoring.

○ Low-temperature grinding
The temperature of the frozen grinding can be customized and adjusted to protect the components of the sample at low temperature and avoid destruction of the sample components.

○ Professional grinding
The instrument has completed nearly a thousand real sample tests in judicial centers and drug enforcement teams in Beijing, Ningbo, Sichuan, Hunan, Shanghai and other places. The positive detection rate is as high as 99%, effectively avoiding false positive interference caused by drug use.

Grinding Contrast:

The excellent grinding effect of LAWSON grinding instrument

▲ Before and after bone grinding with LAWSON grinding apparatus

▲ Mobile phone keyboard, grinding effect under freeze embrittlement condition

▲ Lapping analysis of fiber sample with KBr particles

▲ Before and after grinding of hair samples using LAWSON grinding apparatus

• LAWSON: More samples grinding contrast effect, welcome to I contact us.

Product Applications

Sample for Grinding:
◆ Plant Tissues: roots, stems, leaves, flowers, fruits, seeds, etc.
◆ Animal Tissues: brain, heart, lung, stomach, liver, thymus, kidney, intestine, lymph nodes, muscle, bones, etc.
◆ Fungi and Bacteria: yeast, E. coli, etc.
◆ Food and Medicine: various food, pills, etc.
◆ Volatile Samples: coal, oil shale, wax products, etc.
◆ Plastics and Polymers: PE, PS, textiles, resins, etc.

○ Nucleic Acid/Protein Extraction
Low-temperature grinding of samples can effectively inhibit nucleic acid degradation and preserve protein activity.

○ Analysis of Active Pharmaceutical Ingredients
There are often significant differences between isomers of drug active ingredients. Low-temperature grinding can prevent molecular degradation due to pressure and heat.

○ Reducing Sample Volatility
Low-temperature grinding can significantly reduce sample volatility and more completely retain the content of sample components.

○ Grinding Tough/Hard Samples
For hard-to-grind samples such as tough plastics, high-strength plastics, and resins, low-temperature grinding can greatly improve grinding efficiency and effectiveness.

DHFSTPRP-HR24 frozen hair grinder adopts a special vertical up-down integrated vibration mode, which achieves rapid grinding of samples through the high-frequency reciprocating vibration, impact, and shear of grinding beads (zirconia, steel, glass, ceramics). This results in more thorough and uniform grinding of samples, better sample reproducibility, and no cross-contamination between samples.

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Product Applications

Forensic Appraisal Technical Specification SF/Z JD0107025-2018 "Liquid Chromatography-Tandem Mass Spectrometry Detection Method for 15 Drugs and Metabolites in Hair"

1. Sample Preparation

1.1 Case Sample

The hair sample is washed twice with an appropriate amount of water and acetone by shaking, then dried and cut into approximately 1mm segments. The hair segments are then frozen and ground to a powder in a cryogenic grinder. Weigh 20mg of hair powder, add 1.0mL internal standard methoxamine standard working solution (methoxamine 1ng/mL), perform ice bath sonication for 30 minutes, centrifuge, transfer the supernatant, and dry at 60°C with air flow (or a dry nitrogen blower). The residue is re-dissolved with 100μL methanol for instrument analysis.

1.2 Blank Sample

Take 20mg of blank hair sample, add 1.0mL internal standard methoxamine standard working solution (methoxamine 1ng/mL), and follow the same extraction procedure as described in 6.1.1 for case samples.

1.3 Spike Sample

Take 20mg of blank hair sample, add the suspected target compound reference material that appears in the case sample, add 1.0mL internal standard methoxamine standard working solution (methoxamine 1ng/mL), and follow the same extraction procedure as described in 6.1.1 for case samples.
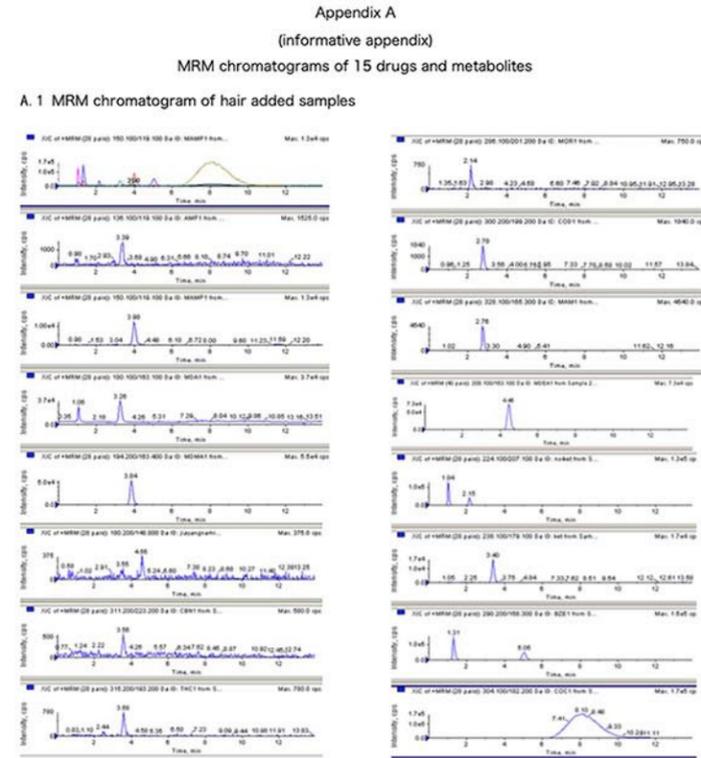

