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## **KALADRUG-R: Laboratory SOP#18**

**Simple method and tool for calculation IC50-values**

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# IC<sub>50</sub> Calculation: IC<sub>50</sub>: Inhibitory concentration at 50% inhibition

## 1) Basic method

A basic and simple method for calculation of the IC<sub>50</sub> is done by linear interpolation between the concentrations just above and just beneath 50% inhibition in the dose response curve (= two flanking points).

The formulas for the basic IC<sub>50</sub> calculations are incorporated into the IC<sub>50</sub>/IC<sub>90</sub> calculation module, which is an easy-to-use Excel template (see example). [The Excel file is freely available upon request.](#)

In this template, only the white-colored cells need to be filled-in: concentration and % inhibition just below and just above 50% inhibition; the IC<sub>50</sub> values are calculated automatically.

### Example:

Dose response curve: (1/4 dilution: 64μM → 0.25μM)

Screening concentration (μM)	64	16	4	1	0,25	IC50
% inhibition	100	100	95	56	32	0,70

Laboratory Tools		
IC50/IC90 calculation module		
Concentration	Signal(%)	Y
0,25	32	<50%
1	56	>50%
0,7071	50%	IC50
1	56	<90%
4	95	>90%
3,3487	90%	IC90

Formula =  $EXP(LN(conc >50\%)-((signal >50\% -50)/(signal >50\% - signal <50\%)*LN(conc >50\% / conc <50\%)))$

## Special cases

<u>Screening concentration</u> ( $\mu\text{M}$ )	<b>64</b>	<b>16</b>	<b>4</b>	<b>1</b>	<b>0,25</b>		<b>IC50</b>
<u>% inhibition</u>							
	100	100	50	0	0		<b>4.0</b>

<u>Screening concentration</u> ( $\mu\text{M}$ )	<b>64</b>	<b>16</b>	<b>4</b>	<b>1</b>	<b>0,25</b>		<b>IC50</b>
<u>% inhibition</u>							
	0	0	0	0	0		<b>&gt;64</b>

<u>Screening concentration</u> ( $\mu\text{M}$ )	<b>64</b>	<b>16</b>	<b>4</b>	<b>1</b>	<b>0,25</b>		<b>IC50</b>
<u>% inhibition</u>							
	75	58	32	<b>58 !!!</b>	0		<b>8.0</b>

Typical problem encountered with poorly soluble compounds: flat and abnormal dose-response curve. It is difficult to know whether the inhibition at 4  $\mu\text{M}$  (32%) or at 1  $\mu\text{M}$  (58%) is the correct one. In this particular case, 58% inhibition at 1  $\mu\text{M}$  is considered less probable and is therefore excluded from the calculation.

### 2) Extended method

Several computer packages are available for calculation of  $\text{IC}_{50}$ -values (Graph pad, Statview, etc...). Care must be taken and the data points that are used for calculation must be defined.

**Remark:** single precision digits are acceptable for  $\text{IC}_{50}$ -values