Intact skin analysis by desorption electrospray ionization mass spectrometry

Maria Katona, Julia Denes, Reka Skoumal,
Miklos Toth and Zoltan Takats*

Semmelweis University, Budapest, Hungary

Analyst, 2011, **136**, 835–840

Amitava Srimany
19-03-2011

INTRODUCTION

There is a need to come with minimally invasive diagnostic and forensic techniques at present due to “presumption of innocence” issue.

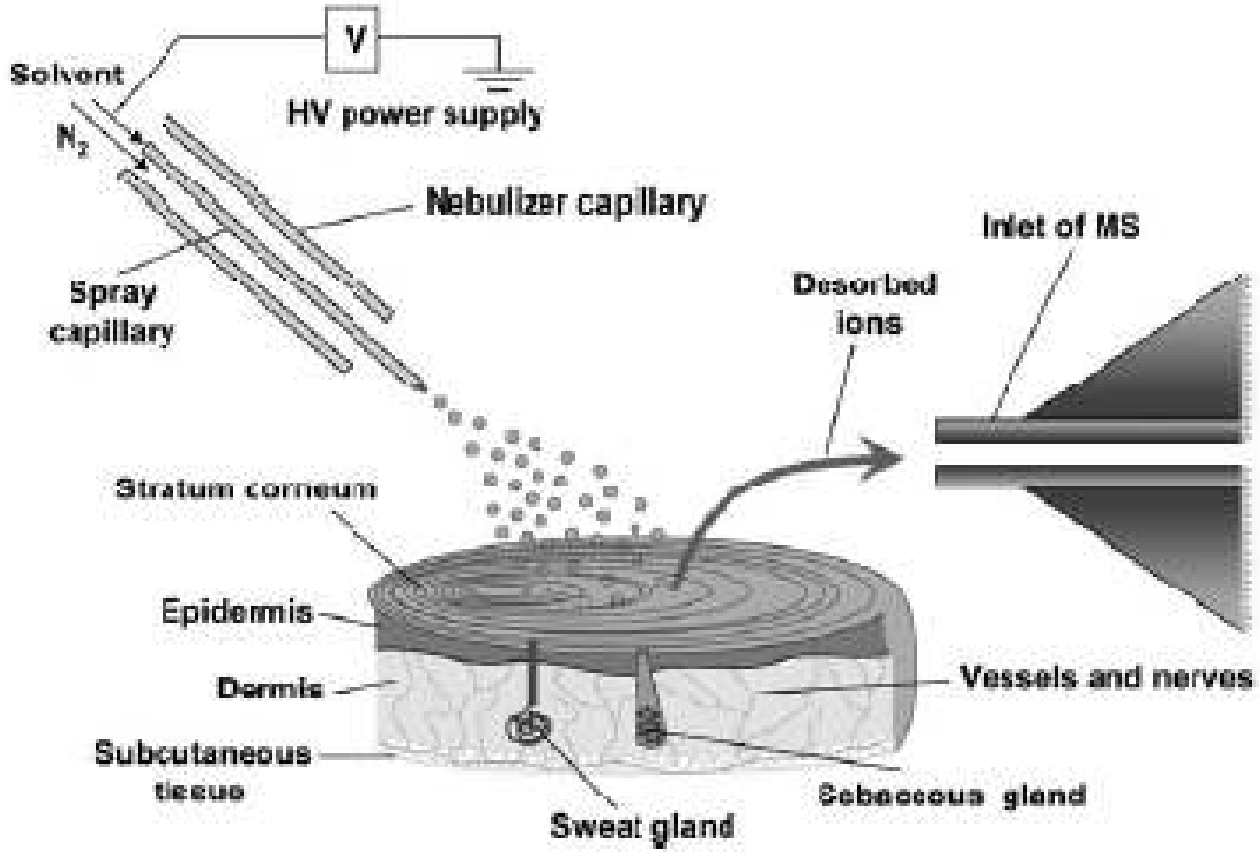
Blood samples are used for most of the clinical diagnostic and forensic applications.

Sweat and saliva can be two alternatives.

With the development of mass spectrometric technique body fluid analysis became very much popular though it is still invasive.

