

Supplementary material to

## Simultaneous quantification of drug and cofomer during cocrystal dissolution using *in situ* UV spectroscopy and multicomponent analysis

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Multicomponent regression analysis in AuPRO 6.0 and later

Multicomponent regression analysis operates on the assumption that a mixture composed of N components has the total absorption of the mixture at a particular wavelength being the sum of all the absorbance contributions of each component. This assumption holds if the UV signal is not saturated and there is no interaction between the components that influence the absorbance.

This assumption can be represented using Equation (S1):

$$A_{\text{Total}}(\lambda) = \sum_{i=1}^N A_i(\lambda) \quad (\text{S1})$$

where  $A_i(\lambda)$  is the absorbance of one component of the mixture at a specific wavelength and  $A_{\text{Total}}(\lambda)$  is the sum of the absorbance of all components of the mixture at a specific wavelength. The equation can also be written such that the absorbance of one component at a specific wavelength is expressed as the measured absorbance of a standard solution of the component, multiplied by a coefficient, to give Equation (S2).

$$A_i(\lambda) = x_i A_{\text{st},i}(\lambda) \quad (\text{S2})$$

where  $A_{\text{st},i}$  is the measured absorbance of a standard of known concentration of one component.  $x_i$  is a coefficient.

Equation (S2) can then be substituted into Equation (S1) to give Equation (S3):

$$A_{\text{Total}}(\lambda) = \sum_{i=1}^N x_i A_{\text{st},i}(\lambda) \quad (\text{S3})$$

This results in a system of N equations and thus N coefficients, which is resolved iteratively to obtain values of  $x_i$  for each component, until

$$A_{\text{Total}}(\lambda) - \sum_{i=1}^N x_i A_{\text{st},i}(\lambda) = 0,$$

or as close to zero as possible for each wavelength, and then across the whole wavelength range in use as per Equation (S4).

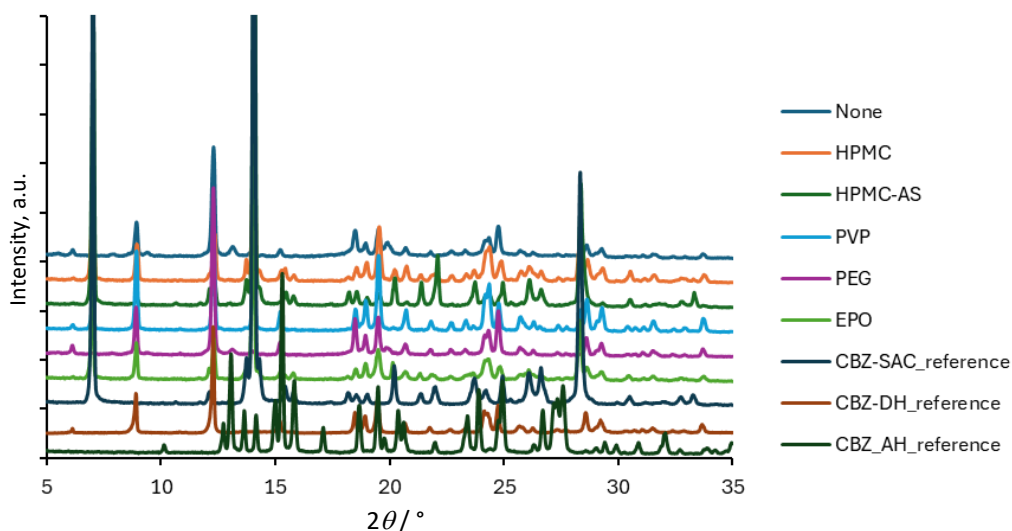
$$\chi^2 = \sum_{\lambda_1}^{\lambda_2} \left[ A_{\text{Measured}}(\lambda) - \sum_{i=1}^N x_i A_{\text{st},i}(\lambda) \right]^2 \quad (\text{S4})$$

When the values of  $x_i$  are found for each component, the calculation of the concentration of each component can be done using Equation (S5):

