Figure 9 Statistical Analysis

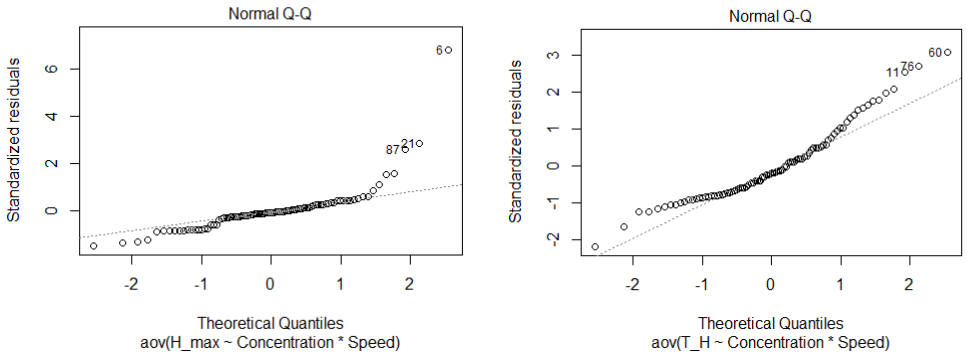
Two-way ANOVA
Input: Concentration and Speed
Output: Magnetic Field Intensity

```
                    Df  Sum Sq Mean Sq F value Pr(>F)
Concentration        2   69495   34747   1.967  0.146
Speed                2   64275   32138   1.820  0.169
Concentration:Speed  4  139471   34868   1.974  0.106
Residuals           81 1430674   17663
```

Two-way ANOVA
Input: Concentration and Speed
Output: Time Period

```
                    Df Sum Sq Mean Sq F value  Pr(>F)
Concentration        2 0.3643 0.18217   4.697 0.01175 *
Speed                2 0.3795 0.18974   4.892 0.00987 **
Concentration:Speed  4 0.6746 0.16865   4.349 0.00309 **
Residuals           81 3.1414 0.03878
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Assumption for ANOVA test: Normality
Output: Magnetic Field Intensity (H_max) and Time Period (T_H)



Assumption for ANOVA test: Homogeneity of variances

Levene's Test
Input: Concentration and Speed
Output: Magnetic Field Intensity

```
Levene's Test for Homogeneity of Variance (center = median)
      Df F value  Pr(>F)
group  8  1.8524 0.07916 .
      81
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Levene's Test
Two-way ANOVA
Input: Concentration and Speed
Output: Time Period

```
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  8  1.5737 0.1457
      81
```

Kruskal-Wallis rank sum test for Magnetic Field Intensity (H_max)

```
data:  H_max by Concentration
Kruskal-Wallis chi-squared = 2.7893, df = 2, p-value = 0.2479
data:  H_max by Speed
Kruskal-Wallis chi-squared = 2.5221, df = 2, p-value = 0.2834
```

Linear model of Time Period (T_H)

```
Residuals:
     Min       1Q   Median       3Q      Max
-0.41030 -0.13965 -0.03850  0.09158  0.57460

Coefficients:
                                Estimate Std. Error t value Pr(>|t|)
(Intercept)                      0.61030    0.06228   9.800 2.10e-15 ***
Concentration07ml               -0.41910    0.08807  -4.759 8.39e-06 ***
Concentration10ml               -0.33250    0.08807  -3.775 0.000303 ***
Speed120mm/s                    -0.33530    0.08807  -3.807 0.000272 ***
Speed160mm/s                    -0.41370    0.08807  -4.697 1.06e-05 ***
Concentration07ml:Speed120mm/s   0.37830    0.12455   3.037 0.003211 **
Concentration10ml:Speed120mm/s   0.28490    0.12455   2.287 0.024781 *
Concentration07ml:Speed160mm/s   0.48190    0.12455   3.869 0.000220 ***
Concentration10ml:Speed160mm/s   0.30030    0.12455   2.411 0.018170 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.1969 on 81 degrees of freedom
Multiple R-squared:  0.3111,   Adjusted R-squared:  0.243
F-statistic: 4.572 on 8 and 81 DF,  p-value: 0.0001266
```