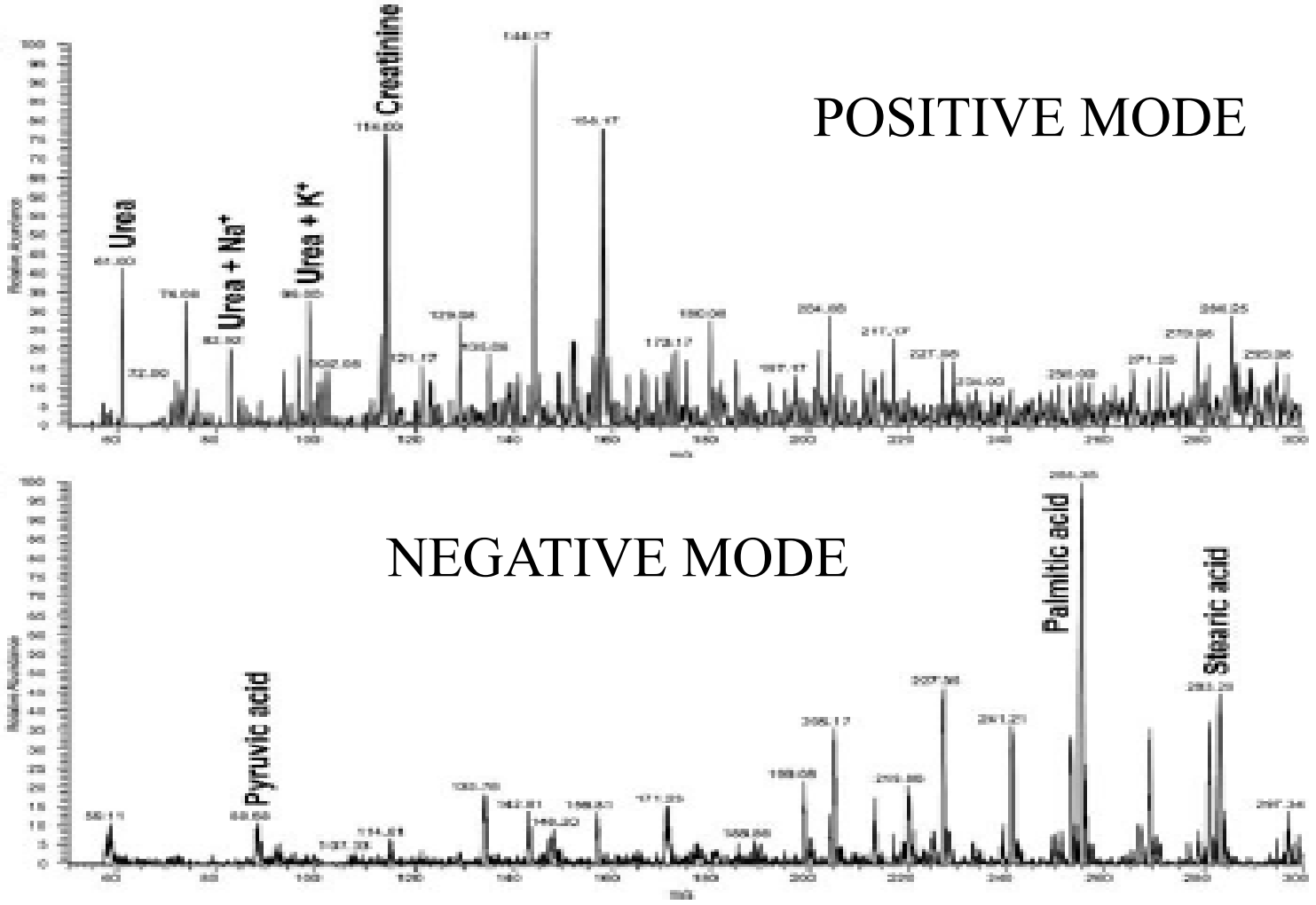
Ambient ionization technique like DESI gave enormous advantages over the others for intact skin analysis which is totally non-invasive.

