

影响 tenax-ta 对 COS 回收率的因素

1、因子及水平的确定

因素	水平	
A/解吸温度 (°C)	180	220
B/解吸时间 (min)	2	3
C/是否使用干燥剂	CaCl ₂	无
D/是否使用冷阱	N ₂	无

2、交互作用确定

除主效外，实验还将同时考察交互作用 AD、CD

3、正交表的选用

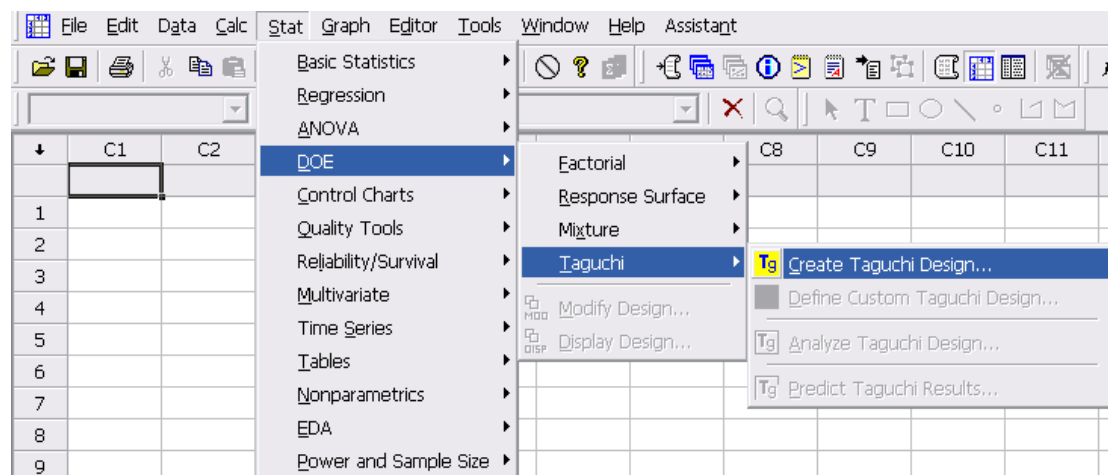
主效应 A, B, C, D: $(2-1) \times 4 = 4$

交互 AD、CD: $(2-1) \times (2-1) \times 2 = 2$

总和: $n \geq 4 + 2 + 1 + 1 = 8$

选用: $L_8(2^7)$

4、表头设计



Taguchi Design

Type of Design

- ☒ 2-Level Design (2 to 31 factors)
- ☐ 3-Level Design (2 to 13 factors)
- ☐ 4-Level Design (2 to 5 factors)
- ☐ 5-Level Design (2 to 6 factors)
- ☐ Mixed Level Design (2 to 26 factors)

Number of factors: 4

Display Available Designs...

Designs... Factors... Options...

Help OK Cancel

Taguchi Design - Design

Runs 2 ** Columns

L8	2 ** 4
L12	2 ** 4
L16	2 ** 4
L32	2 ** 4

☐ Add a signal factor for dynamic characteristics

Help OK Cancel

Taguchi Design

Type of Design

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- ☐ 5-Level Design (2 to 6 factors)
- ☐ Mixed Level Design (2 to 26 factors)

Number of factors: 4

Display Available Designs...

Designs... Factors... Options...

Help OK Cancel

Taguchi Design - Factors

Assign Factors

- ☐ To columns of the array as specified below
- ☒ To allow estimation of selected interactions Interactions...

Facto	Name	Level Values	Column	Level
A	A	1 2	1	2
B	B	1 2	2	2
C	C	1 2	4	2
D	D	1 2	7	2

Help OK Cancel

Taguchi Design - Factors

Assign Factors

- ☐ To columns of the array as specified below
- ☒ To allow estimation of selected interactions Interactions...

