

# Sciex API 3000 Versus Finnigan TSQ 7000: A Head to Head Comparison of Linearity

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## ABSTRACT

**Purpose:** To perform a head to head linearity comparison of the Finnigan TSQ 7000 and the Sciex API 3000 LC/MS/MS systems.

**Methods:** An LC/MS/MS assay based on solid phase extraction was developed for a proprietary new chemical entity and its metabolite in human plasma. Initially, the assay was validated on the Finnigan TSQ 7000. The assay linearity on the Finnigan was assessed by analyzing 6 replicates of each calibration standard over the validated range, as well as above and below these concentrations. To compare the linearity of the Sciex, the API 3000 was tuned for both analytes and 6 replicates of each calibration standard were run. Both data sets were evaluated by constructing sensitivity plots (response/concentration versus log concentration) and comparing the observed behavior to theoretical models. In addition, the mean percent biases using various regression fits were calculated. The background signal as a function of concentration injected was also examined.

**Results:** Both LC/MS/MS platforms performed well, and conditions were found that gave less than ~10% average bias on both instruments. Based on the sensitivity plots and their theoretical fits, the Sciex API 3000 is more linear over the validated concentration range. Furthermore, the Sciex showed smaller mean percent bias values than the Finnigan. The Sciex also had lower background signals after high concentrations of drug were injected.

## EXPERIMENTAL

<b>Matrix:</b>	100 $\mu$ L EDTA human plasma
<b>SPE:</b>	Empore Mixed Phase Cation - MPC, 7mm/3mL
<b>HPLC Column:</b>	Nova-Pak CN HP Radial Compression cartridge (5 x 100 mm, 4 $\mu$ m, Waters)
<b>Mobile Phase:</b>	50%/50% methanol/80 mM formic acid, pH 3
<b>Drug:</b>	312.8 (m/z) $\rightarrow$ 224.3 (m/z)
<b>Metabolite:</b>	284.7 (m/z) $\rightarrow$ 197.5 (m/z)
<b>Internal Standards:</b>	d <sub>3</sub> isotopes of drug and metabolite
<b>Validated Range:</b>	Drug = 1 to 250 ng/mL Metabolite = 10 to 10,000 ng/mL
<b>Regression Shown:</b>	1/X Linear

## Finnigan TSQ 7000

Parameter:	Value
Sheath gas:	70 psi
Auxiliary gas:	40 units
Capillary:	300°C
CID gas:	Argon
CID gas pressure:	~ 2.1 mT
Collision offset (drug):	-13.4 V
Collision offset (ISTD):	-13.4 V
Scan time:	300 msec
Electron Multiplier:	1250 V
Spray Voltage:	4.5 kV