SCHEMATICS FOR EXPERIMENTAL SET UP



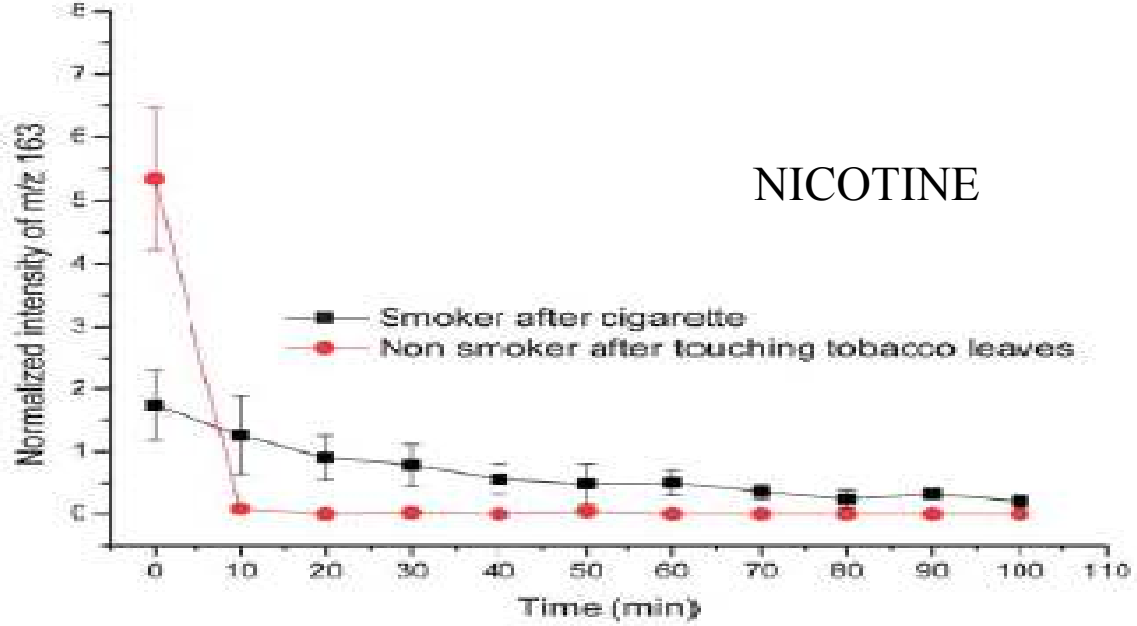
Ion source was modified by using a 4 GΩ ohmic resistor in the HV line and special spacers were used to avoid direct contact between the skin and the electrospray tip and between the skin and the atmospheric inlet of mass spectrometer.

