DISCOVER PROTEOMICS

Microwave-Assisted Proteomic Sample Preparation

Enzymatic Digestion
Chemical Cleavage
Deglycosylation
Protein tagging

CEM
Microwave-Enhanced Science

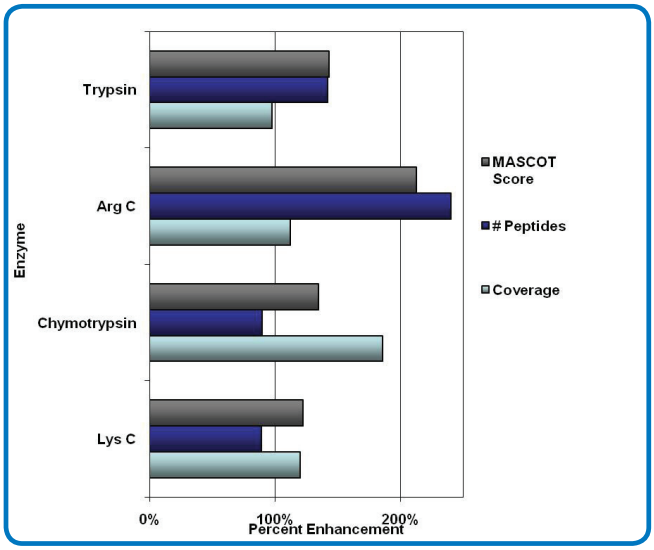
How can microwave energy benefit proteomic sample preparation?

CEM's patented microwave technology is changing the way scientists are performing sample preparation for proteomics applications. The low frequency energy of microwave irradiation offers several benefits.

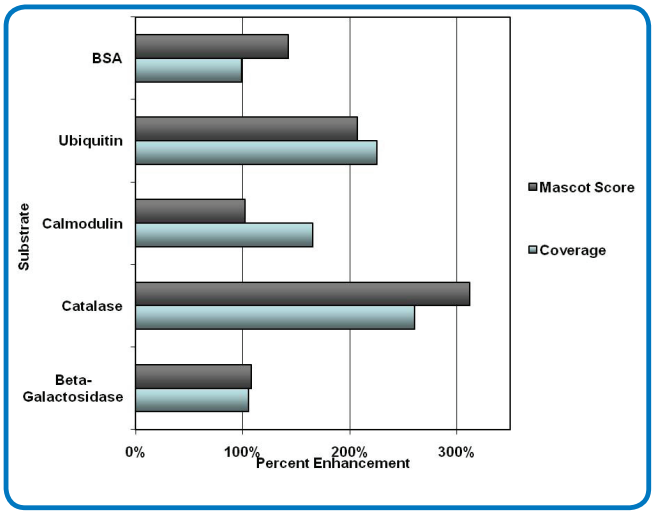
- Increase protein coverage and improve results
- Increase purity profiles and selectivity
- Significantly decrease preparation times
- Access results that cannot be achieved with conventional methods

CEM's patented microwave systems produce short bursts of finely controlled energy, which is not possible with thermal heating methods. CEM microwave systems give chemists the ability to tightly control the amount of energy introduced to a reaction, which is especially important when performing temperature-sensitive chemistries, such as enzymatic and chemical protein digestions.

Case Study



Comparison of the conventional overnight enzymatic digestion of Bovine Serum Albumin at 37 °C for 16 hours to microwave enhanced digestion at 35 °C (55 °C for Trypsin) for 10 minutes .



Microwave enhanced Trypsin digestion of various proteins.

Results:

- Microwave enzymatic digestion in 10-15 minutes
- Better database score searching
- Higher coverage of proteins
- Unique peptides can be generated

Easy as 123

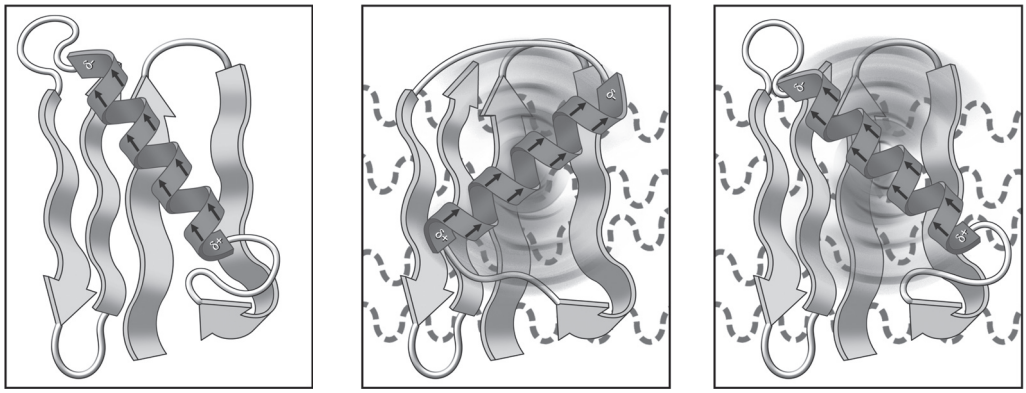
1. Load your samples into the holder and into the cavity

2. Seal the microwave cavity

3. Insert the fiber optic probe and press Play

The Microwave Advantage

Biomolecules, such as proteins, interact uniquely with microwave energy due to the highly charged resonance structure of the peptide bond. The peptide bond will readily absorb microwave energy, inducing molecular motion within the protein. In addition to the absorption of microwave energy by the peptide bond, microwave energy interacts with the secondary structure of proteins. The alpha helix of a protein has a macrodipole due to the alignment of all the peptide bonds in the same direction, and this macrodipole provides an additional source of polarity. The alpha helix will selectively absorb microwave energy, causing destabilization of the protein's secondary structure allowing easier access to the protein backbone for enzymatic or chemical cleavage.



(a) Generic protein with no microwave irradiation and after the application of microwave irradiation (b) and (c). (b) and (c) are in equilibrium with one another and the helix is oscillating in the microwave field.

System Features

- Fiber optic probe for accurate temperature measurement
- Variable power setting for precise power control
- Simultaneous cooling technology increases the power input to the sample
- Flexible, open architecture design allows introduction of a variety of different vessel types

SYSTEM SPECS

Sample Size	30 µL – 1.0mL
Reaction Vessel Sizes	300 µL glass tubes, 0.6 mL or 1.5 mL microcentrifuge tubes
Total Vessels	up to 20 in parallel
Temperature Sensor	In situ Fiber-Optic
Agitation	Magnetic stirring if desired
Controller	Discover keypad or through optional external software package
Power	120V/60Hz or 240V/50Hz
Dimensions	14.5"W x 17.2"D x 8.7"H (36.2cm x 43.2cm x 22.1cm)
Warranty	1-year full warranty
Patents	US Patents 6648659, 6666223, 5459302, 660792082, with other US & Worldwide patents pending

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