Induced vs Constitutive Project: Univariate repeated analysis of biochemical assays

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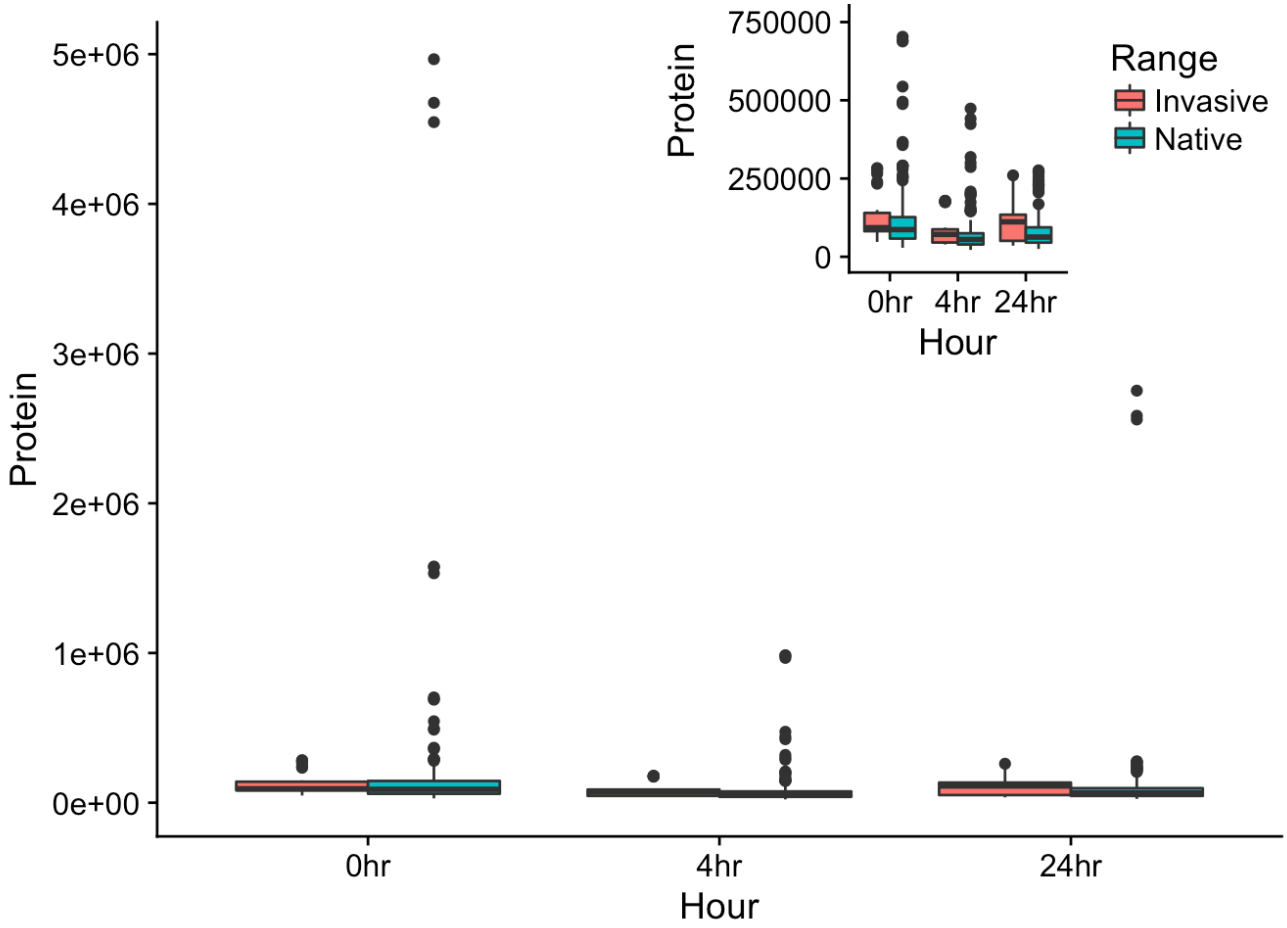
Results of the univariate analyses for each biochemical assay

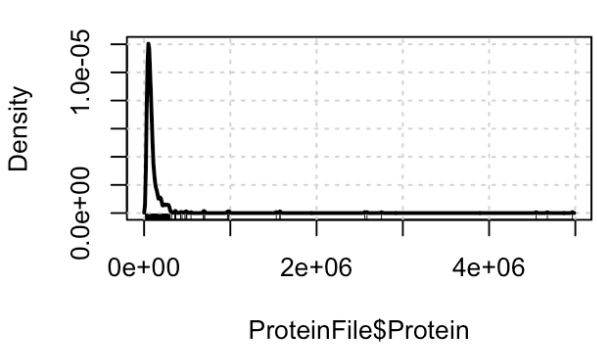
Prior to running the multivariate analysis, I looked at each assay separately as a repeated measures test.