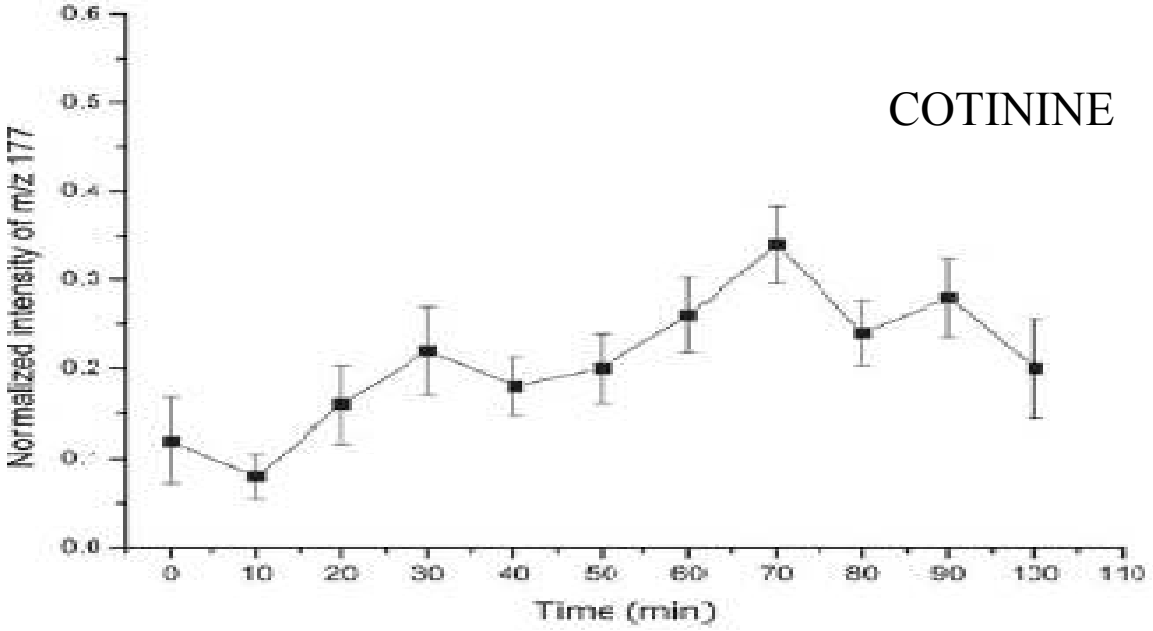
RESULTS AND DISCUSSION



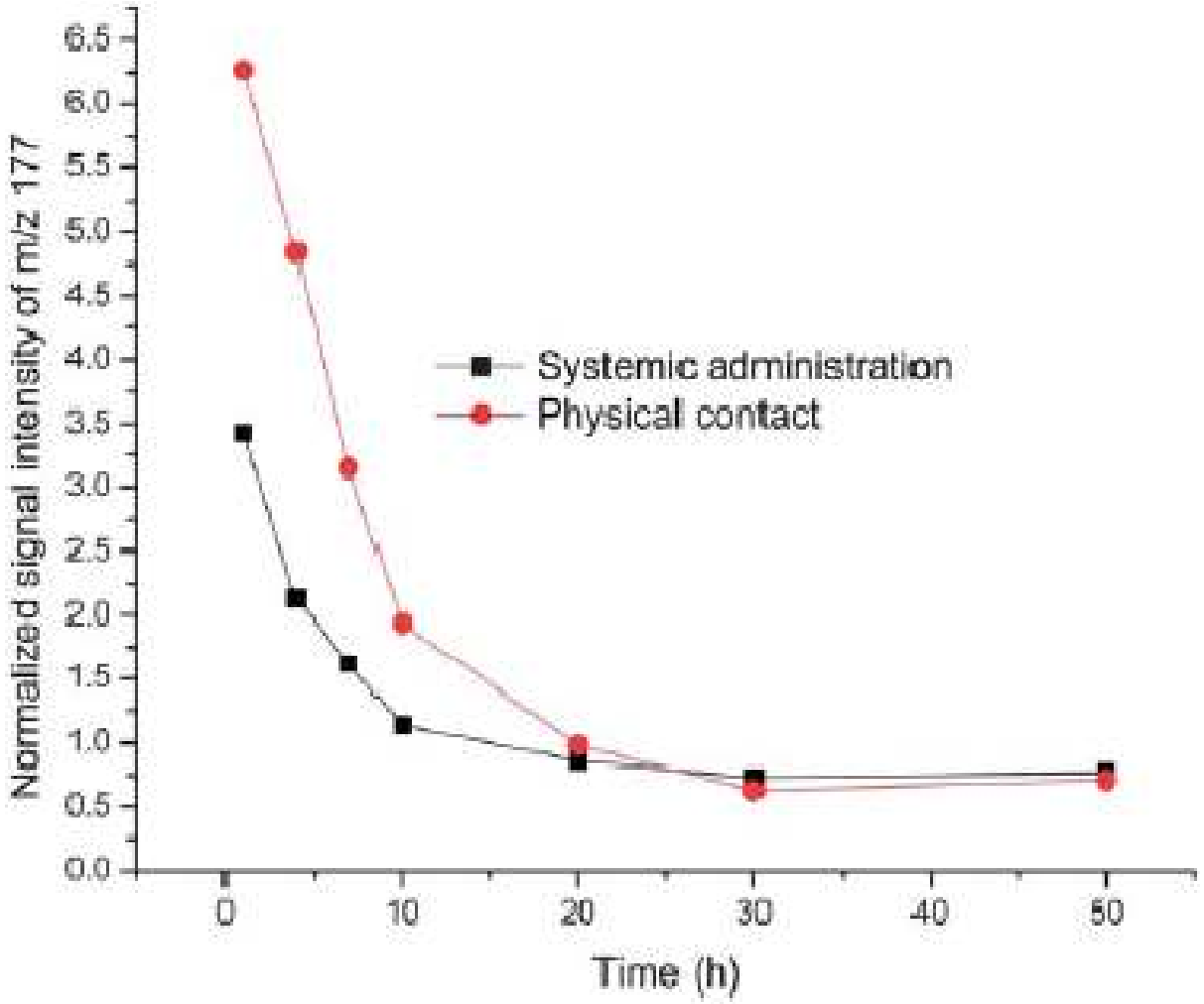
Background mass spectra from human skin

STUDY OF NICOTINE AND ITS METABOLITE COTININE