LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

α	Alpha
B	Beta
δ	Delta (chemical shift in parts per million)
°C	Degrees Celsius
^{13}C NMR	Carbon-13 nuclear magnetic resonance spectroscopy
^{1}H NMR	Proton nuclear magnetic resonance spectroscopy
AcOH	Acetic acid
Aq.	Aqueous
Br	Broad
C	Concentration
Calcd	Calculated
*c*AMP	Cyclic adenosine monophosphate
$CDCl_3$	Deuterated chloroform
Cm	Centi-meter
CuI	Copper iodide
D	Doublet
DCM	1,2-dichloromethane
DMF	*N, N*-dimethylformamide
DMSO	Dimethylsulfoxide
DNA	Deoxyribonucleic acid
DSC	Differential scanning calorimeter
Equiv.	Equivalent
ESI	Electro-spray ionization
EtOH	Ethanol
$FeCl_3$	Iron (III) chloride
FeF_3	Iron (III) fluoride
FT-IR	Fourier Transform infrared spectroscopy

G	Gram
GABA	Gamma-aminobutyric acid
h / hr	Hour
H_2SO_4	Sulfuric acid
HCl	Hydrochloric acid
HCN	Hydrogen cyanide
HEK	Human embryonic kidney
Hz	Hertz
J	coupling constant in hertz
M	Molar
M	Multiplet
m/z	mass-to-charge ratio
MCR	Multi component reaction
MDS	Molecular design suite
MeOH	Methanol
Mg	Milligram
MHz	Megahertz
Min	Minute
mL	Milliliter
mmol.	Millimole
mol %	Molar percentage
Mp	Melting point
MW	Microwave
NAD	Nicotinamide adenine dinucleotide
NADP	Nicotinamide adenine dinucleotide phosphate
Na_2SO_4	Sodium sulphate
$NaHCO_3$	Soidumbicarbonate
NH_3	Ammonia
NH_4Cl	Ammonium chloride

NH_4OAc	Ammonium acetate
O	Ortho
PCl_5	phosphorus pentachloride
PDE	Phosphodiesterase
PEG-400	Polyethyleneglycol-400
PLP	Piecewise linear wise potential
$POCl_3$	Phosphoryl chloride
PMA	Phosphomolybidicacid
Ppm	Parts per million
p-TSA or *p*-TsOH	para toluene sulfonic acid
Py	Pyridine
Q	Quartet
RLU	Relative Light Units
RNA	Ribonucleic acid
Rt	Room temperature
S	Singlet
Sat.	Saturated
$SOCl_2$	Thionyl chloride
Sf	Spodoptera frugiperda
$SnCl_2.2H_2O$	Stannouschloride.dihydrate
T	Triplet
TEA	Triethylamine
TFA	Trifluoroacetic acid
THF	Tetrahydrofuran
TLC	Thin-layer chromatography
UV	Ultraviolet
Wt	Weight

METHODOLOGY AND INSTRUMENTATION

Unless stated otherwise, solvents and chemicals were obtained from commercial sources and were used without further purification.Thin layer chromatography (TLC) on silica gel plates (60 F254), visualizing with a 254 nm and 365 nm UV lamp.Column chromatography was performed on silica gel (60-120 mesh) using hexane and ethyl acetate of dichloromethane and methanol system.

The ^{1}H and ^{13}C NMR spectra were determined in $CDCl_3$/DMSO-$d_6$solution using Varian Gemini 2000 model 200MHz instrument and Oxford magnet Varian Mercury 400MHz instrument. The ^{1}H chemical shift values were reported on the δ scale in ppm, relative to TMS (δ = 0.00 ppm), while ^{13}C chemical shifts relative to $CDCl_3$ and DMSO-d_6 (δ = 39.5 ppm) as internal standards. Spin multiplicities are given as s (singlet), d (doublet), t (triplet), and m (multiplet) as well as b (broad). Coupling constants *(J)* are given in hertz (Hz).

Mass spectra were run on an Agilent 1100 series LC system coupled to a triple quadrupole mass spectrometer (Agilent LC/MS/MS model 6410, Agilent Technologies) with electrospray ionization (ESI) source. The high-resolution mass spectra (HRMS) were determined using Waters LCT Premier time-of-flight mass spectrometer (Milford, USA) with ESI source.

Infrared spectra (IR) spectra for all samples were recorded on Perkin Elmer 1650 FT IR spectrometer. All melting points were determined by using a Buchi Melting point B-540 apparatus in open capillary tubes.