

# Seedcalc Changes



Bangkok  
Ordinary meeting  
2005

# Seedcalc Revisions

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- b-Factor: %DNA VS %Seed for quantitative plans (revised quant plan design & quant impurity estimation sheets)
- Define constraints of quantitative test plans (e.g.,  $AL > 0$ )
- New estimate matrix at various pool sizes (S Gregoire)
- New qualitative test plan analysis sheet
- Revisions to Zero Deviant Test plans
- Revisions to re-test OC curves for qualitative
- Finding pool size
- Cosmetic changes to labels and format
- New qual purity estimation sheet
- Revised qual impurity estimation sheet
- Implementation of Qualstat optimization algorithm (in process)
- Future: consider skew normal distribution for quant plan design sheet

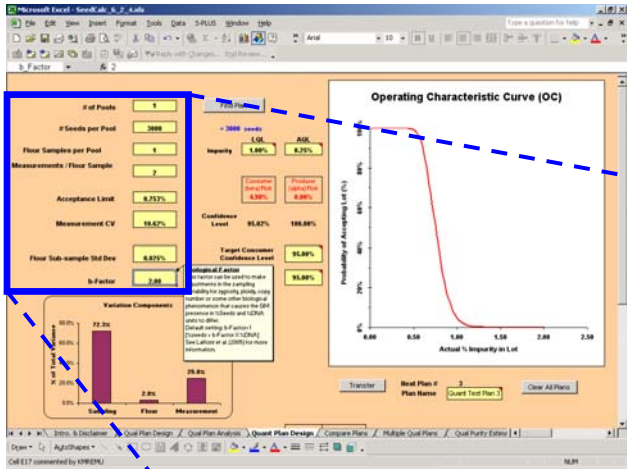
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# Biological factor (b-Factor) for quantitative test plans

(Laffont et al., submitted 2004)



Allows sampling variability to be calculated adequately when %Seeds is not equal to %DNA

$$\%Seed = b\text{-Factor} \times \%DNA$$

Reference material and test lots have the same zygosity/ploidy/copy number → **b-Factor= 1**

Homozygous reference material and hemizygous test lots → **b-Factor= 2**

# of Pools	1	n
# Seeds per Pool	3000	m
Flour Samples per Pool	1	I
Measurements / Flour Sample	2	J
Acceptance Limit	0.753%	AL
Measurement CV	10.62%	CV
Flour Sub-sample Std Dev	0.025%	
b-Factor	2.00	

- 3000

# % GM Estimates Matrix for semi-quantitative pooling approach

by Sylvain Gregoire

**Enter the number of seeds in sample**

# seeds tested  
3000

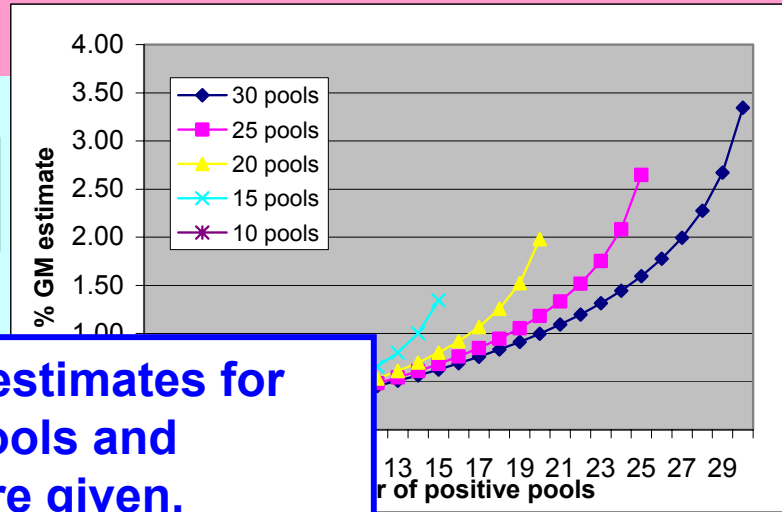
% GM Estima

[A useful tool to help practitioners choose pool sizes that give the desired % GM estimation resolution when using a qualitative assay]