FROM INTERNAL AND EXTERNAL ORIGIN

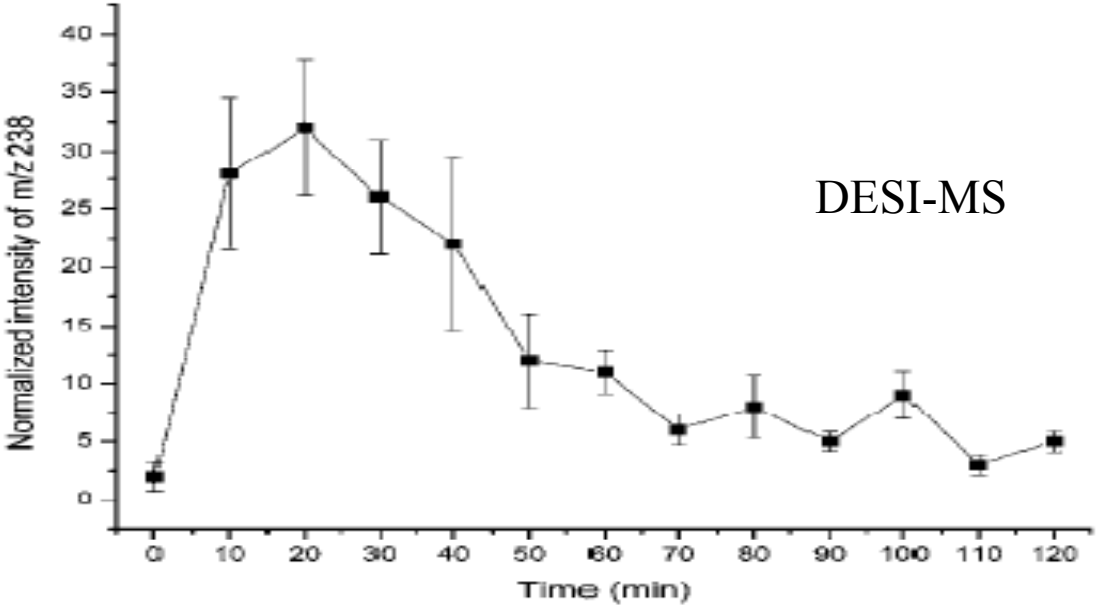


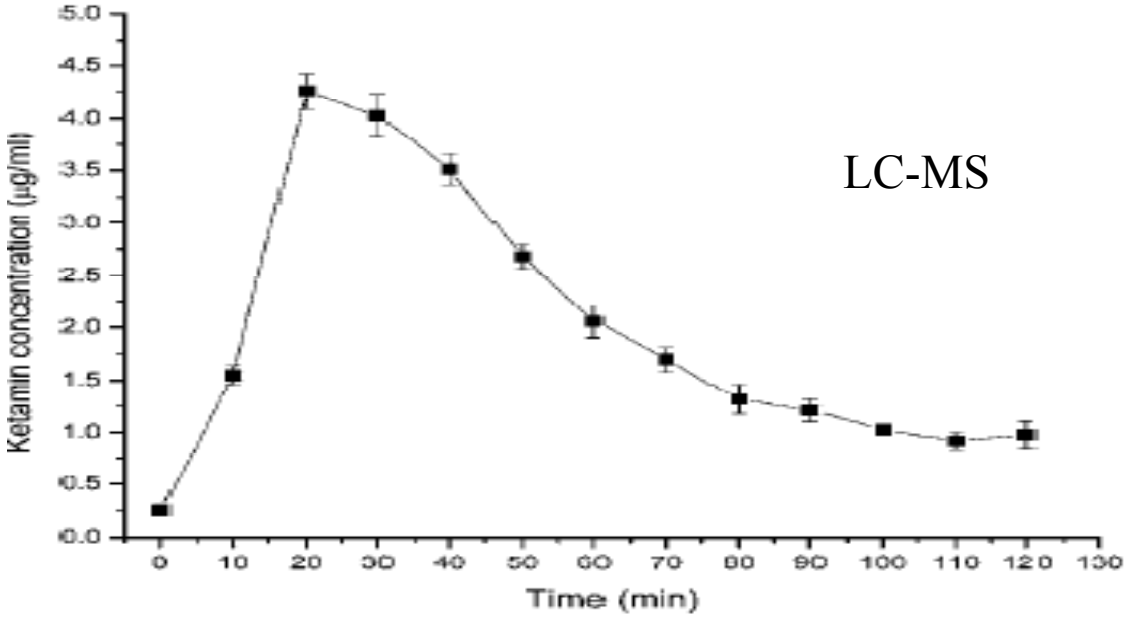


PHARMACOKINETIC STUDY USING ANESTHETIC PROPOFOL (2,6-DIISOPROPYLPHENOL)