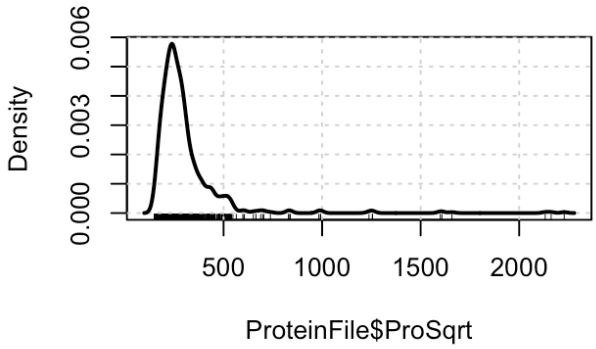
```
library(ggplot2)
library(data.table)
library(scales)
library(plyr)
library(dplyr)
library(reshape2)
library(lme4)
library(effects)
library(multcomp)
library(lmerTest)
library(piecewiseSEM)
library(car)
library(gridExtra)
library(cowplot)
library(Rmisc)
```

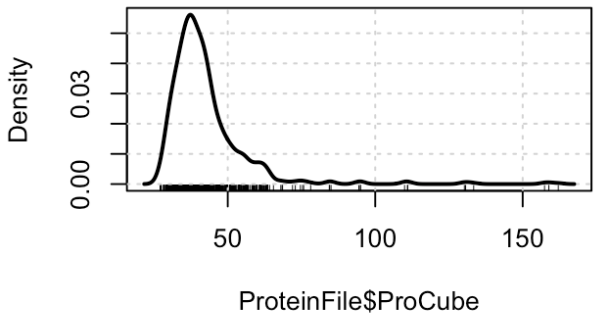
Protein Quantification Analysis

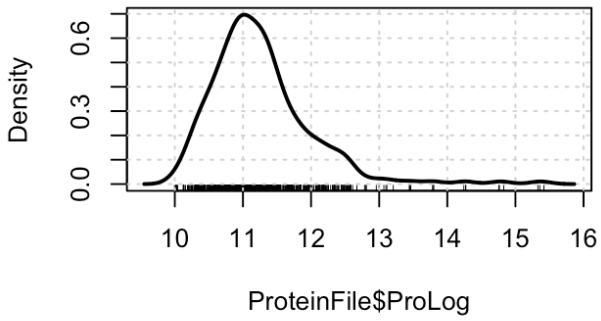
Boxplots to examine for homogeneity of variances and density plots for normal distributions


Protein
5e+06
4e+06
3e+06
2e+06
1e+06
0e+00
0hr
4hr
24hr
Hour
Protein
750000
500000
250000
0
0hr
4hr
24hr
Hour
Range
Invasive
Native