Appendix A
(informative appendix)
MRM chromatograms of 15 drugs and metabolites

A. 1 MRM chromatogram of hair added samples

Figure A1 MM Chromatogram of 15 Drugs and Internal Standards in Hair Addition Samples

Product Advantages

Multiple operation, good effect	Highly efficient and fast operation can complete the grinding of 2x24, 2x48, 4x96 samples within 1 minute. It saves time and effort, and has small differences between batches and within batches. The extracted protein has a higher activity and longer nucleic acid fragments.
No cross-contamination	The sample tubes are in a fully enclosed state during the crushing process, and disposable centrifuge tubes and beads can be used. The samples are kept intact in the tubes, avoiding cross-contamination between samples and external contamination.
Easy operation	1. Built-in program controller, which can set parameters such as grinding time and vibration frequency of the rotor; 2. User-friendly operating interface.
Good stability	1. Adopting vertical oscillation mode for more thorough grinding and better stability; 2. During instrument operation, the noise is less than 55dB, which will not interfere with other experiments or instruments.
Convenient for low-temperature operation	When a low-temperature grinding environment is required, the adapter with the sample can be immersed in liquid nitrogen for 1-2 minutes, and then moved to the main unit for quick fixation to start grinding without the need for re-freezing, saving liquid nitrogen.
Good repeatability	Setting the same program for the same tissue sample can obtain the same grinding effect. The working time is short, and the sample temperature does not rise.

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Technical Parameters

Model	DHFSTPRP-HR24
Application Fields	Hair grinder, tissue grinder, homogenization, cell lysis, material dispersion, preparation, sample mixing, oscillation, etc.
Processing Capacity	Maximum processing capacity of 24 samples at the same time within 15 seconds, with built-in compressor for cooling
Compatible Sample Tubes	24*(0.2-0.5mL) /24*2mL /6*(7-15)mL /2*25mL /2*50mL, and various specifications of grinding tubes can be customized
Display	Touch screen display for convenient and intuitive operation
Data Storage	Up to ten sets of experimental data can be stored, and different experimental samples are pre-set such as animal heart, spleen, lung, kidney, bone, skin, hair, etc.
Cycle Mode	According to the set experimental parameters, the device can cycle through several pre-set parameter settings to further reduce human interference
Anti-Vibration Principle	Innovative anti-vibration principle based on the German "schleifen-1" working mode, as well as the innovative three-dimensional motion of the grinding beads in the vertical, horizontal and rocking directions, to ensure maximum sample processing and instant crushing effect
Maximum Feed Size	No specific requirements, can be adjusted according to the adapter
Cooling function	Yes, adjustable from -30°C to 37°C

Technical Parameters

Temperature control accuracy	+0.5°C
Open lid operation protection	Electromagnetic lock
Final particle size	~5μm
Number of grinding platforms	(can accommodate number of grinding jars) > 2
Fastening device	With automatic centering
Homogenization speed	0-70 Hz/second, working time: 0 seconds to 99 minutes, user can set it
Grinding ball diameter	0.1-30mm
Grinding ball material	Alloy steel, chromium steel, zirconia, tungsten carbide, quartz sand
Acceleration/Deceleration	Reaches maximum speed within 2 seconds / Reaches lowest speed within 2 seconds
Noise level	<55db
Grinding mode	Wet grinding, dry grinding, and low temperature grinding are all available
Temperature control	Has the ability to upgrade to ultra-low temperature liquid nitrogen refrigeration or air refrigeration
Adapter material	Polytetrafluoroethylene, alloy steel
Safety instructions	Fastening device with automatic centering, safety lock during operation, full protection
Grinding kit material	Hard alloy, polytetrafluoroethylene (PTFE), zirconia
Dimensions/Weight	630*300*480mm / 58 kg