seeds # of per pools pool	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 3000	0	---														
2 1500	0	0.05	---													
3 1000	0	0.04	0.11	---												
4 750	0	0.04	0.09	0.18	---											
5 600	0	0.04	0.09	0.15	0.27	---										
6 500	0	0.04	0.08	0.14	0.22	0.36	---									
7 428	0	0.04	0.08	0.13	0.20	0.29	0.45	---								
8 375	0	0.04	0.08	0.13	0.18	0.26	0.37	0.55	---							
9 333	0	0.04	0.08	0.12	0.18	0.24	0.33	0.45	0.66	---						
10 300	0	0.04	0.07	0.12	0.17	0.23	0.31	0.42	0.55	0.71	---					
11 272	0	0.04	0.07	0.12	0.17	0.22	0.29	0.38	0.49	0.62	0.78	---				
12 250	0	0.03	0.07	0.12	0.16	0.22	0.28	0.36	0.45	0.55	0.67	0.81	---			
13 230	0	0.03	0.07	0.11	0.16	0.21	0.27	0.34	0.42	0.51	0.61	0.73	0.88	---		
14 214	0	0.03	0.07	0.11	0.16	0.21	0.26	0.32	0.39	0.47	0.56	0.67	0.79	0.94	---	
15 200	0	0.03	0.07	0.11	0.15	0.20	0.25	0.31	0.37	0.44	0.52	0.62	0.74	0.87	1.02	---
16 187	0	0.03	0.07	0.11	0.15	0.20	0.25	0.30	0.36	0.42	0.50	0.59	0.70	0.83	0.98	1.15
17 176	0	0.03	0.07	0.11	0.15	0.20	0.25	0.30	0.35	0.41	0.49	0.57	0.68	0.80	0.94	1.11
18 166	0	0.03	0.07	0.11	0.15	0.20	0.25	0.30	0.35	0.40	0.48	0.56	0.66	0.78	0.91	1.07
19 157	0	0.03	0.07	0.11	0.15	0.19	0.24	0.29	0.34	0.39	0.46	0.54	0.64	0.75	0.87	1.02
20 150	0	0.03	0.07	0.11	0.15	0.19	0.24	0.29	0.33	0.38	0.45	0.52	0.62	0.73	0.85	1.00
21 142	0	0.03	0.07	0.11	0.15	0.19	0.23	0.28	0.32	0.37	0.43	0.50	0.58	0.68	0.80	0.95
22 136	0	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.36	0.41	0.48	0.56	0.65	0.77	0.91
23 130	0	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.40	0.47	0.54	0.63	0.74	0.88
24 125	0	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.40	0.46	0.53	0.61	0.72	0.85
25 120	0	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.40	0.46	0.52	0.59	0.69	0.81
26 115	0	0.03	0.07	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.40	0.46	0.52	0.58	0.67	0.79
27 111	0	0.03	0.07	0.11	0.14	0.18	0.23	0.27	0.31	0.35	0.40	0.46	0.52	0.58	0.66	0.77
28 107	0	0.03	0.07	0.11	0.14	0.18	0.23	0.27	0.31	0.35	0.40	0.46	0.52	0.58	0.65	0.76
29 103	0	0.03	0.07	0.11	0.14	0.18	0.22	0.27	0.31	0.35	0.40	0.46	0.51	0.57	0.64	0.74
30 100	0	0.03	0.07	0.11	0.14	0.18	0.22	0.27	0.31	0.35	0.40	0.46	0.51	0.57	0.63	0.69
n	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
m	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

$$\% \text{ GM est.} = (1 - (1 - d/n)^{1/m}) \times 100$$

d= number of deviant pools (0 to 30)  
n= number of pools (1 to 30)  
m= number of seeds per pool (rounded to integer)



**A matrix of impurity estimates for various number of pools and observed (+) pools are given.**

**Used for routine testing and also for GMO PT #4 and #5**

Enter the total number or seeds to be tested and then the % GM estimates are calculated in the matrix for all possible combinations of d, n and m.