## Sciex API 3000

NEB	12
CUR	11
IS	1800
TEM	400
CAD	4
DP	29
FP	210
EP	-7
CE	16
CXP	13

## Sensitivity Plots

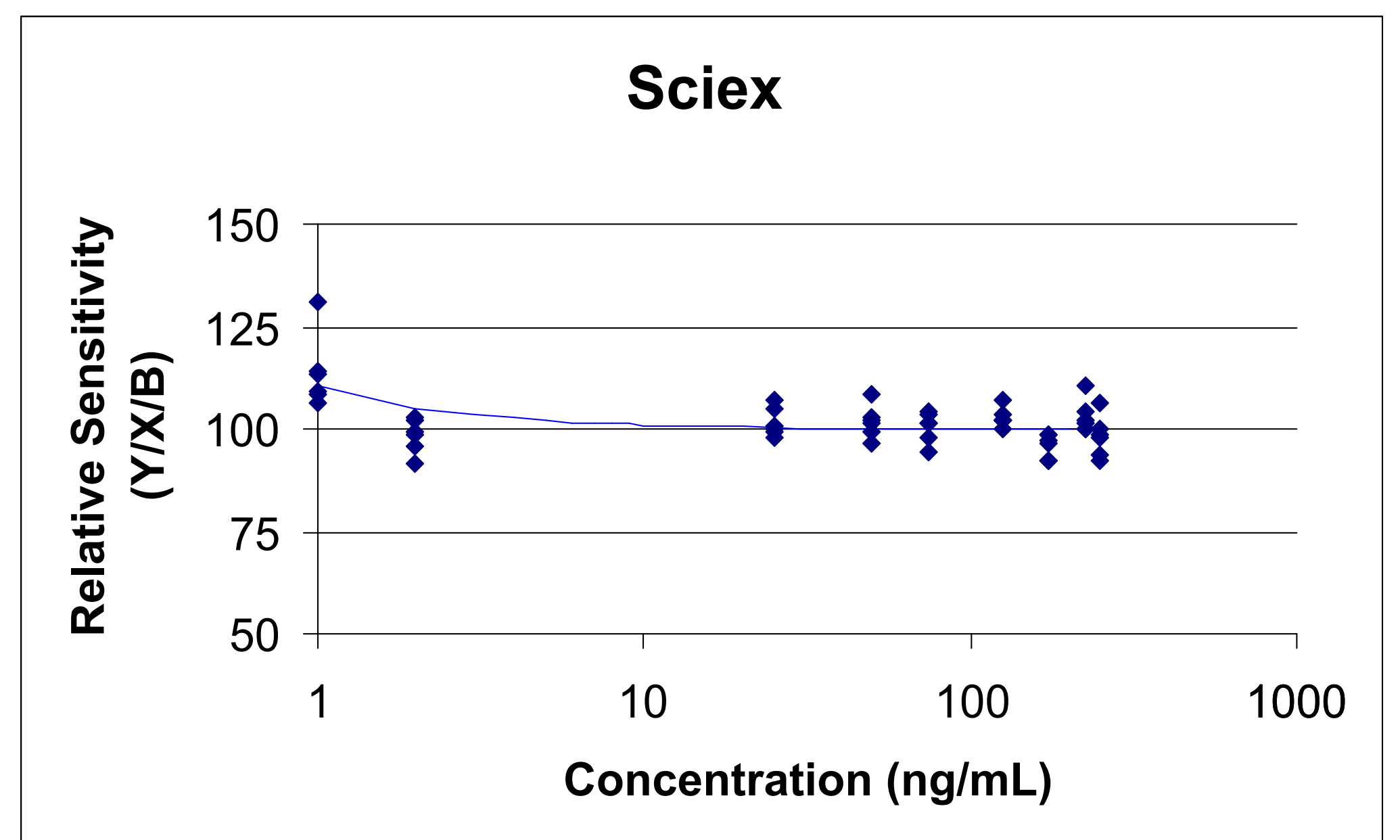
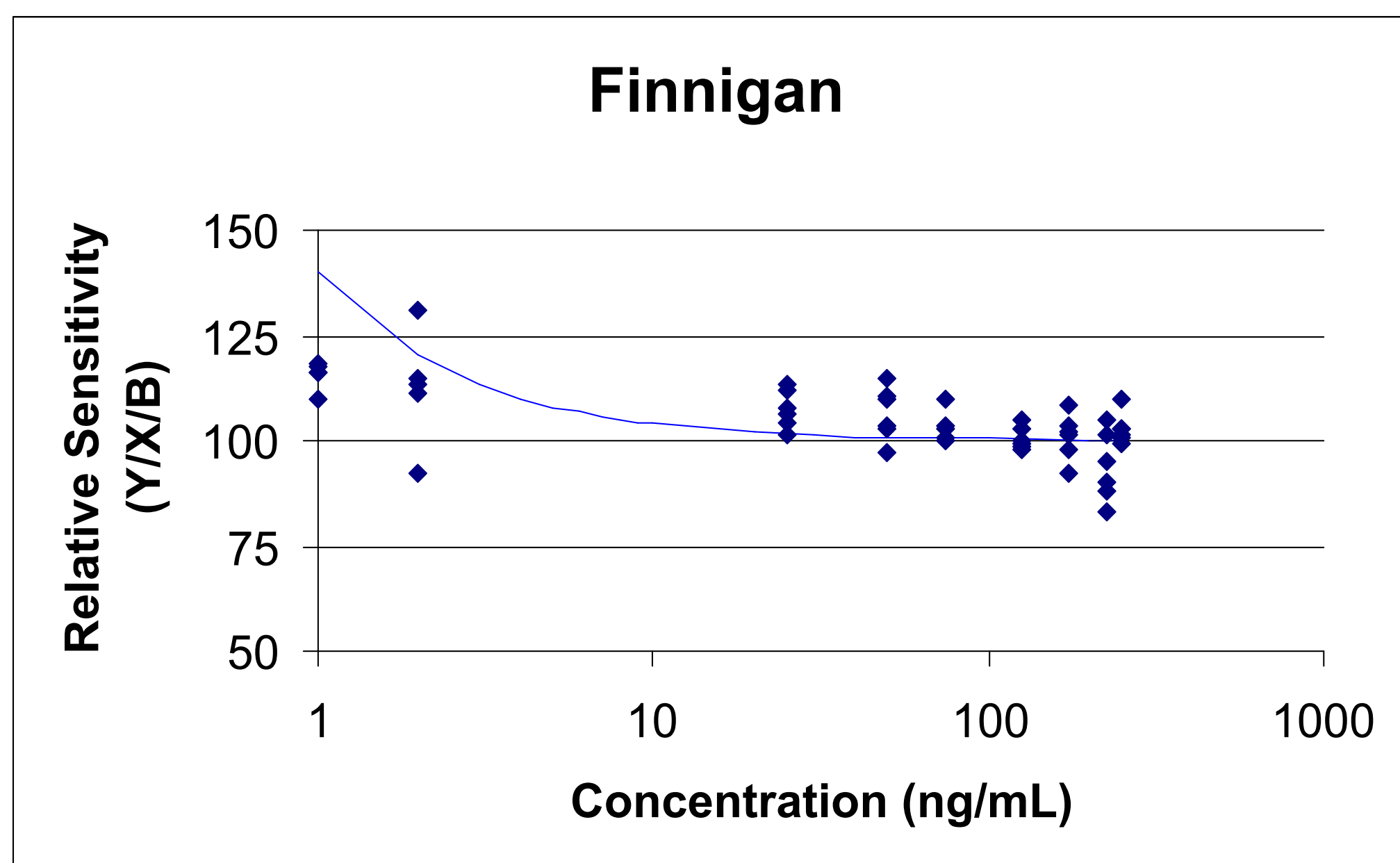
(y/x versus x)

