CLAIM(S):

1. A method for determining the optimum operating binding capacity for a multiple column chromatograph y (MCC) process, the method using a single column, wherein the MCC process includes N number of columns, the method comprising:

(a) loading a target product on a first column at a first residence time and/or at a first flow rate;

(b) loading the target product on the first column at a second residence time and/or at a second flow rate, wherein the first residence time and/or first flow rate is different than the second residence time and/or the second flow rate;

(c) generating a first breakthrough curve for the first residence time and/or first flow rate and a second breakthrough curve for the second residence time and/or the second flow rate, wherein the first breakthrough curve represents target product breakthrough for the first column and the second breakthrough curve represents target product breakthrough for an Nth column in the N number of columns; and

(d) using the first and second breakthrough curves to determine a target product loading capacity of the first column before target product breakthrough at the Nth column; wherein the target product loading capacity of the first column equals the optimum operating binding capacity for the MCC process.

2. The method of claim 1 wherein the second residence time is about double the first residence time and/or the second flow rate is about half the first flow rate.

3. The method of claim 1 or 2, further comprising

(b') loading the target product on the first column at a third residence time and/or at a third flow rate, wherein the third residence time and/or third flow rate is different than the first and second residence times and/or the first and second flow rates;

(c') generating a third breakthrough curve for the third residence time and/or the third flow rate, wherein the third breakthrough curve represents breakthrough for a third column; and

(d) using the first, second, and third breakthrough curves to determine a target product loading capacity of the first column before target product breakthrough at the third column; wherein the target product loading capacity of the first column equals the optimum operating binding capacity for the MCC.

4. The method of claim 3 wherein the third residence time is about triple the first residence time and/or the third flow rate is about one-third the first flow rate.

5. A method for optimizing operating binding capacity for a multiple column chromatography (MCC) process, the method comprising:

(a) connecting at least first and second columns of equal size in series;

(b) loading target product on the first and second columns at a constant flow rate to provide predetermined residence times through the first and second columns;

(c) generating a breakthrough curve for the predetermined residence times, wherein the breakthrough curve represents target product breakthrough as a function of target product concentration versus time; and

(d) using the breakthrough curve to determine target product loading capacity of the first column before target product breakthrough at the second column; wherein the target product loading capacity of the first column equals the optimum operating binding capacity for the MCC process.

6. The method of claim 1, wherein the first and second breakthrough curves present target product breakthrough as a function of target product concentration versus time.