```
data one;
  do trt='stroph1','stroph2','ouabain';
    ni=7; if trt='ouabain' then ni=9;
  do rep=1 to ni;
    dum1=(trt='stroph1'); dum2=(trt='stroph2');
    input tols @@; tols=tols/10; logtols=log(tols); drop rep; output;
  end; end; datalines;
155 158 171 144 124 189 234 242 185 200 227 170 147 220
523 991 476 651 668 576 493 458 669
;
*********  only comparing Strophanthus 1 with Strophanthus 2 now *********;
data one; set one; if trt='ouabain' then delete;
proc nlin hougaard data=one;
  parms th1=1 th2=1;
  model tols=th1*dum1+th1*th2*(1-dum1);
  output out=two r=r p=p;
run;
```

The NLIN Procedure
Dependent Variable tols
Method: Gauss-Newton
Iterative Phase

Iter	th1	th2	Sum of Squares
0	1.0000	1.0000	4381.3
1	8.8929	2.5429	632.7
2	12.7285	1.2962	338.8
3	16.3728	1.1631	150.0
4	16.7816	1.1841	144.0
5	16.7857	1.1838	144.0

NOTE: Convergence criterion met.

Estimation Summary

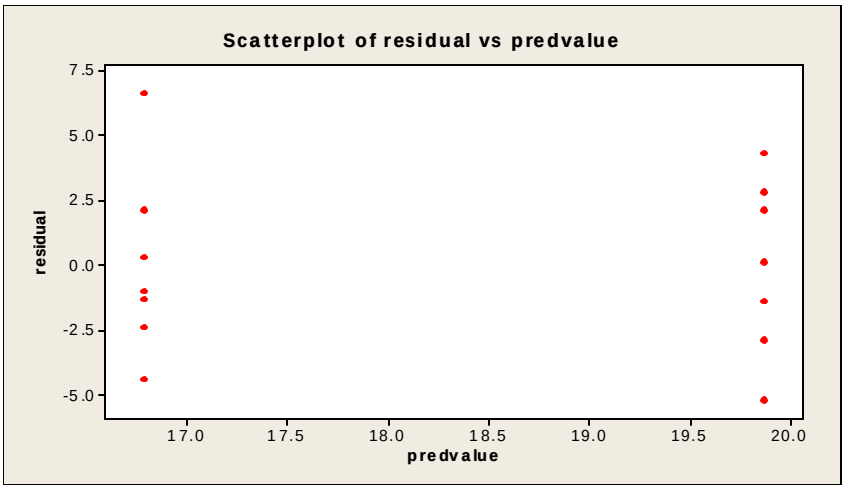
Method	Gauss-Newton
Iterations	5
Subiterations	2
Average Subiterations	0.4
R	1.742E-6
PPC(th1)	4.697E-7
RPC(th2)	0.000263
Object	8.244E-7
Objective	144.0229
Observations Read	14
Observations Used	14
Observations Missing	0

Source	DF	Sum of Squares	Mean Square	F Value	Approx Pr > F
Model	1	33.3257	33.3257	2.78	0.1215
Error	12	144.0	12.0019		
Corrected Total	13	177.3			

Parameter	Estimate	Approx Std Error	Approximate 95% Confidence Limits		Skewness
th1	16.7857	1.3094	13.9327	19.6387	9.47E-17
th2	1.1838	0.1209	0.9204	1.4472	0.3576

Approximate Correlation Matrix

	th1	th2
th1	1.0000000	-0.7639278
th2	-0.7639278	1.0000000




```
Proc iml;
  start neg2ll(th) global(yy,zz,n1,n2,nn);
    th1=th[1]; th2=th[2]; sig=th[3]; sig2=sig*sig;
    ym=yy-th1*j(n1,1); zm=zz-th1*th2*j(n2,1);
    brac=t(ym)*ym+t(zm)*zm;
    thingy=nn*log(sig2)+brac/sig2;
    return(thingy);
  finish neg2ll;

  n1=7; n2=7; nn=n1+n2;
  yy={15.5,15.8,17.1,14.4,12.4,18.9,23.4};
  zz={24.2,18.5,20.0,22.7,17.0,14.7,22.0};
  th0={16 1 3.5}; opt={.,0};
  con={.001 .001 .001,
         .    .    . };
  call nlptr(rc,theta,"neg2ll",th0,opt,con);
  minneg2ll=neg2ll(theta); print theta minneg2ll; ans=j(50,5);
  do jj=1 to 50;
    ans[jj,3]=minneg2ll+2.71;
    ans[jj,4]=minneg2ll+3.84;
    ans[jj,5]=minneg2ll+6.63;
    star=0.8; fini=1.6; th2=star+(fini-star)*(jj-1)/49; ans[jj,1]=th2;
    th0=theta; opt={.,0};
    con2={.001 .001 .001,
            .    .    . };
    th0[2]=th2; con2[1,2]=th2; con2[2,2]=th2;
    call nlptr(rc,thtil,"neg2ll",th0,opt,con2);
    ans[jj,2]=neg2ll(thtil);
  end;
  create dset from ans[colname={theta2 neg2ll cut90 cut95 cut99}];
  append from ans;
quit;
data final; set dset;
  y=neg2ll;  zz=1; output;
  y=cut90;   zz=2; output;
  y=cut95;   zz=3; output;
  y=cut99;   zz=4; output;

axis1 w=2 minor=none label=(a=90 font=swiss 'Profile Likelihood');
axis2 w=2 minor=none label=(font=swiss 'relative potency');
symbol1 i=join w=5 l=1 c=blue;
symbol2 i=join w=3 l=2 c=blue;
symbol3 i=join w=3 l=3 c=blue;
symbol4 i=join w=3 l=4 c=blue;
proc gplot data=final;
  plot y*theta2=zz / fr vaxis=axis1 nolegend haxis=axis2;
run;
```

THETA			MINNEG2LL
16.785714	1.1838298	3.2073894	46.632806