



# Discover<sup>®</sup> Proteomics

Microwave Protein Sample Preparation

Enzymatic Digestion

Chemical Cleavage

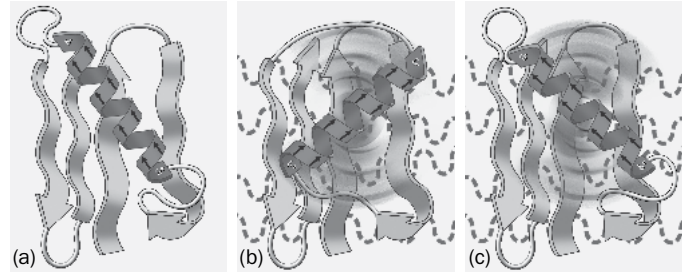
Deglycosylation

Protein Tagging



# 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.

## Features

Microwave technology has become a common tool for chemical synthesis both in academia and industry. Heating with a microwave has many advantages over conventional means of synthesis.

- 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

## Easy As 1-2-3



1

Load samples into the holder and insert into the cavity.



2

Seal the microwave cavity.



3

Insert the fiber optic probe and press *Play*.

# Microwave Energy Benefits Proteomic Sample Preparation

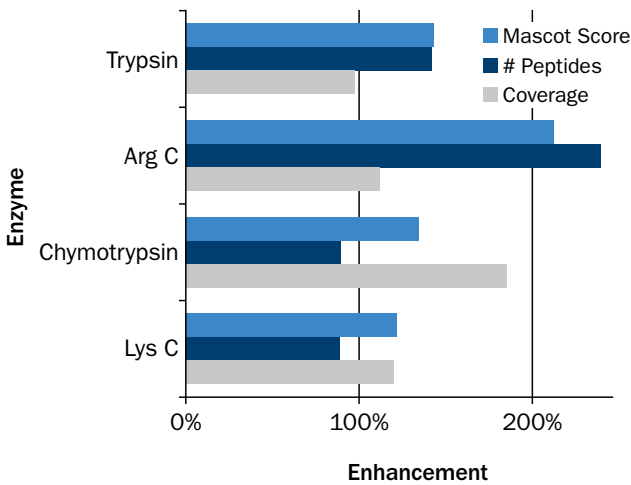
CEM's patented microwave technology is changing the way scientists are performing sample preparation for proteomics applications. The low frequency energy of microwave irradiation offers several benefits.

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.

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



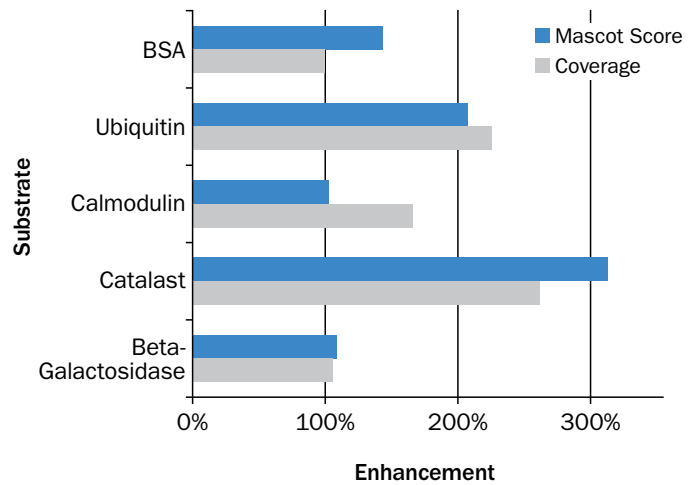
## Case Study



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.

## Results

- Microwave enzymatic digestion in 10-15 minutes
- Better database score searching



Microwave enhanced Trypsin digestion of various proteins.

- Higher coverage of proteins
- Unique peptides can be generated



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