linear  $y = ax + b$   
quadratic  $y = ax^2 + bx + c$

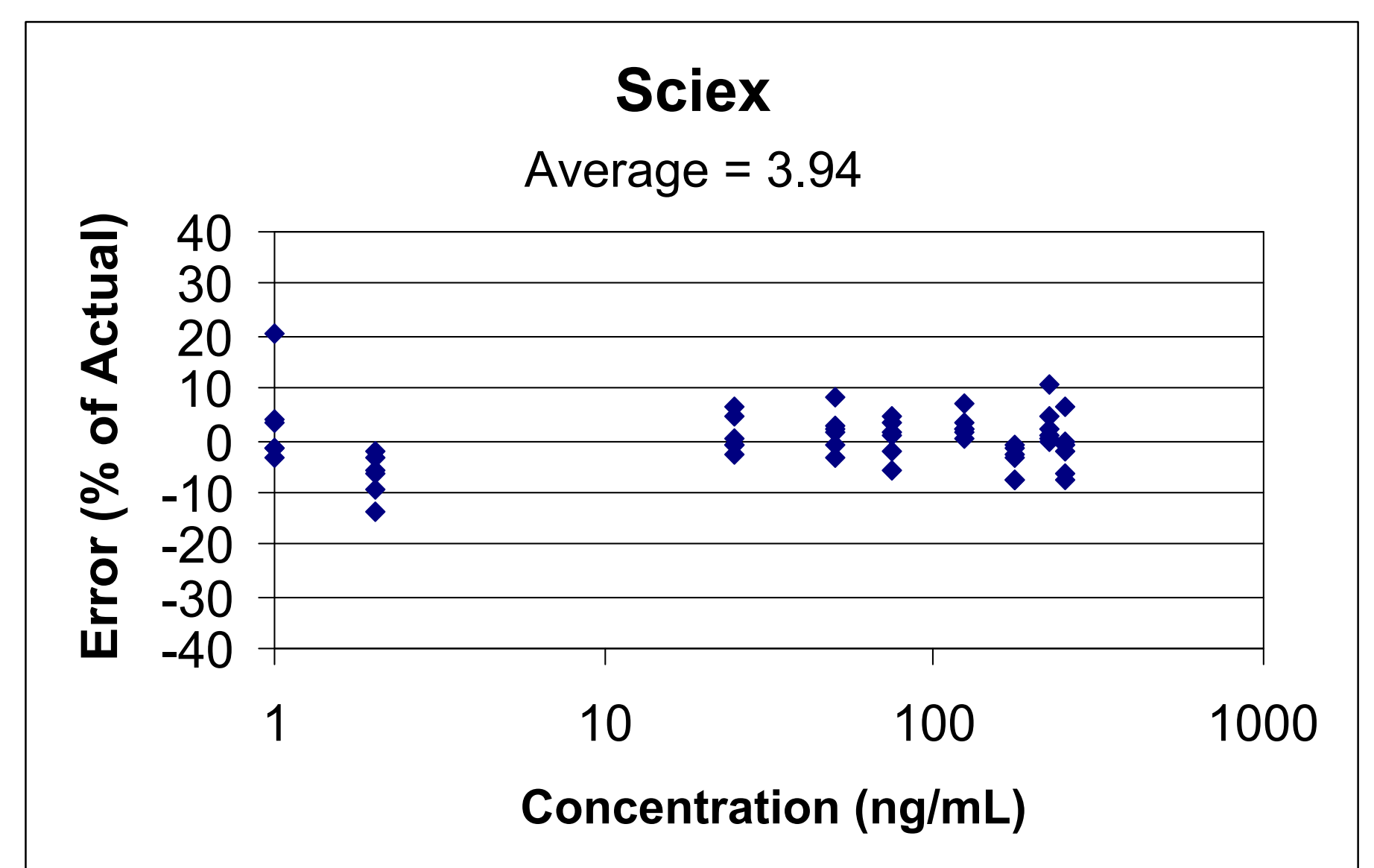