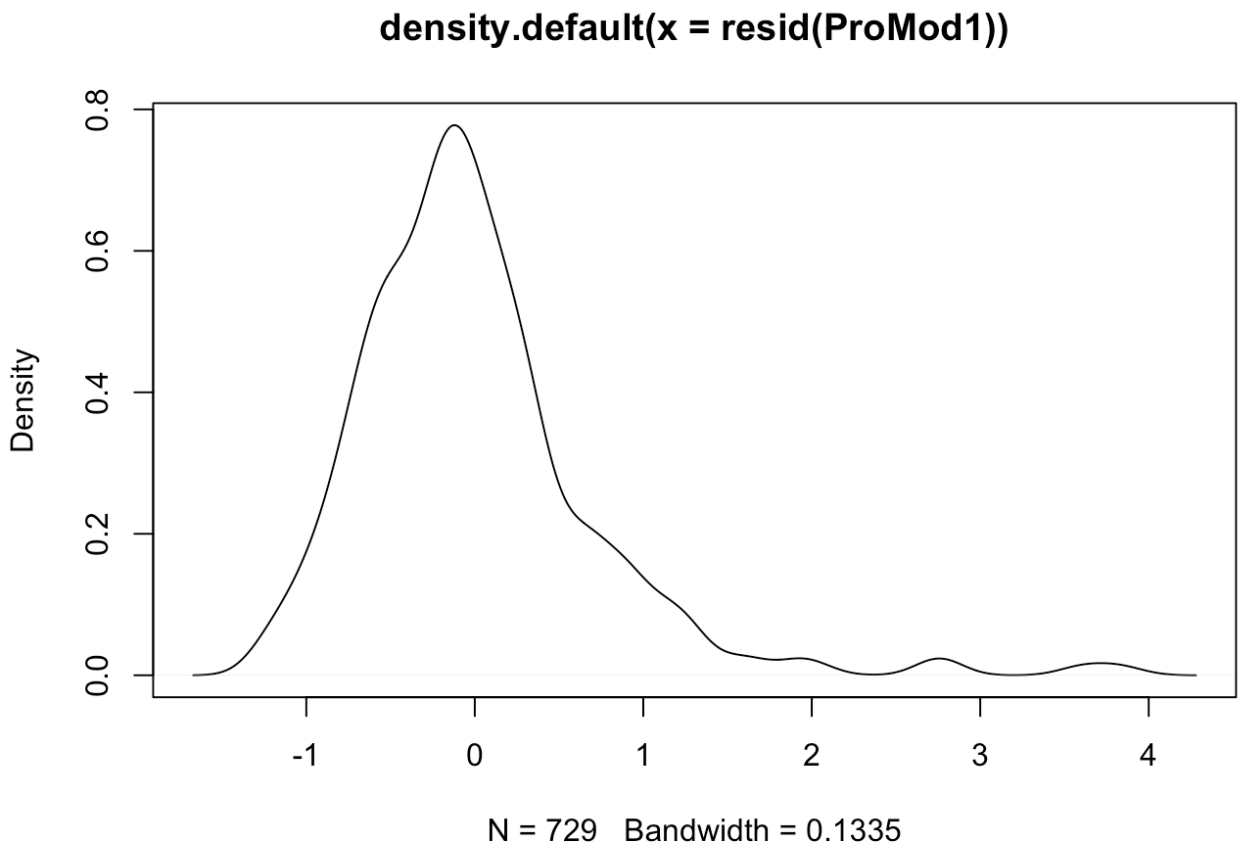




Results of the univariate repeated measures

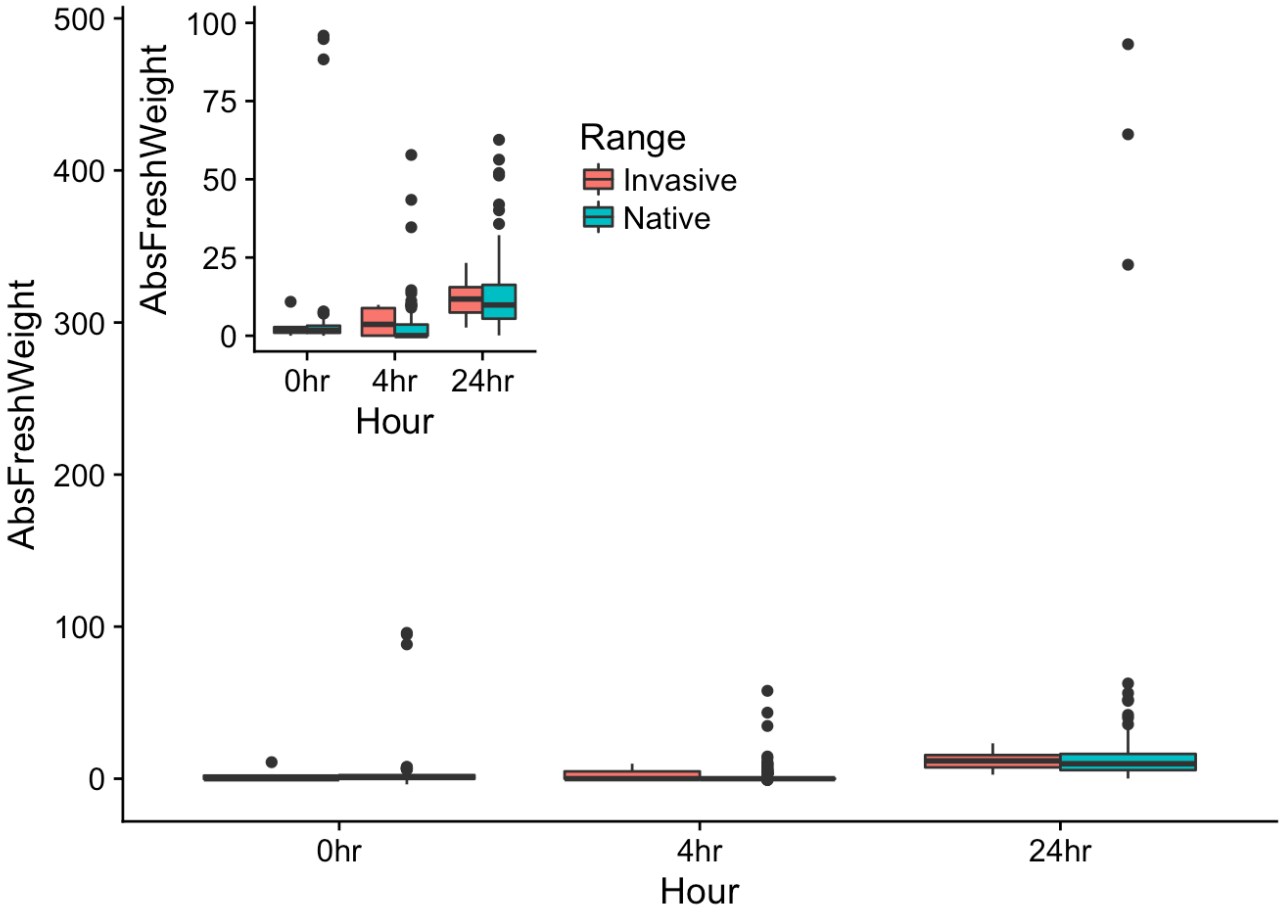
```
ProMod1 <- lm(cbind(ProteinHr0, ProteinHr4, ProteinHr24) ~ Range, data = ProteinW
ide)
```

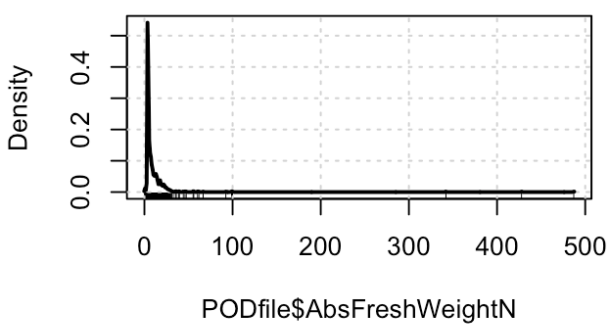
Residuals:

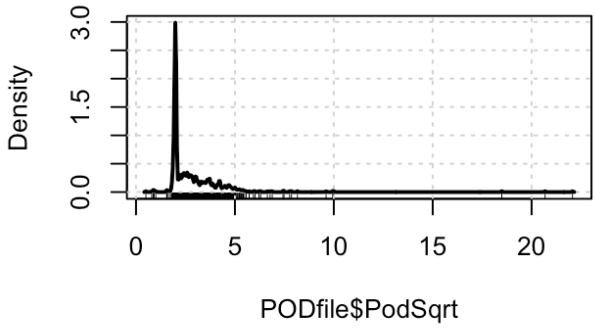


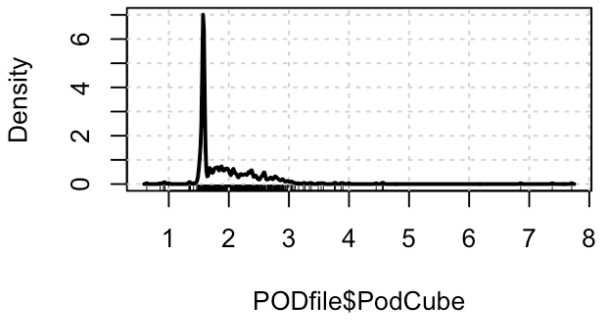

```
##
## Type II Repeated Measures MANOVA Tests: Pillai test statistic
##               Df test stat approx F num Df den Df    Pr(>F)
## (Intercept)    1   0.99824   136641      1    241 < 2.2e-16 ***
## Range          1   0.01886        5      1    241   0.03235 *
## blockD         1   0.24001       38      2    240 4.979e-15 ***
