DA_Anova-R.R

USUARIO

2024-05-08

```r
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# Ingresar datos ---------------------------------------------------
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# Ingresar datos del diseño aleatorio
# 5 tratamientos germinativos
# 4 repeticiones cada tratamiento


germ <- c(3, 3, 4, 2, 7, 8, 7, 6, 8, 9, 8, 7,
          6, 7, 7, 6, 3, 2, 1, 3)
trat <- gl(5, 4, 20, labels = c ("ctrl", "EM", "Ra4h",
           "AG", "AC"))

Exper <- data.frame(trat, germ)

boxplot(Exper$germ ~ Exper$trat, col= "purple",
        xlab = "Tratamientos", ylab = "Germinación (%)")
```
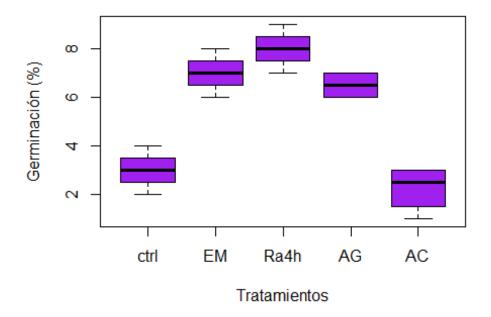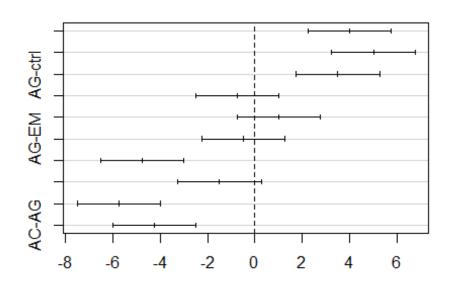
```
# Revisar normalidad
shapiro.test(Exper$germ)

##
##  Shapiro-Wilk normality test
##
## data:  Exper$germ
## W = 0.90183, p-value = 0.04462

# Revisa la igualdad de varianzas
bartlett.test(Exper$germ, Exper$trat)

##
##  Bartlett test of homogeneity of variances
##
## data:  Exper$germ and Exper$trat
## Bartlett's K-squared = 0.65675, df = 4, p-value = 0.9566

med.trat <- tapply(Exper$germ, Exper$trat, mean)
med.trat

## ctrl   EM Ra4h   AG   AC
## 3.00 7.00 8.00 6.50 2.25

# Media general
MG<- mean(Exper$germ)
```

```r
var.trat <- tapply(Exper$germ, Exper$trat, var)
var.trat
```

```
##      ctrl        EM      Ra4h        AG        AC
## 0.6666667 0.6666667 0.6666667 0.3333333 0.9166667
```

```r
Exper$SC <- (Exper$germ - MG) ^2

# Suma de cuadrados del experimento SCTotal
SCtot <- sum(Exper$SC)


# Suma de cuadrados del tratamiento SCTrat
SCtrat <- sum((med.trat-MG)^2*4)
SCtrat
```

```
## [1] 104.8
```

```r
# Suma cuadrado del error
SCtot - SCtrat
```

```
## [1] 9.75
```

```r
SCtrat/4
```

```
## [1] 26.2
```

```r
9.7/15
```

```
## [1] 0.6466667
```

```r
26.2/0.64
```

```
## [1] 40.9375
```

```r
# ANOVA usando función aov

Exp.aov <- aov(Exper$germ ~ Exper$trat)

# Existen diferencias entre los trat de germ
# Por lo tanto, aplicaremos una prueba de Tukey

TukeyHSD(Exp.aov)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = Exper$germ ~ Exper$trat)
##
## $`Exper$trat`
##           diff       lwr       upr    p adj
## EM-ctrl   4.00  2.2396122  5.7603878 0.0000356
```

```
## Ra4h-ctrl   5.00   3.2396122   6.7603878 0.0000024
## AG-ctrl     3.50   1.7396122   5.2603878 0.0001587
## AC-ctrl    -0.75  -2.5103878   1.0103878 0.6862491
## Ra4h-EM     1.00  -0.7603878   2.7603878 0.4332120
## AG-EM      -0.50  -2.2603878   1.2603878 0.9009428
## AC-EM      -4.75  -6.5103878  -2.9896122 0.0000045
## AG-Ra4h    -1.50  -3.2603878   0.2603878 0.1140897
## AC-Ra4h    -5.75  -7.5103878  -3.9896122 0.0000004
## AC-AG      -4.25  -6.0103878  -2.4896122 0.0000175
```

```
plot(TukeyHSD(Exp.aov))
```


95% family-wise confidence level

Differences in mean levels of Exper$trat