

## **Supplementary Materials**

### **Integrated Purification and Formulation of an Active Pharmaceutical Ingredient *via* Agitated Bed Crystallization and Fluidized Bed Processing**

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### **DLE Final Equations for Combinations of Categorical Factors**

Binder: PVP

Solvent: Ethanol

$$\begin{aligned} \text{DLE} = & 111.52 - (0.98 \cdot \text{Inlet Temperature}) - (1.61 \cdot \text{Binder Mass}) \\ & - (1.14 \cdot \text{Solvent Volume}) \\ & + (0.02 \cdot \text{Inlet Temperature} \cdot \text{Solvent Volume}) \\ & + (0.12 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

Binder: PVP

Solvent: Methanol

$$\begin{aligned} \text{DLE} = & 202.32 - (2.06 \cdot \text{Inlet Temperature}) - (9.58 \cdot \text{Binder Mass}) \\ & - (1.14 \cdot \text{Solvent Volume}) \\ & + (0.02 \cdot \text{Inlet Temperature} \cdot \text{Solvent Volume}) \\ & + (0.12 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

Binder: HPMC

Solvent: Ethanol

$$\begin{aligned} \text{DLE} = & 98.477 - (0.98 \cdot \text{Inlet Temperature}) - (1.61 \cdot \text{Binder Mass}) \\ & - (0.85 \cdot \text{Solvent Volume}) \\ & + (0.02 \cdot \text{Inlet Temperature} \cdot \text{Solvent Volume}) \\ & + (0.12 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

Binder: HPMC

Solvent: Methanol

$$\begin{aligned} \text{DLE} = & 171.43 - (2.06 \cdot \text{Inlet Temperature}) - (9.58 \cdot \text{Binder Mass}) \\ & - (0.85 \cdot \text{Solvent Volume}) \\ & + (0.02 \cdot \text{Inlet Temperature} \cdot \text{Solvent Volume}) \\ & + (0.12 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

## DoC final equations for combinations of categoric factors

Binder: PVP

Solvent: Ethanol

$$\begin{aligned} \text{DLE} = & 298.63 - (2.83 \cdot \text{Inlet Temperature}) - (38.72 \cdot \text{Binder Mass}) \\ & - (0.42 \cdot \text{Solvent Volume}) + (0.18 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

Binder: PVP

Solvent: Methanol

$$\begin{aligned} \text{DLE} = & 35.55 - (1.04 \cdot \text{Inlet Temperature}) - (23.05 \cdot \text{Binder Mass}) \\ & - (0.42 \cdot \text{Solvent Volume}) + (0.18 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

Binder: HPMC

Solvent: Ethanol

$$\begin{aligned} \text{DLE} = & 270.88 - (2.83 \cdot \text{Inlet Temperature}) - (22.86 \cdot \text{Binder Mass}) \\ & - (0.82 \cdot \text{Solvent Volume}) + (0.18 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$

Binder: HPMC

Solvent: Methanol

$$\begin{aligned} \text{DLE} = & 27.93 + (1.04 \cdot \text{Inlet Temperature}) - (7.19 \cdot \text{Binder Mass}) \\ & - (0.82 \cdot \text{Solvent Volume}) + (0.18 \cdot \text{Binder Mass} \cdot \text{Solvent Volume}) \end{aligned}$$