## Range:blockD   1   0.00388        0      2    240   0.62683
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

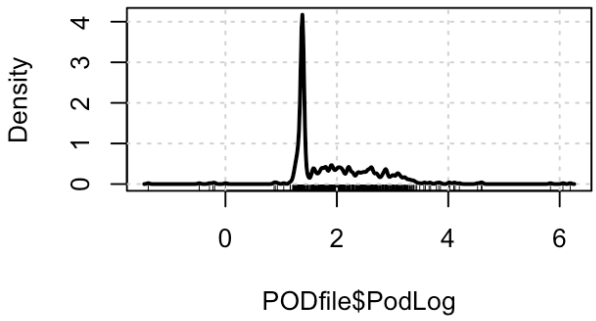
Peroxidase Activity Assay


AbsFreshWeight
500
400
300
200
100
0
0hr
4hr
24hr
Hour
AbsFreshWeight
100
75
50
25
0
0hr
4hr
24hr
Hour
Range
Invasive
Native

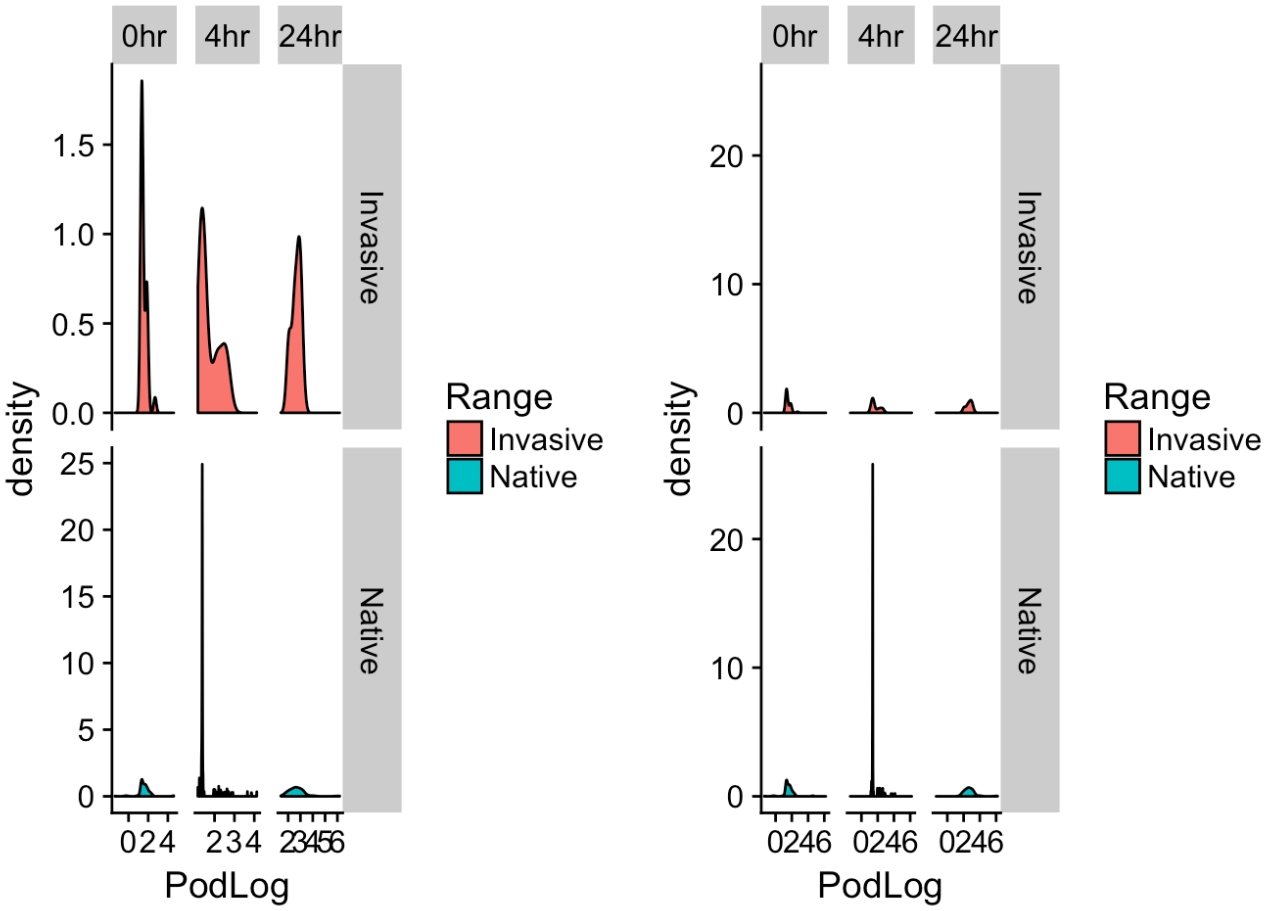








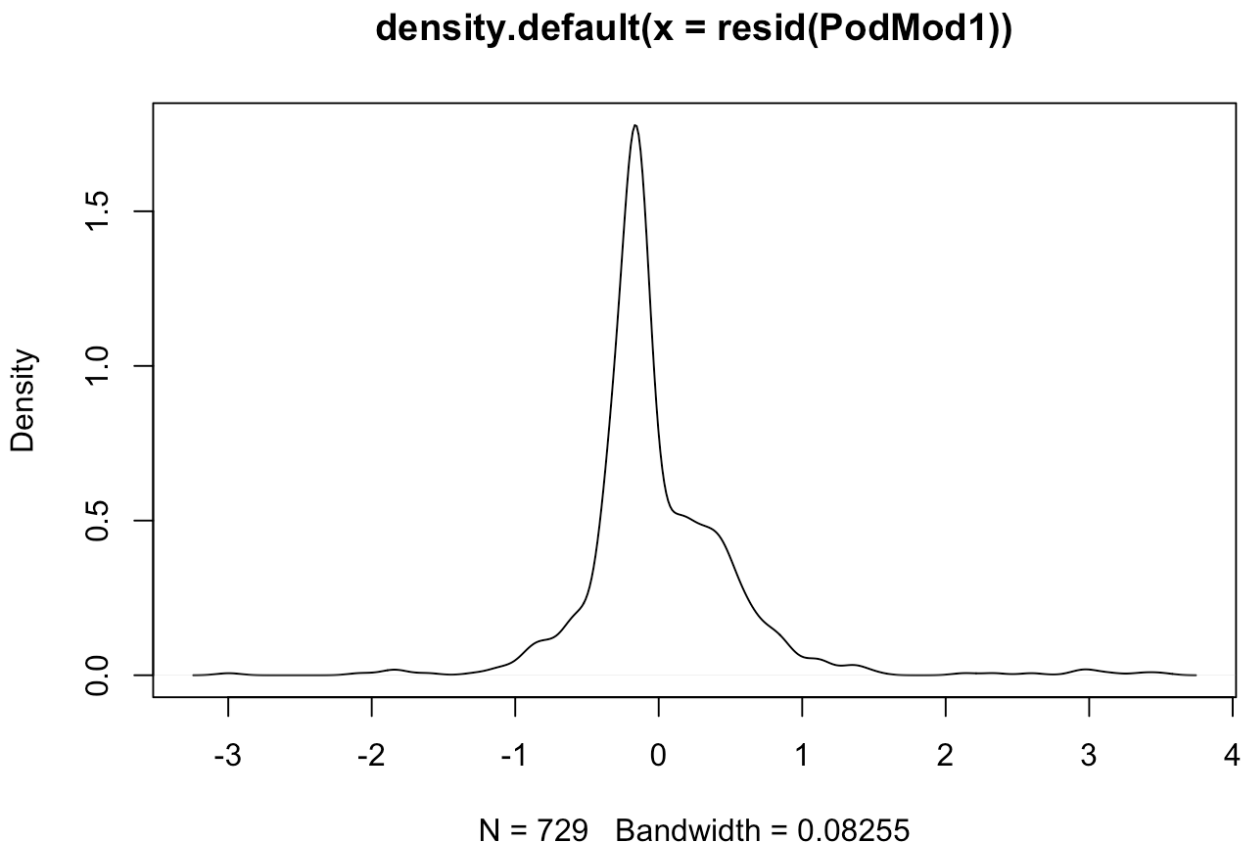