Facto	Name	Level Values	Column	Level
A	A	1 2	1	2
B	B	1 2	2	2
C	C	1 2	4	2
D	D	1 2	7	2

Help OK Cancel

Taguchi Design - Interactions

Available Terms:

AB
AC
BC
BD

Selected Terms:

AD
CD

>>> <<<

Factors:

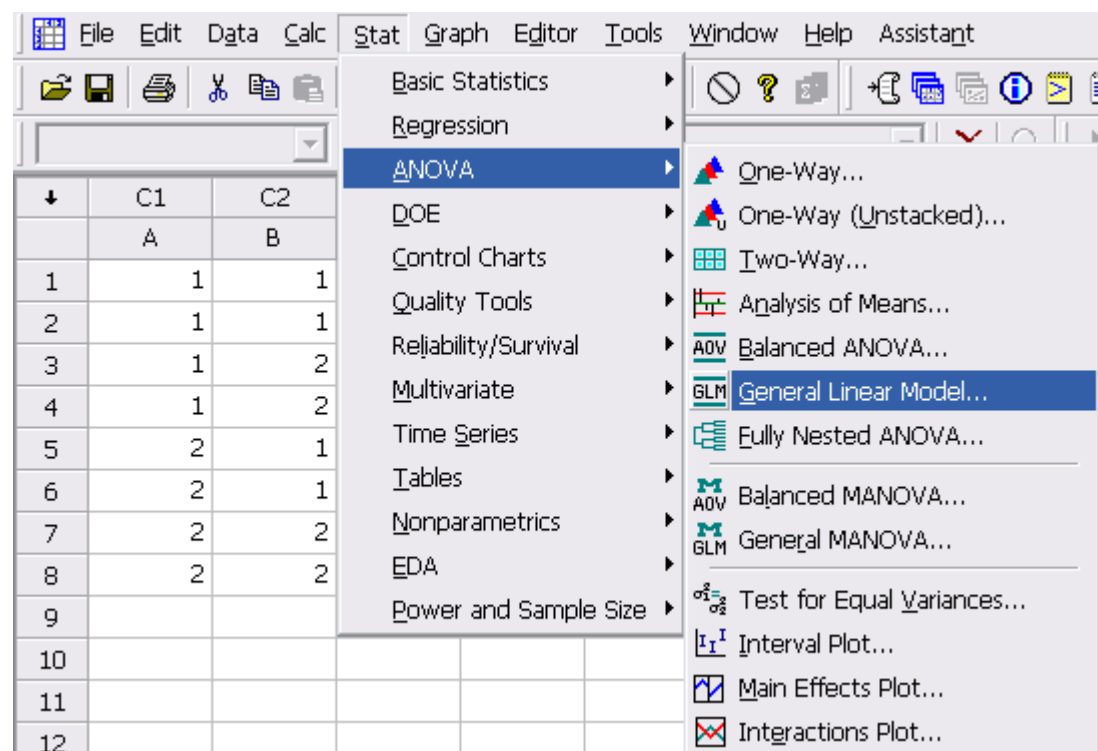
A:A
B:B
C:C
D:D

Help OK Cancel

实验实施结束

C1	C2	C3	C4	C5
A	B	C	D	y
1	1	1	1	113.792
1	1	1	2	80.559
1	2	2	1	132.305
1	2	2	2	167.400
2	1	2	1	164.744
2	1	2	2	182.927
2	2	1	1	49.758
2	2	1	2	116.038

方差分析



General Linear Model

Responses: y

Model:
A B 'C' D A*D C*D

Random factors:

Covariates... Options... Comparisons...

Graphs... Results... Storage...

Factor Plots...

Select

Help

OK Cancel

方差分析结果

Analysis of Variance for y, using Adjusted SS for Tests						
Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	47	47	47	0.03	0.895
B	1	732	732	732	0.43	0.630
C	1	10313	10313	10313	6.09	0.245
D	1	931	931	931	0.55	0.594
A*D	1	853	853	853	0.50	0.607
C*D	1	51	51	51	0.03	0.890
Error	1	1694	1694	1694		
Total	7	14621				

SAS 程序

```

data www;
  input a b c d y @@;
  cards;
1 1 1 1 113.792
1 1 1 2 80.559
1 2 2 1 132.305
1 2 2 2 167.400
2 1 2 1 164.744
2 1 2 2 182.927
2 2 1 1 49.758
2 2 1 2 116.038
;
proc anova;
  class a b c d;
  model y=a b c d a*d c*d;
run;