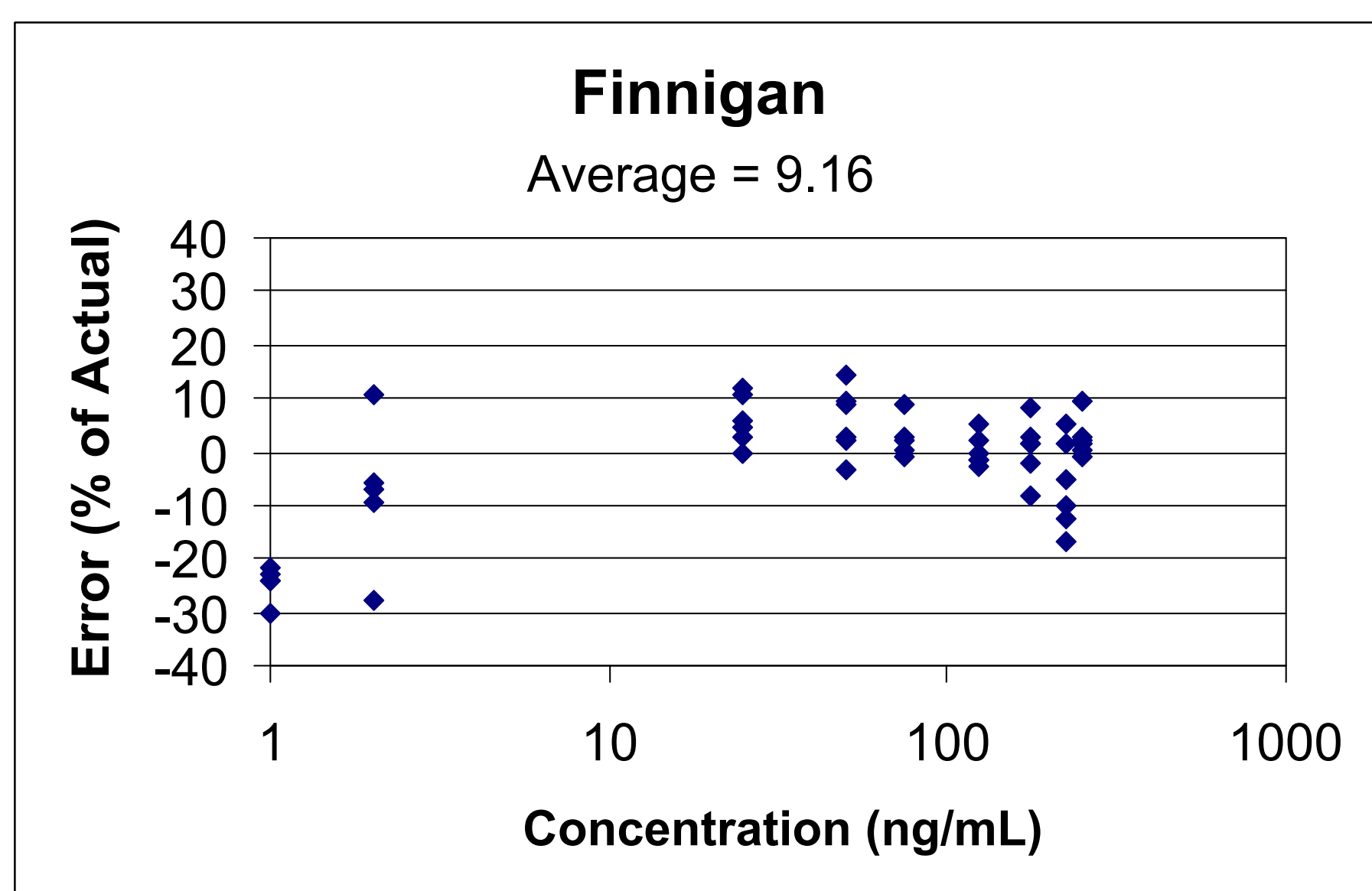
if no signal observed in absence of analyte,  
then intercept = 0 and