These looked a little odd so I broke them down by range. Graph on the right is at same scale, left is to give better view of distribution



Results of the univariate repeated measures

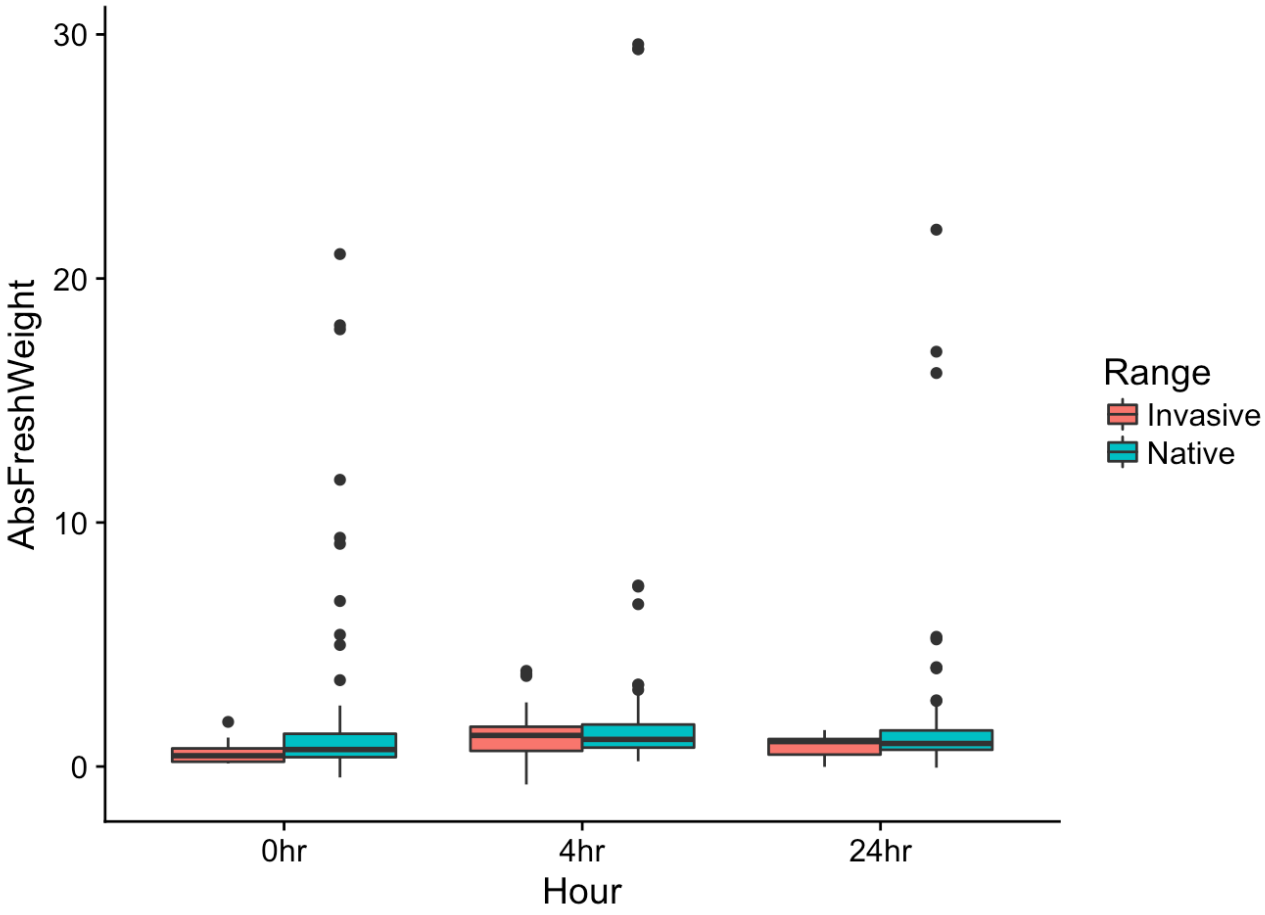
```
PodMod1 <- lm(cbind(PODHr0, PODHr4, PODHr24) ~ Range, data = PODWide)
```

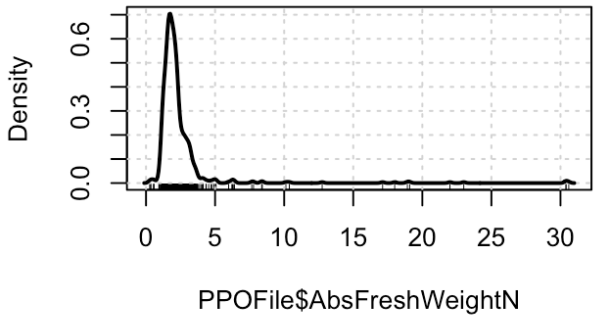
Residuals:

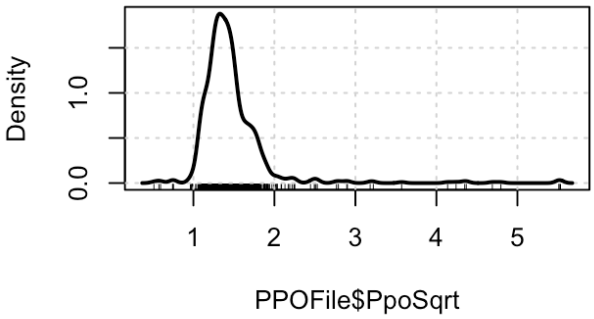


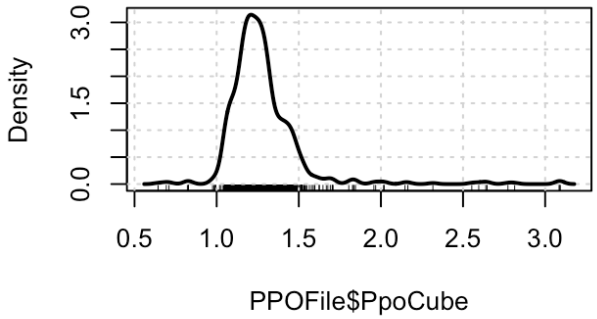