```

SAS 运行结果

Source	DF	Anova SS	Mean Square	F Value	Pr > F
a	1	47.09837	47.09837	0.03	0.8948
b	1	731.93293	731.93293	0.43	0.6298
c	1	10312.56231	10312.56231	6.09	0.2452
d	1	931.50070	931.50070	0.55	0.5938
a*d	1	852.86565	852.86565	0.50	0.6072
c*d	1	51.16167	51.16167	0.03	0.8905

Design Expert 实现过程

主效与交互作用列应该所处的列的位置

7 Factors: A, B, C, D, E, F, G	
Design Matrix Evaluation for Factorial Main effects Model	
Factorial Effects Aliases	
[Est. Terms]	Aliased Terms
[Intercept]	= Intercept
[A]	= A - BC - DE - FG
[B]	= B - AC - DF - EG
[C]	= C - AB - DG - EF
[D]	= D - AE - BF - CG
[E]	= E - AD - BG - CF
[F]	= F - AG - BD - CE
[G]	= G - AF - BE - CD

初始的表格

AD空列CD										
Select	Std	Run	Factor 1 A:A	Factor 2 B:B	Factor 3 C:C	Factor 4 D:D	Factor 5 E:E	Factor 6 F:F	Factor 7 G:G	Response 1 R1
2		1	1	1	1	2	2	2	2	
	5	2	2	1	2	1	2	1	2	
	8	3	2	2	1	2	1	1	2	
	1	4	1	1	1	1	1	1	1	
	7	5	2	2	1	1	2	2	1	
	6	6	2	1	2	2	1	2	1	
	3	7	1	2	2	1	1	2	2	
	4	8	1	2	2	2	2	1	1	

保留 1-4 列，删除 5-7 列。

Select	Std	Run	Factor 1 A:A	Factor 2 B:B	Factor 3 C:C	Factor 4 D:D	Response 1 R1
	1	1	1	1	1	1	113.792
	2	4	1	1	1	2	80.559
	3	5	1	2	2	1	132.305
	4	8	1	2	2	2	167.4
	5	6	2	1	2	1	164.744
	6	7	2	1	2	2	182.927
	7	3	2	2	1	1	49.758
	8	2	2	2	1	2	116.038

方差分析前选定所要进行分析的主效和互作项

The screenshot shows the Minitab software interface. The 'Effects' tab is selected in the top menu. The 'Effects List' is displayed in the center, showing terms A-A, B-B, C-C, D-D, AD, and CD. The 'Effects Tool' dialog box is open on the right, showing the 'Effects List' button selected.

Term	Stdized Effects	Sum of Squares	% Contribution
Intercept			
A-A	4.85	47.10	0.32
B-B	-19.13	731.93	5.01
C-C	71.81	10312.56	70.53
D-D	21.58	931.50	6.37
AD	20.65	852.87	5.83
CD	5.06	51.16	0.35
ABC		Aliased	
ABD		Aliased	
ACD		Aliased	
BCD		Aliased	
ABCD		Aliased	
Lenth's ME	116.60		
Lenth's SME	279.04		

方差分析结果

Use your mouse to right click on individual cells for definitions.

Response	1	R1			
ANOVA for selected factorial model					
Analysis of variance table [Partial sum of squares - Type III]					
	Sum of	Mean	F	p-value	
Source	Squares	df	Square	Value	Prob > F
Model	12927.12	6	2154.52	1.27	0.5907 not significant
A-A	47.10	1	47.10	0.028	0.8948
B-B	731.93	1	731.93	0.43	0.6298
C-C	10312.56	1	10312.56	6.09	0.2452
D-D	931.50	1	931.50	0.55	0.5938
AD	852.87	1	852.87	0.50	0.6072
CD	51.16	1	51.16	0.030	0.8905
Residual	1694.35	1	1694.35		
Cor Total	14621.47	7			