linear  $y/x = a$   
quadratic  $y/x = ax + b$

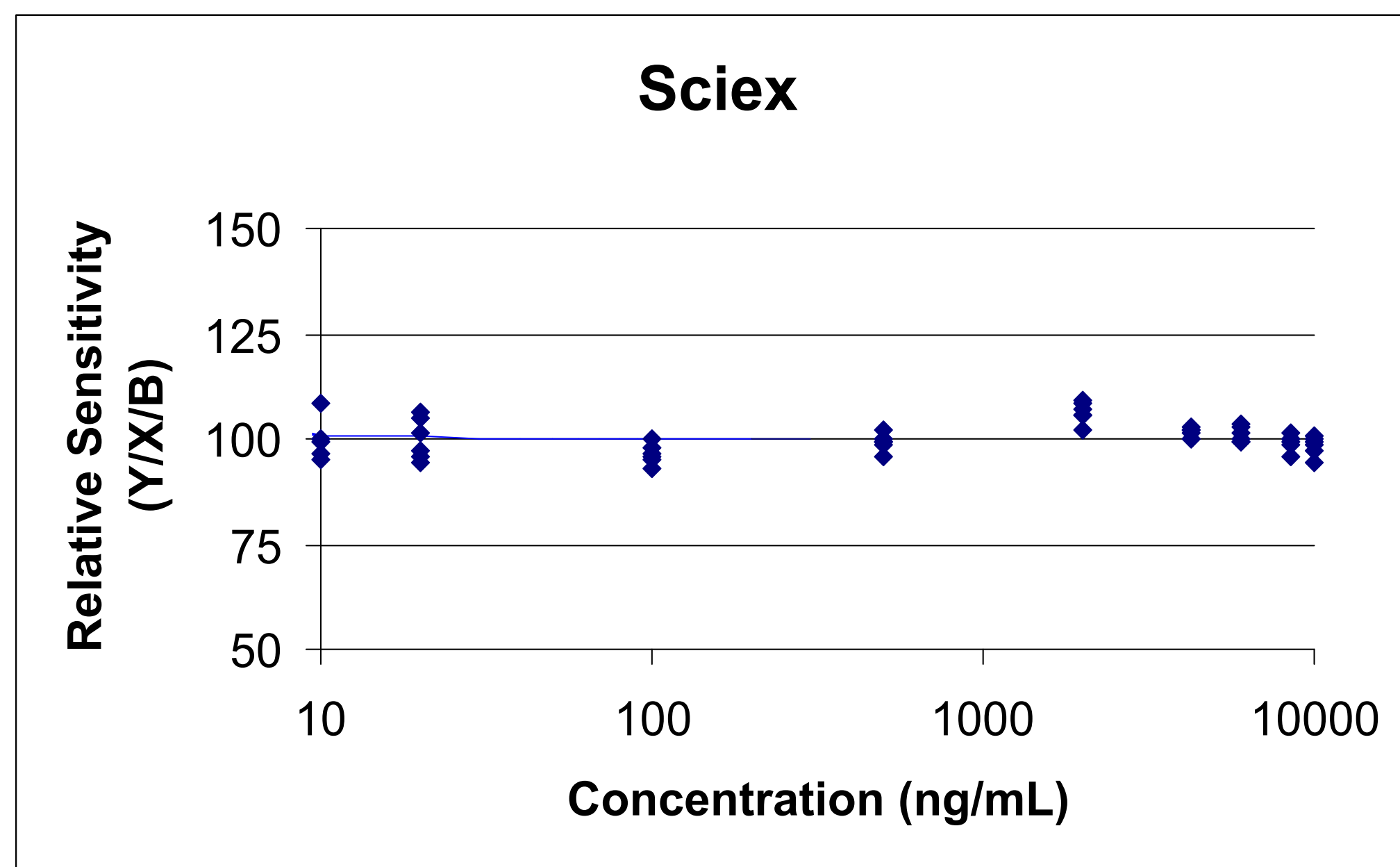
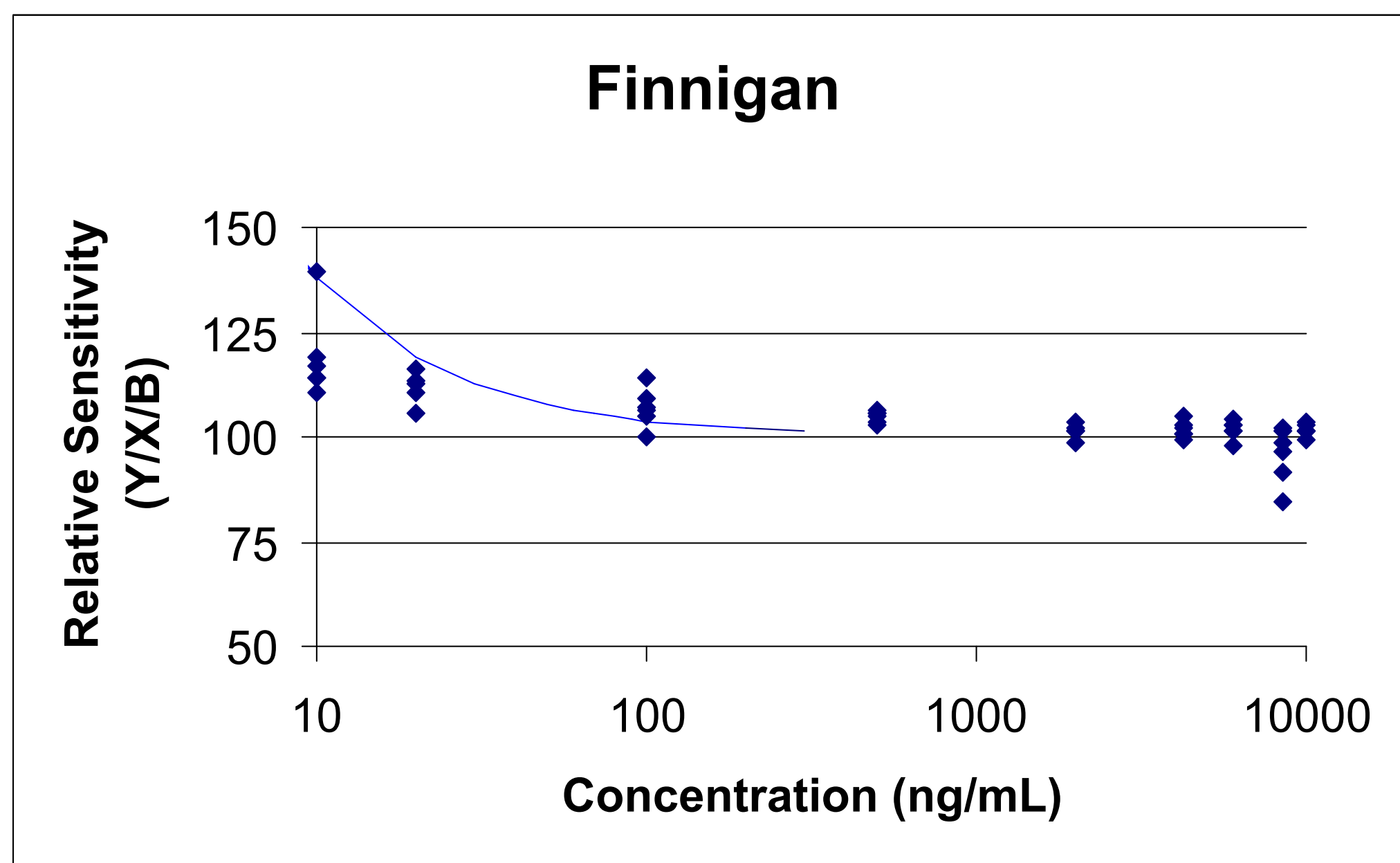
## Drug Sensitivity



