

Table 1: The chosen independent variables and their intervals

| Label | Independent variables | -1 | +1 |
|-------|---|------|------|
| X_1 | w amount of water [§] [-] | 0.75 | 1.25 |
| X_2 | $acid$ concentration of acid [mol/l] | 0 | 0.66 |
| X_3 | ω_A intensity of stirring A [rpm] | 715 | 2160 |
| X_4 | $t_{mix A}$ time of stirring A [§] [min] | -1 | +1 |
| X_5 | $t_{sed A}$ time of sedimentation A [min] | 5 | 20 |
| X_6 | ω_B intensity of stirring B [rpm] | 715 | 2160 |
| X_7 | $t_{mix B}$ time of stirring B [min] | 2 | 10 |

$t_{mix A}$ is time of first stirring and $t_{mix B}$ is time of second stirring

[§] Amount of water: Lower limit (0.75) means 75 % and upper limit (1.25) means 125 % of optimal amount of water needed for the maximum transmission of RRM at 570 nm (see 3.3).

[§] Time of stirring after addition of water. Lower limit (-1) means that the mixture is stirred until constant value of absorbance. Upper limit (+1) means that the mixture is stirred twice as long.

Table 2: Plackett-Burman: Detailed experimental plan for independent variables

| number of experiment | w [-] | $acid$ [mol/l] | ω_A [rpm] | $t_{mix A}$ [min] | $t_{sed A}$ [min] | ω_B [rpm] | $t_{sed B}$ [min] |
|----------------------|------------|-------------------|---------------------|----------------------|----------------------|---------------------|----------------------|
| 1 | 1.25 | 0.66 | 2160 | +1 | 5 | 715 | 2 |
| 2 | 1.25 | 0.66 | 715 | -1 | 20 | 2160 | 2 |
| 3 | 0.75 | 0.66 | 715 | +1 | 5 | 2160 | 10 |
| 4 | 0.75 | 0 | 2160 | +1 | 20 | 2160 | 2 |
| 5 | 1.25 | 0 | 715 | +1 | 20 | 715 | 10 |
| 6 | 0.75 | 0.66 | 2160 | -1 | 20 | 715 | 10 |
| 7 | 1.25 | 0 | 2160 | -1 | 5 | 2160 | 10 |
| 8 | 0.75 | 0 | 715 | -1 | 5 | 715 | 2 |

Table 3: Verification of the model: chosen and calculated variables

| | | | | | | | | |
|-------------------------|-----|-------------------|----------------------|----------------------|---------------------|-----------------|-----------------|------------------|
| chosen variables | Oil | $acid$ [mol/l] | $t_{mix A}$ [min] | $t_{sed A}$ [min] | ω_B [rpm] | Y_1 [g/g] | Y_5 [mg/g] | Y_6 [mg/kg] |
| | RO | 0.66 | +1 | 5 | 715 | 0.198 | 0.48 | 150 |
| | SO | 0 | -1 | 5 | 2160 | 0.195 | 0.27 | 191 |
| calculated variables | Oil | w [-] | ω_A [rpm] | $t_{mix B}$ [min] | Y_2 [wt-%] | Y_3 [wt-%] | Y_4 [g/g] | Y_7 [wt-%] |
| | RO | 0.26 | 2020 | 9.11 | 0 | 19.67 | 0.802 | 0.215 |
| | SO | 0.75 | 1830 | 9.1 | 1.4 | 17.17 | 0.805 | 0.286 |

Table 4: Verification of the model: comparison of prediction and experimental values
 (experimental value is 100 %)

| value | | Y_1 [g/g] | Y_2 [wt-%] | Y_3 [wt-%] | Y_4 [g/g] | Y_5 [mg/g] | Y_6 [wt-%] | Y_7 [mg/kg] |
|-------|-----------|----------------|-----------------|-----------------|----------------|-----------------|-----------------|------------------|
| RO | pred. | 0.198 | 0.00 | 19.67 | 0.802 | 0.48 | 150 | 0.215 |
| | exper. | 0.191 | 0.00 | 20.19 | 0.809 | 0.58 | 134 | 0.227 |
| | corr. [%] | 103.7 | 100.0 | 97.4 | 99.1 | 82.3 | 111.6 | 94.6 |
| SO | pred. | 0.195 | 1.40 | 17.17 | 0.805 | 0.27 | 191 | 0.286 |
| | exper. | 0.210 | 1.10 | 17.08 | 0.790 | 0.33 | 177 | 0.267 |
| | corr. [%] | 107.6 | 78.1 | 99.5 | 98.2 | 122.2 | 92.6 | 93.3 |