```
##
## Type II Repeated Measures MANOVA Tests: Pillai test statistic
##               Df test stat approx F num Df den Df  Pr(>F)
## (Intercept)    1   0.96493   6630.6      1    241 < 2e-16 ***
## Range          1   0.00101      0.2      1    241 0.62198
## blockD         1   0.80547    496.9      2    240 < 2e-16 ***
## Range:blockD   1   0.03572      4.4      2    240 0.01271 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

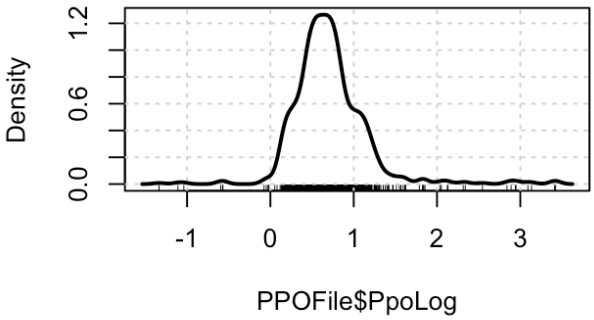
Polyphenol Oxidase Activity

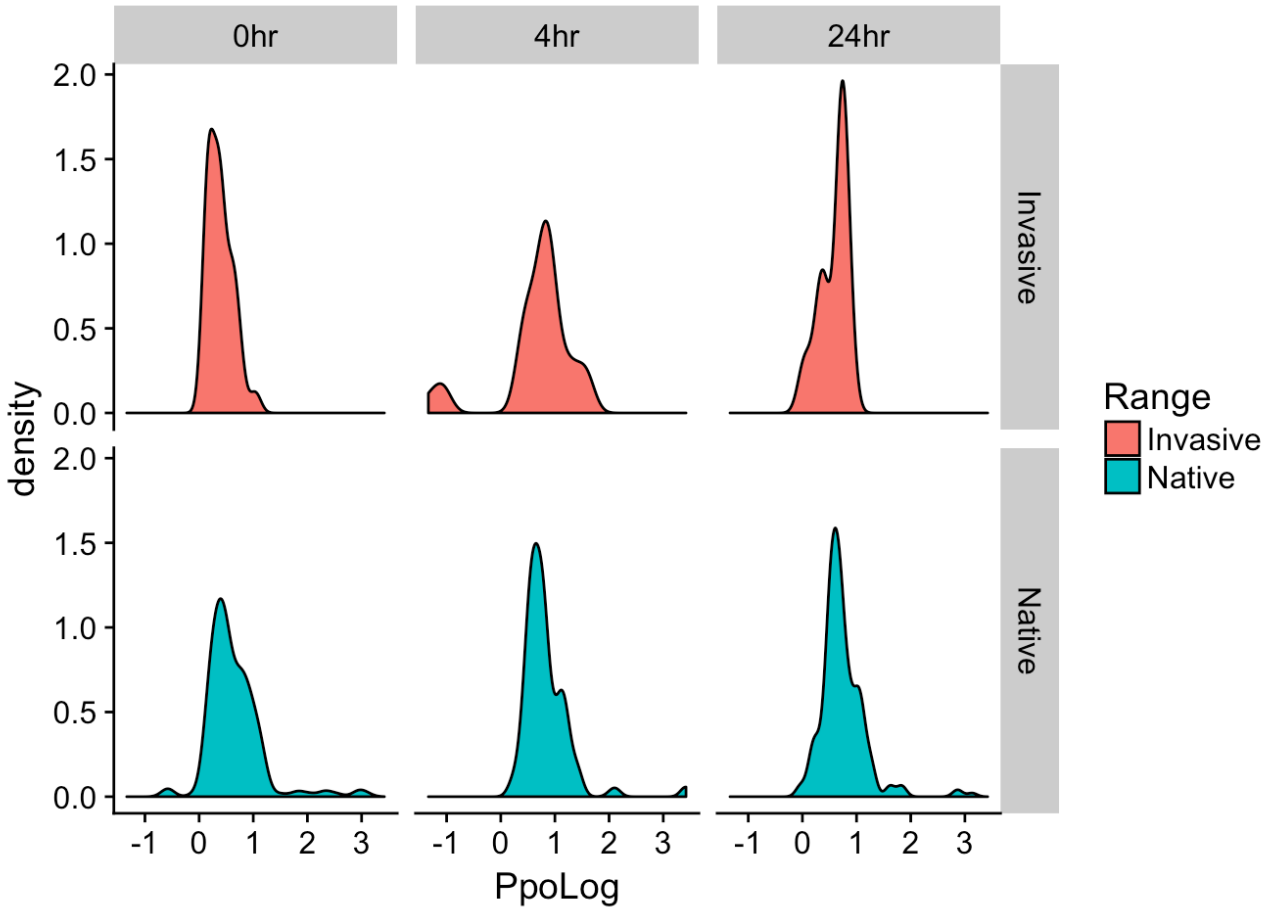

30
20
10
0
AbsFreshWeight
0hr
4hr
24hr
Hour
Range
Invasive
Native


Density
0.0
0.3
0.6
0
5
10
15
20
25
30
PPOFile$AbsFreshWeightN


Density
0.0
1.0
1
2
3
4
5
PPOFile$PpoSqrt


Density
