

DA_Anova.R

USUARIO 1

2024-05-08

```
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#2071394  
#08/05/2024
```

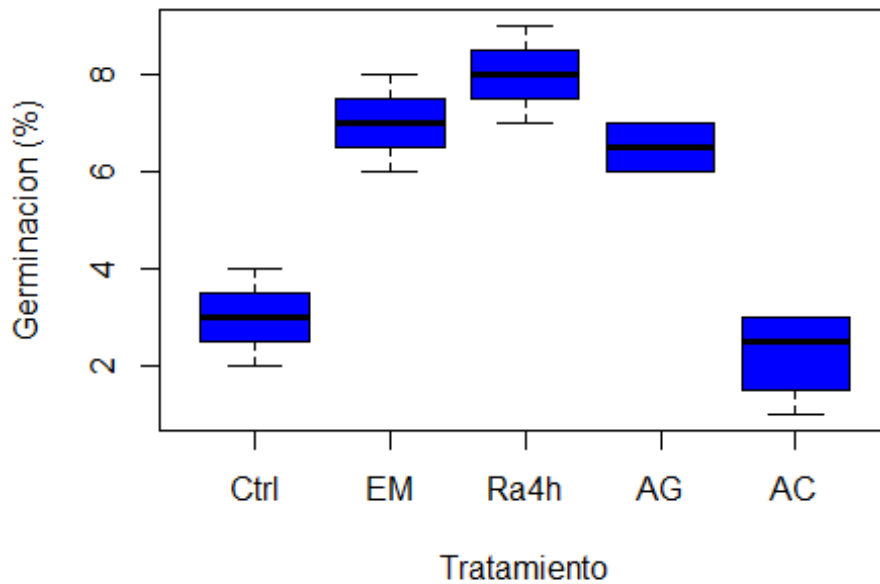
```
# Ingresar datos -----  
--
```

```
#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"))
```

```
Experimento <- data.frame(trat, germ)
```

```
boxplot(Experimento$germ ~ Experimento$trat, col = "blue", xlab =  
"Tratamiento", ylab = "Germinacion (%)")
```



```
# Revisar normalidad
```

```
shapiro.test(Experimento$germ)
```

```
##
```

```
## Shapiro-Wilk normality test
```

```
##
```

```
## data: Experimento$germ
```

```
## W = 0.90183, p-value = 0.04462
```

```
#Revisa la igualdad de la varianza
```

```
bartlett.test(Experimento$germ, Experimento$trat)
```

```
##
```

```
## Bartlett test of homogeneity of variances
```

```
##
```

```
## data: Experimento$germ and Experimento$trat
```

```
## Bartlett's K-squared = 0.65675, df = 4, p-value = 0.9566
```

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

```
med.trat
```

```
## Ctrl EM Ra4h AG AC
```

```
## 3.00 7.00 8.00 6.50 2.25
```

```
#Media general
```

```
MG <- mean(Experimento$germ)
```

```

var.trat <- tapply(Experimento$germ, Experimento$trat, var)
var.trat

##          Ctrl          EM          Ra4h          AG          AC
## 0.6666667 0.6666667 0.6666667 0.3333333 0.9166667

Experimento$SC <- (Experimento$germ - MG)^2

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

## [1] 114.55

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

## [1] 104.8

#Suma de cuadrado error
SCtot - SCtrat

## [1] 9.75

SCtrat/4

## [1] 26.2

9.7/15

## [1] 0.6466667

26.2/0.64

## [1] 40.9375

#ANOVA usando funcion aov
Exp.aov <- aov(Experimento$germ ~ Experimento$trat)
summary(Exp.aov)

##              Df Sum Sq Mean Sq F value    Pr(>F)
## Experimento$trat  4 104.80    26.20   40.31 7.42e-08 ***
## Residuals       15   9.75     0.65
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

#Existen diferencias entre Los trat de germ
#Por Lo tanto, aplicaremos prueba de Tukey

TukeyHSD(Exp.aov)

## Tukey multiple comparisons of means
## 95% family-wise confidence level

```

```
##
## Fit: aov(formula = Experimento$germ ~ Experimento$strat)
##
## `$Experimento$strat`
##      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