# Finding pool size using semi-quantitative approach

**SAMPLING TYPE**

SINGLE  DOUBLE

**Find Plan** **# Seeds per Pool** false pos. rate 0.0%

Analyze false neg. rate 0.0%

1 Stage

Calc 1 # of Pools (N1) 8 % impurity LQL 1.00% AQL 0.20%

Opt 1 = 1840 seeds

Accept Lot if # Deviants does not exceed 5 C1

Consumer (beta) Risk 3.72%

Producer (alpha) Risk 3.32%

Confidence Level 96.28% 96.68%

Target Consumer Confidence Level 95.00%

Target Producer Confidence Level 95.00%

# Seeds Tested 100,000

Probability of Accepting Lot (%)

Retest (dashed line)

Acceptance (solid line)

**Click Find Plan button and pool size option to calculate pool size for robust and efficient test plans**

**If pool size is too large relative to LQL and AQL a warning message appears**

# Seeds per Pool	false pos. rate	0.0%
1000	false neg. rate	0.0%
<b>Warning: pool size may be too large</b>		
% impurity	LQL	AQL
	1.00%	0.20%

# Analyze present semi-quantitative testing plan

Microsoft Excel - SeedCalc\_6\_2\_4.xls

File Edit View Insert Format Tools Data S-PLUS Window Help

Type a question for help

Number\_of\_P... 8

**SAMPLING TYPE**

SINGLE  
 DOUBLE

Find Plan # Seeds per Pool false pos. rate 0.0%  
Analyze 230 false neg. rate 0.0%

← Stage

Calc 1 # of Pools (N1) 8 % impurity LQL 1.00% AQL 0.20%  
Opt 1 = 7840 seeds

Accept Lot if # deviants does not exceed 5 C1  
Consumer (beta) Risk 3.72% Producer (alpha) Risk 3.3%

Confidence Level 96.28% 96.28%

Target Consumer Confidence Level 95.00%  
Target Producer Confidence Level 95.00%

Max # Seeds Tested 100,000

g Lot (%)

Retest  
Acceptance

Actual % Impurity in Lot

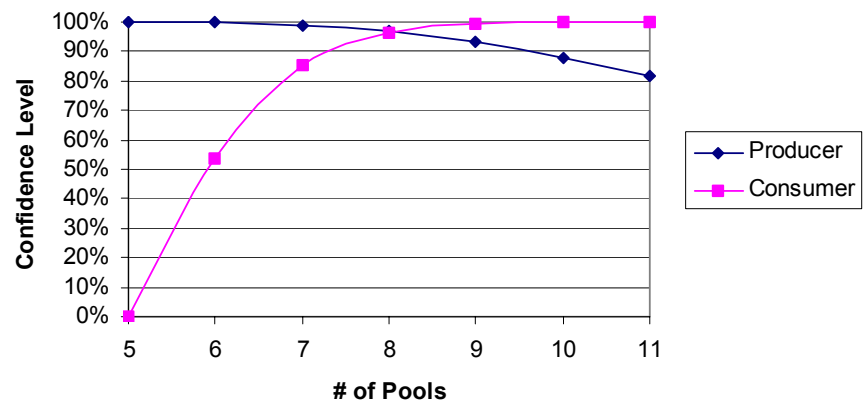
Qual Plan Design | Qual Plan Analysis | Quant Plan Design | Compare Plans | Multiple Qual Plans | Qual Purity Estimation | Qual Impurity

Ready NUM

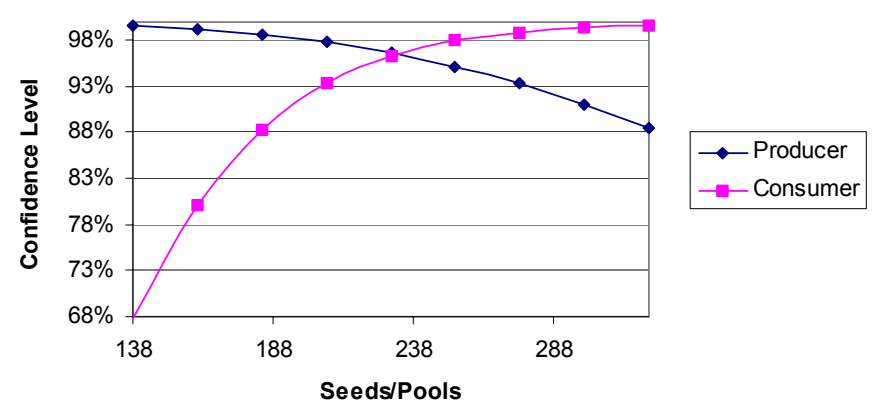
**Analyze button is used to review other test plans in the 'neighborhood' (close) to present test plan**