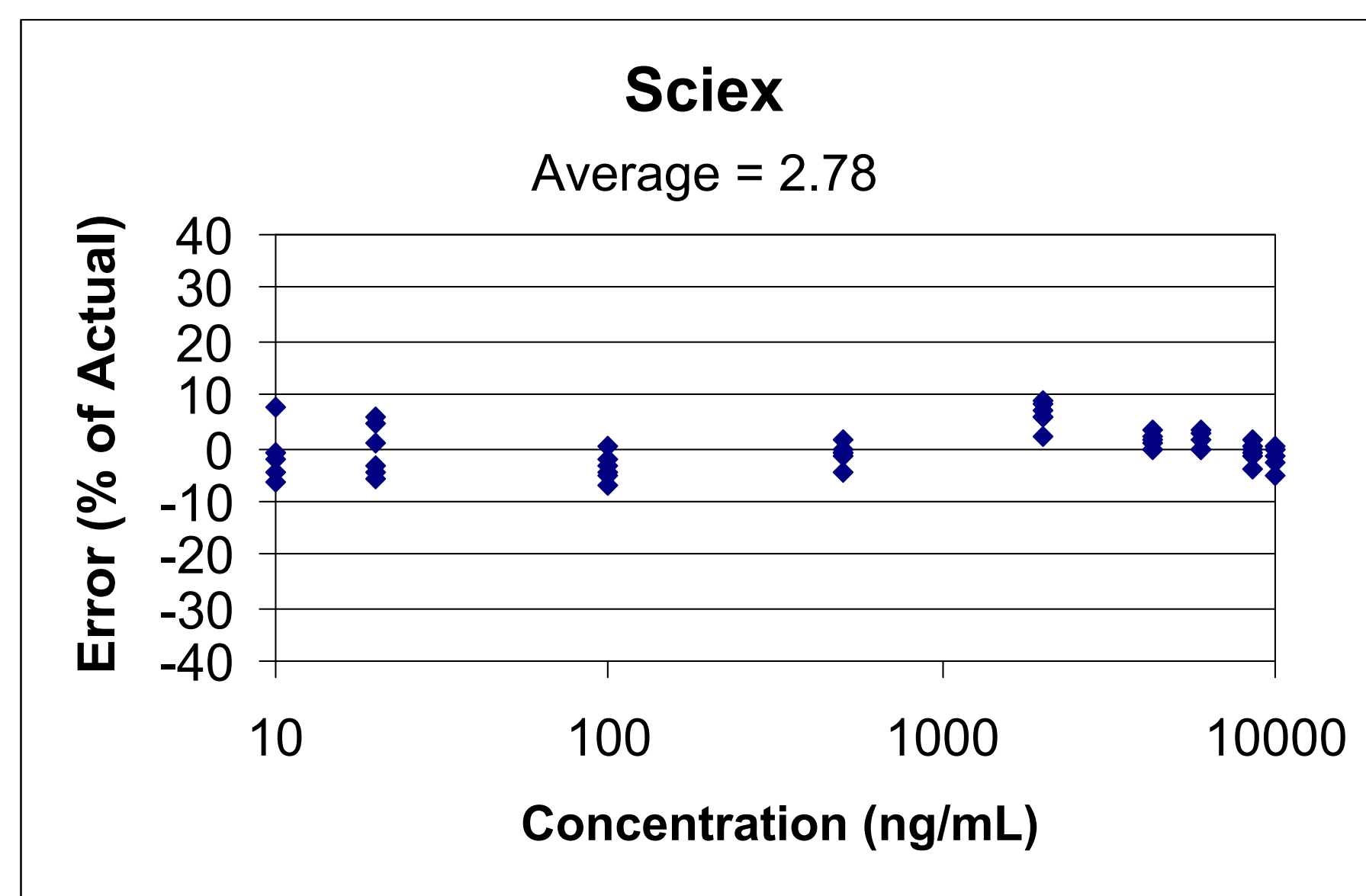
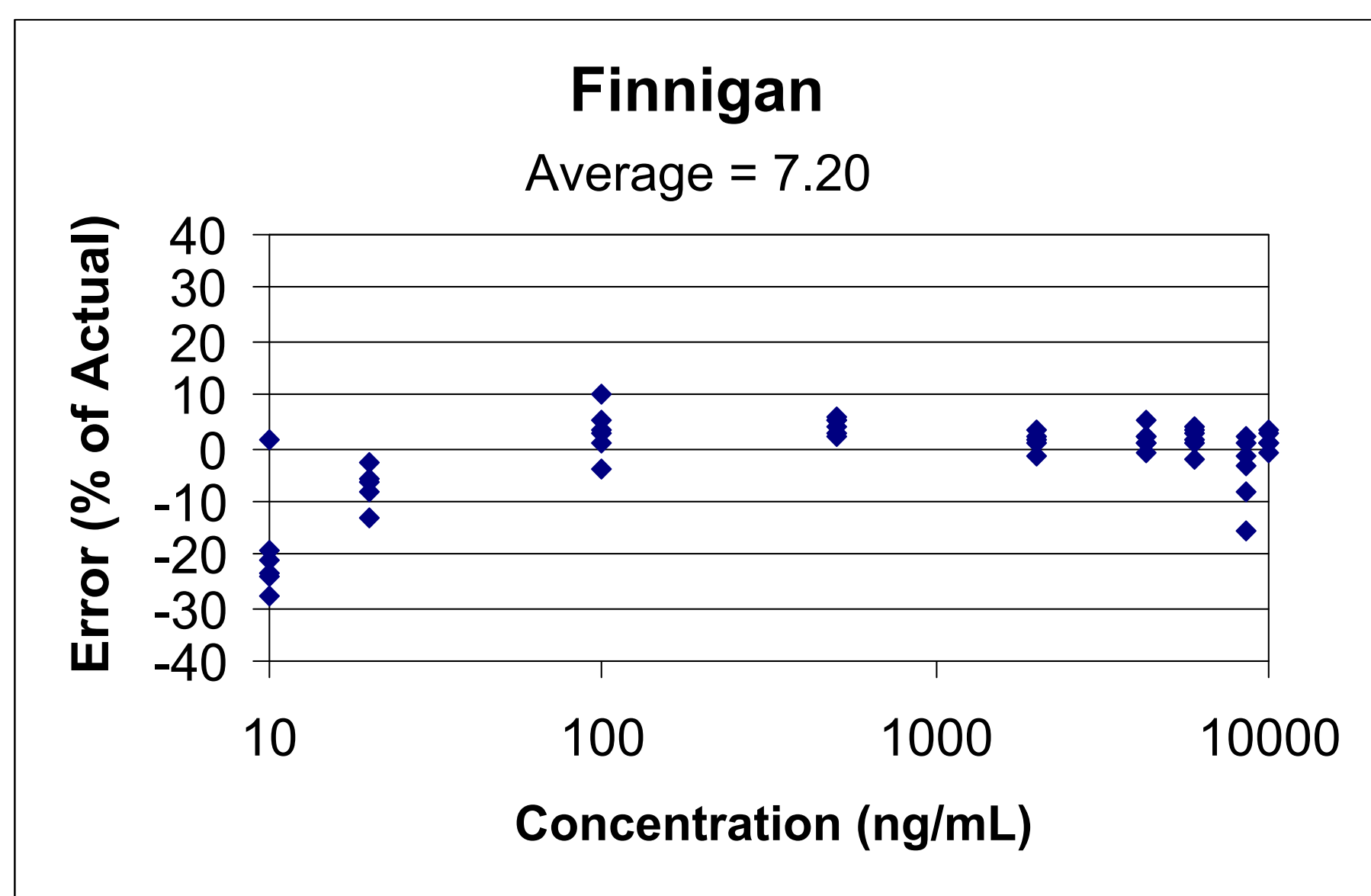
## Drug % Bias



