**Size of the Lactase from *Kluyveromyces lactis*: 124 kDa**

## Calculation example for activity:

Slope from the machine:

(imaginary value, careful with the unit – the machine gives it in **AU/min** not AU/s)

$$\frac{dAbs}{dt} = 0.123\ \frac{AU}{\boldsymbol{min}}$$

Concentration (Lamber-Beer-Equation)

$$\frac{dC}{dt} = \frac{\frac{dAbs}{dt}}{\varepsilon * l} = \frac{0.123\ min^{-1}}{3296\ M^{-1}\ cm^{-1} * 1\ cm} = 3.73\ * 10^{-5}\ \frac{mol}{l * min}$$

**Initial velocity**

$$v_0 = \frac{dC}{dt} * volume = \ 3.73\ * 10^{-5}\ \frac{mol}{l * min} * 0.001\ l = \ \ 3.73\ * 10^{-8}\ \frac{mol}{min}$$
$$= 37.3 \frac{nmol}{min}\ bzw\ 0.621\ \frac{nmol}{s}$$

(Without the dilution factor)

# Calculation of kcat

$$k_{cat} = \frac{V_{max}}{[E_0]}$$

Let's assume for example

$$V_{max} = 1.23\ \frac{dC}{dt} = 1.23\ \frac{mol}{l * min}$$

And

$$[E_0] = 10\ \frac{mg}{ml}$$

Then we first have to calculate $E_0$ in mol/l

$$MW(lactase) = 124\ 000\ Da\ =\ 124\ 000\ \frac{g}{mol}$$

$$[E_0] = \frac{10\ \frac{mg}{ml}}{124\,000\ \frac{g}{mol}} = 8.065 * 10^{-5}\ \frac{mol}{l} = 80.65\ \mu M$$

Let's come back to $k_{cat}$

$$k_{cat} = \frac{V_{max}}{[E_0]} = \frac{1.23\ \frac{mol}{l * min}}{80.65\ * 10^{-6}\ \frac{mol}{l}} = 15252\ min^{-1} = 254\ s^{-1}$$