# Qual Plan Analysis sheet provides graphs showing semi-quantitative testing plans in close proximity current testing plan

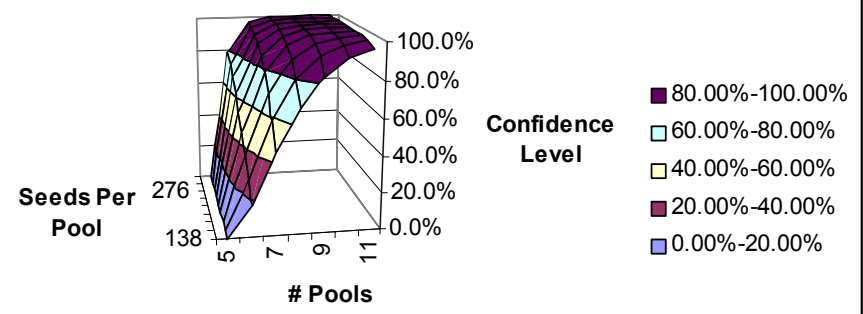
**N1 Residuals**



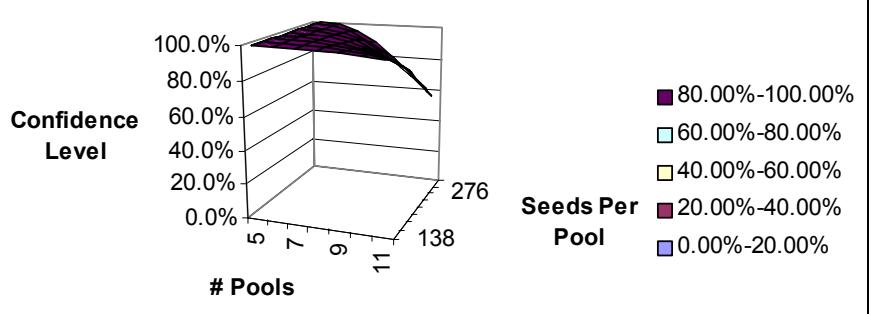
**Seeds/Pool Residuals**



**Consumer Confidence**



**Producer Confidence**



# Separate sheets for purity and impurity

## Purity Sheet

Microsoft Excel - SeedCalc\_6\_2\_4.xls

Purity Estimation & Confidence Intervals (Assay measures purity characteristic)  
(Number of seed sampled should not exceed 10% of total number in population)

# of Individual Seeds Tested	400	% Purity in sample	98.75 %
# Deviants Seeds	5		
False Negative Rate (%)	0.0	Desired Confidence Level	95 %
False Positive Rate (%)	0.0		

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Upper Bound of True % Impurity **2.61**  
*(95% confident that the lot impurity is below 2.61%)*

2-sided CI for True % Impurity **0.41 to 2.89**

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Lower Bound of True % Purity **97.39**  
*(95% confident that the lot purity is above 97.39%)*

2-sided CI for True % Purity **97.11 to 99.59**

Ready

## Impurity (AP) Sheet

Microsoft Excel - SeedCalc\_6\_2\_4.xls

Impurity Estimation & Confidence Intervals (Assay measures impurity characteristic)  
(Number of seed sampled should not exceed 10% of total number in population)

# of Seed Pools	15	Computed % in sample	0.20 %
# of Seeds per Pool	200		
Total Seeds Tested	3000		
# Deviants Pools	5		<i>Measured property on seed pools</i>
False Positive Rate %	0.0	Desired Confidence Level	95 %
False Negative Rate %	0.0		

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Upper Bound of True % Impurity **0.43**  
*(95% confident that the lot impurity is below 0.43%)*

2-sided CI for True % Impurity **0.06 to 0.48**

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Lower Bound of True % Purity **99.57**  
*(95% confident that the lot purity is above 99.57%)*

2-sided CI for True % Purity **99.52 to 99.94**

Ready

Thank you for your  
attention

