CBR
UBC Centre for Blood Research

Fermentation Optimization Package for 3 factors in 20 runs using DOE (Design of Experiment) with Design-Expert® software
## Design style: Response Surface Matrix in Central Composite Design

Summary: This is a statistical analysis service (Design-Expert software from Stat-Ease Inc.) for process optimization to find a theoretical optimal condition to maximize target production. Normally three potential factors which determine production in fermentation set up (such as temperature, dissolved oxygen, or pH for instance). Central Composite Design (from Response Surface Methodology) will create a process map which allows to determine significance of individual factors as well as find a theoretical optimal condition (combination of the factors). It will require 20 fermentation runs in 700-ml scales and follow by validation runs in the theoretical condition suggested by software. Service includes all fermentation, statistical analysis, confirmation runs (validation runs) and technical assistance from suite manager to write a publication if desirable.

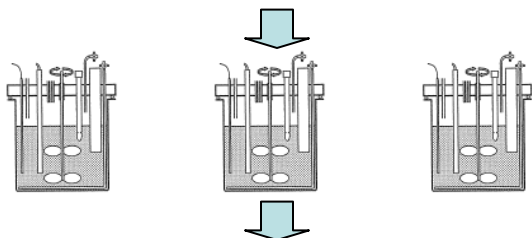## 1. Select 3 factors and design experiments

Factor A (pH, 4-9)
Factor B (temperature, 20C – 37C)
Factor C (dissolved oxygen, 0% - 100%)
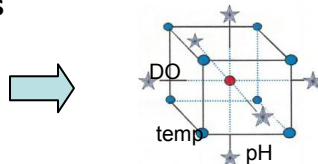
20 conditions:
8 Factorial points
6 Axial points
Central points (6 repeats)

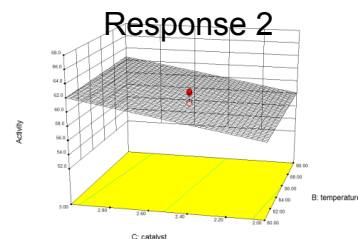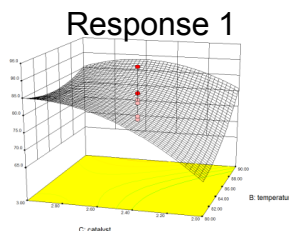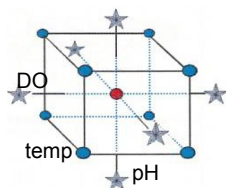## 2. Conduct 20 experiments and measure results (responses)

(Prepare +20 starter cultures and freeze at -80C)

X 7 days = 21 runs

Record responses (protein expression, cell growth, etc)

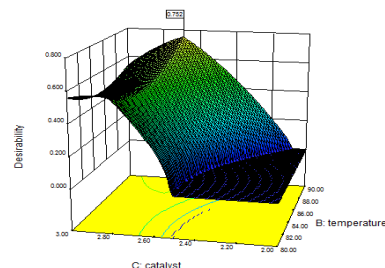## 3. Analyze responses statistically to fit a model

Response 1

Response 2

4. Find optical condition to meet requirement

What's your goal?

Response 1 :Maximize
Response 2: 63

Goal maximize

	Lower	Upper
Limits:	80	100
Weights:	1	1

Importance: +++

100.0

80.0

5. Validation

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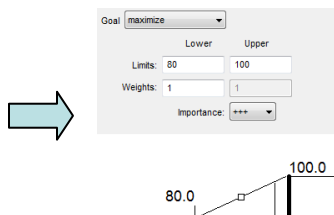
6. Service Fee

If each fermentation takes 1 day (24 hrs) and requires total 20 runs,

Price will be announced shortly

NOTE: Additional runs might be required based on situation or if augmentation is required in which case, an additional fee (75% of normal fermentation fee) will be added.

What's included?

1. All fermentation experiments by suite manager (customer must provide proper starter culture and also must measure responses (cell growth, product yield etc).
2. All the data analysis using DOE software (find a model to fit data, diagnose to find outliers).
3. Fermentation product (if it is desirable) can be harvested.
4. Find optimal condition (sweet spot) based on DOE optimization.
5. Scale up fermentation (in 5-L media) in the optimal condition suggested by software)
6. If the data need to be published, all the data can be prepared in publication format.

If you are interested in this service at the Fermentation Suite at CBR, please contact Suite Manager. This facility provide annual workshop regarding this DOE process optimization. If you want to receive information regarding next available workshop, please send email to Suite Manager.

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Design of Experiment (DOE)
in fermentation suite at CBR

Design of Experiment (DOE) Workshop in
fermentation suite at CBR (April 4-15 2011)