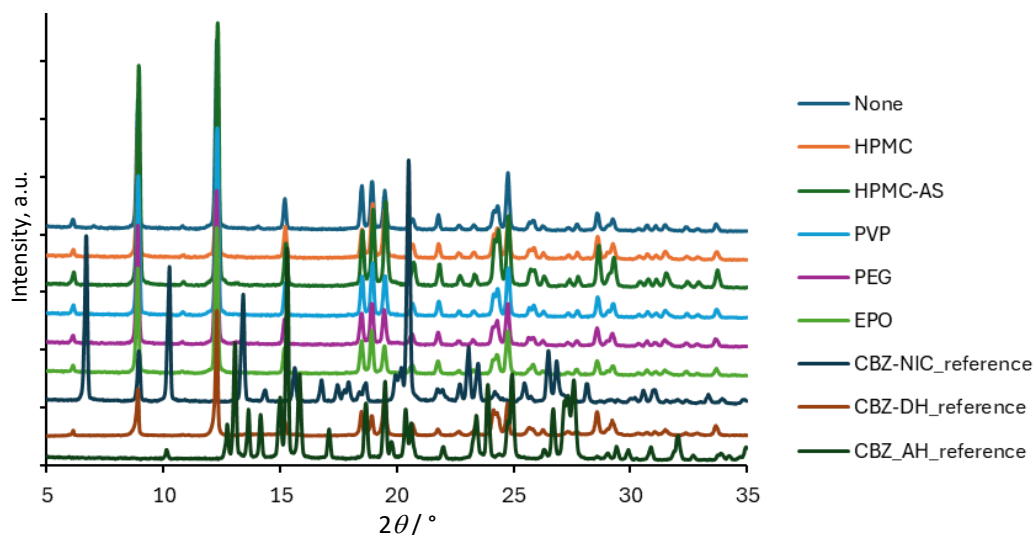
$$C_i = X_i C_{st} \quad (S5)$$

where  $C_{st}$  is the real concentration of the standard solution whose measured absorbance value was used to determine  $x_i$  using Equation (S3).

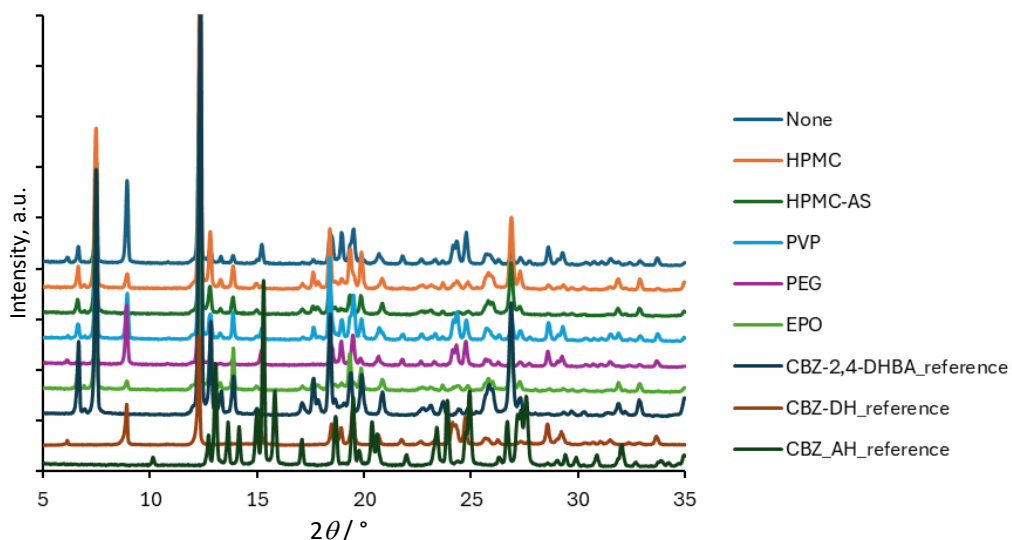
*Powder X-ray diffraction data without horizontal offset*



**Figure S1.** PXRD data of residual solid after 60 min in the dissolution test of CBZ-SAC



**Figure S2.** PXRD data of residual solid after 60 min in the dissolution test of CBZ-NIC



**Figure S3.** PXRD data of residual solid after 60 min in the dissolution test of CBZ-DHBA