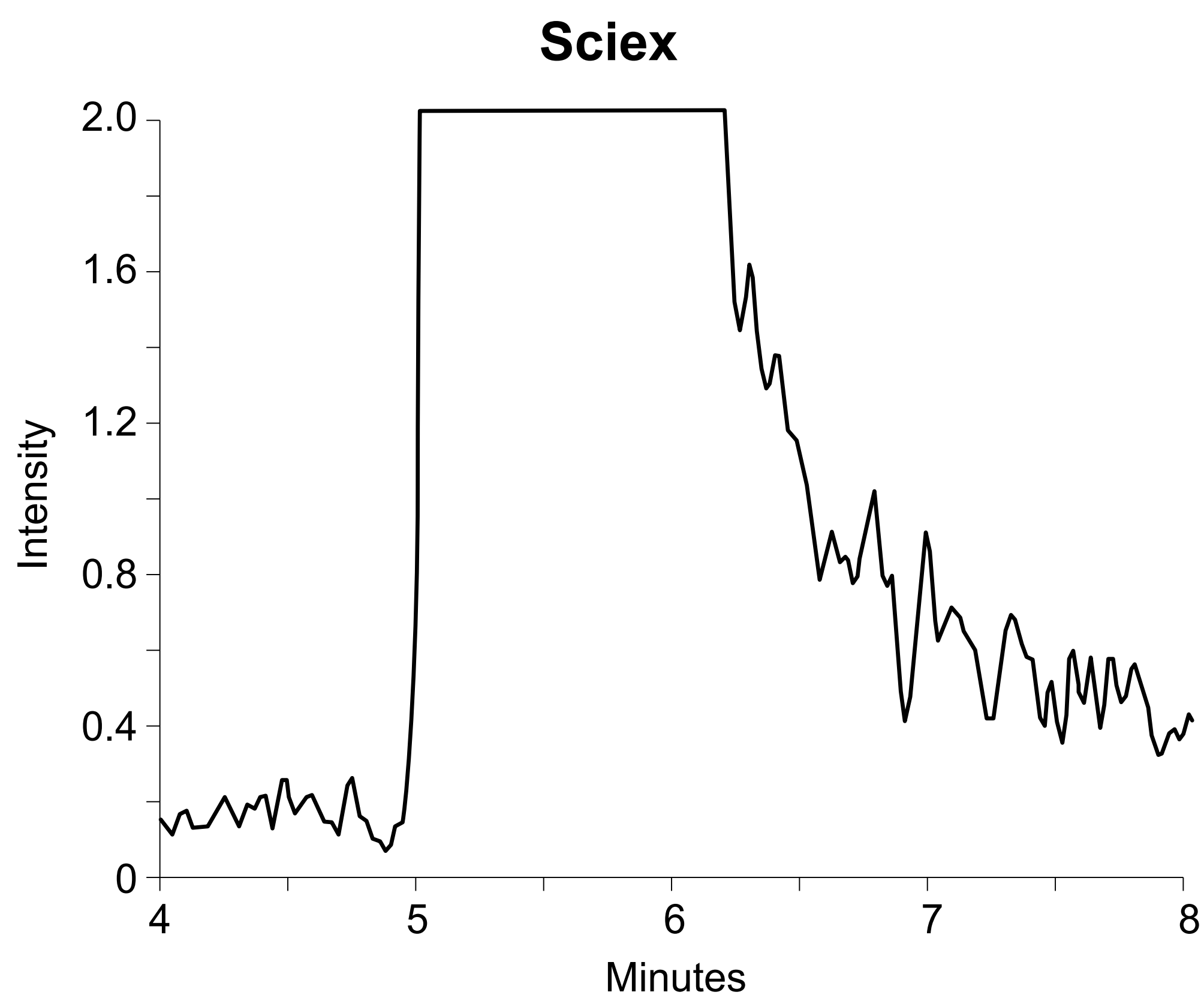
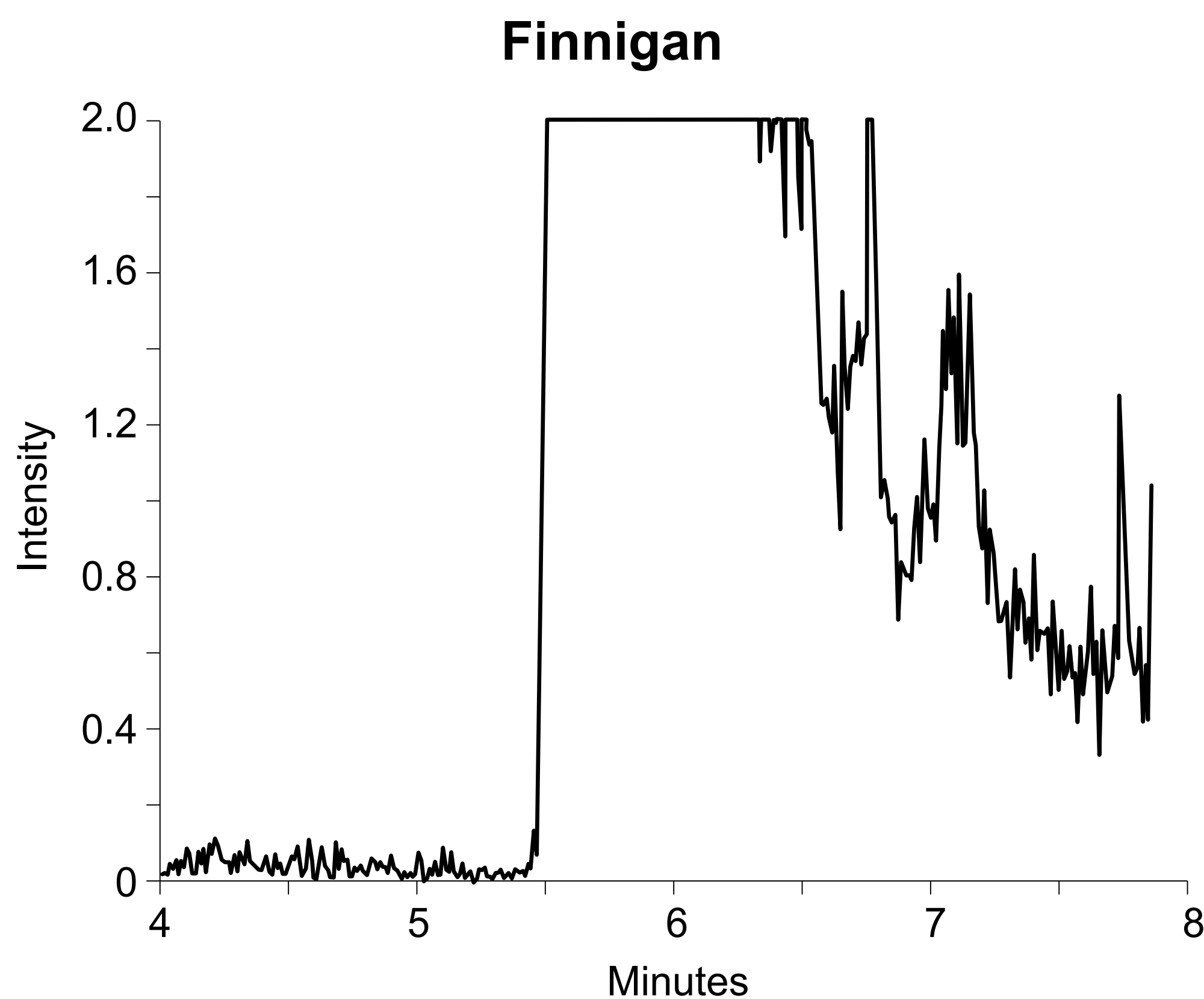
## Metabolite Sensitivity



## Metabolite % Bias



## Background Signal



## CONCLUSIONS

- Sciex API 3000 more linear over the validated concentration range than the Finnigan TSQ 7000.
- Sciex API 3000 showed slightly lower percent bias for the calibration standards.
- Sciex API 3000 had lower background signal for drug after injections.