0.0
1.5
3.0
0.5
1.0
1.5
2.0
2.5
3.0
PPOFile$PpoCube

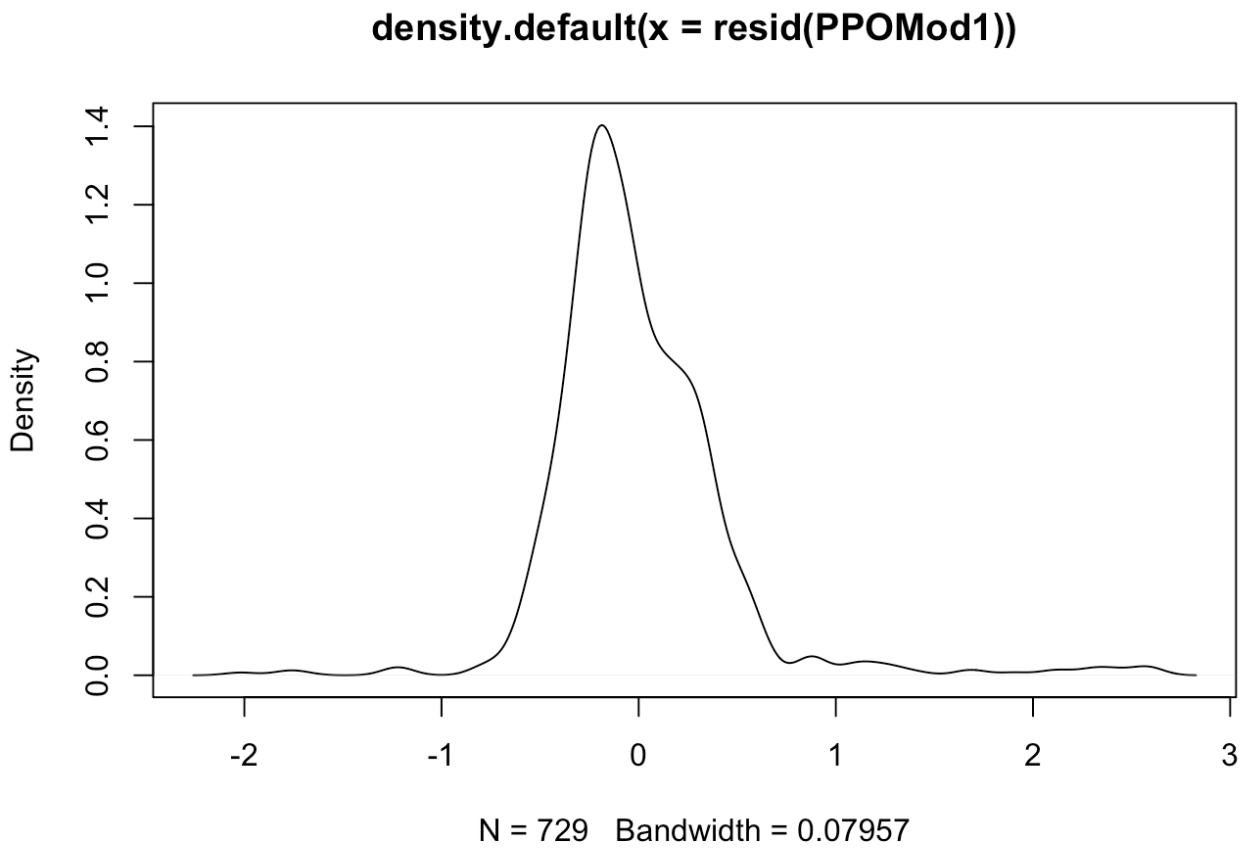

Density
0.0
0.6
1.2
-1
0
1
2
3
PPOFile$PpoLog



Results of the univariate repeated measures

```
PPOMod1 <- lm(cbind(PPOHr0, PPOHr4, PPOHr24) ~ Range, data = PPOWide)
```

Residuals:




```
##
## Type II Repeated Measures MANOVA Tests: Pillai test statistic
##              Df test stat approx F num Df den Df    Pr(>F)
## (Intercept)   1   0.88625  1877.64      1    241 < 2.2e-16 ***
## Range         1   0.06083    15.61      1    241 0.0001023 ***
## blockD        1   0.07883    10.27      2    240 5.256e-05 ***
## Range:blockD  1   0.00298     0.36      2    240 0.6992842
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```