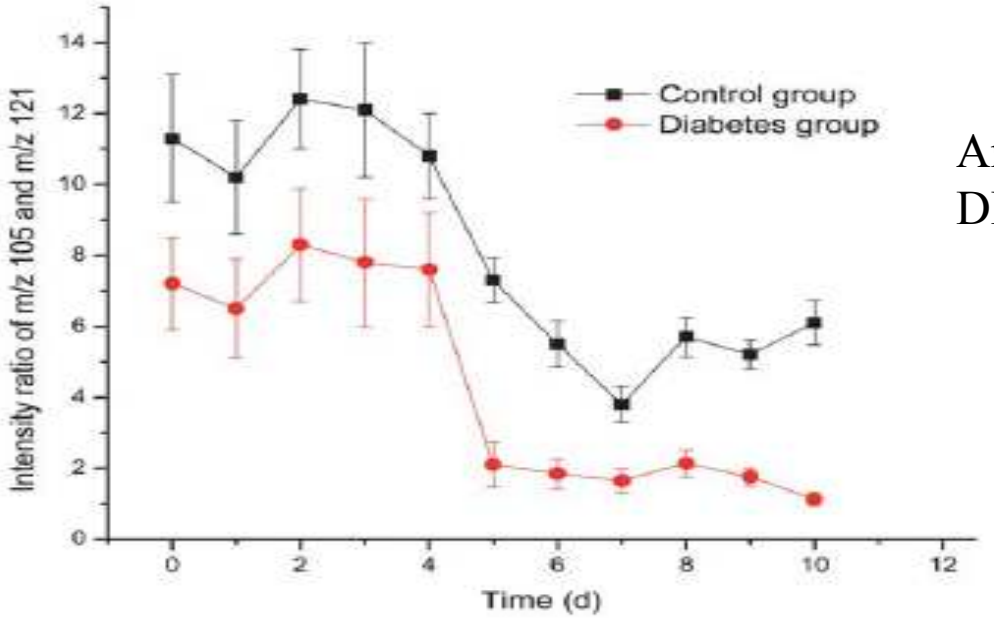


EXPERIMENTS WITH ANIMAL MODEL USING KETAMINE AND XYLAZINE

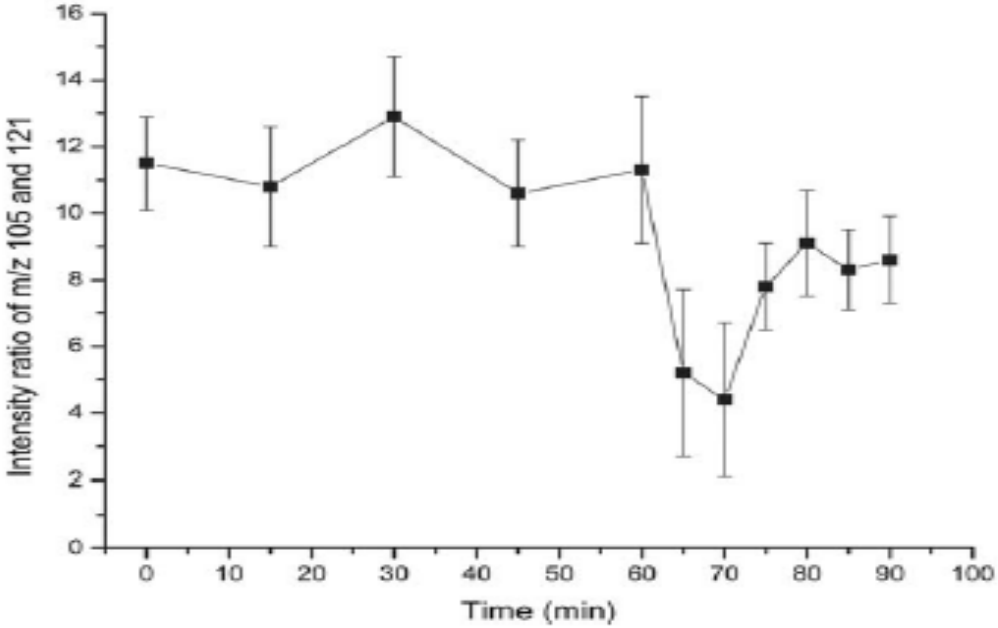




MONITORING OXIDATIVE STRESS USING DMTU SCAVENGER



Angiotensin II was administered
DMTU/DMTU-*S*-oxide ratio measured



Temporary Coronal ligation

CONCLUSION

In vivo intact skin DESI-MS analysis provides various real life applications, such as

Forensic (Drug of abuse can be monitored)

Medical diagnostic (Oxidative stress can be studied)

Pharmacology (Pharmacokinetics of drug molecules can be studied and compounds from internal and external origin can be detected)

FUTURE POSSIBILITY

Various drugs and their metabolites can be monitored from fingerprints also and may be the lipid concentration change associated with various diseases like cancer also be determined.

THANK YOU