## Effect of digestion on composition and more

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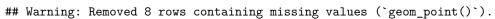
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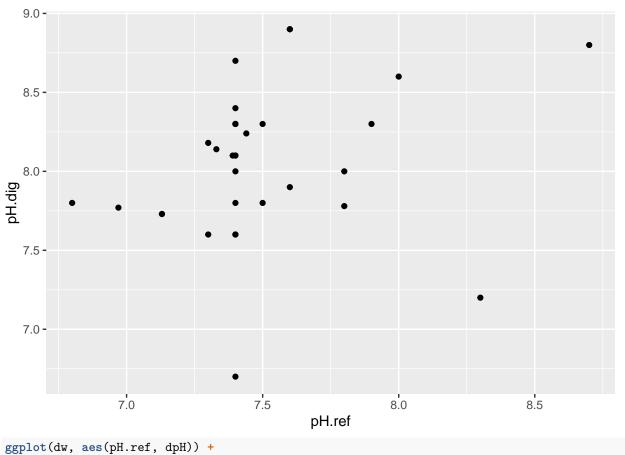
## Vars

geom\_point()

```
dw$dpH <- dw$pH.dig - dw$pH.ref
```

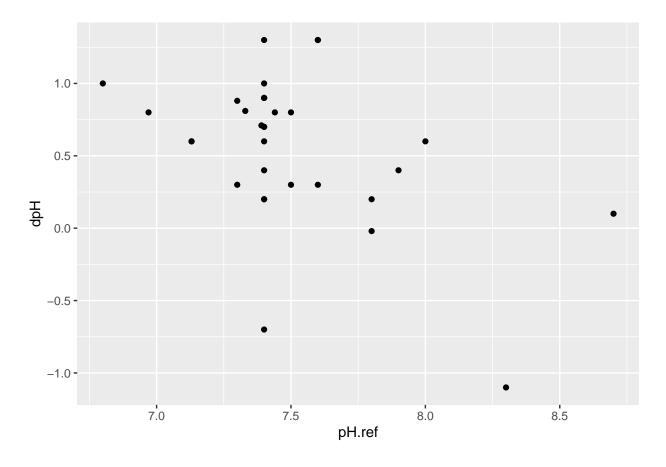
```
Plots
ggplot(dat, aes(source, pH, colour = relDiff.frac)) +
    geom_point() +
    theme(legend.position = 'top', axis.text.x = element_text(angle = 90, vjust = 0.5, hjust = 1))
## Warning: Removed 14 rows containing missing values (`geom_point()`).
                                                     relDiff.frac • digestate •
                                                                                                               reference
     9 -
     8
     7 -
표 6 -
     5 -
     4 -
     3 -
                                                                                                                                                                            Wagner et al. (2021) -
                                                                                                                                  Pedersen et al., in preparation A -
                                                                                                                                          Perschke et al., in prep
                                                       Hafner et al., in preparation
            Amon et al. (2006)
                     Anderson et al. (2023)
                             Chantigny et al. (2007)
                                     Chantigny et al. (2009)
                                              Clemens et al. (2006)
                                                               Hansen et al. (2004)
                                                                       Hjorth et al. (2009)
                                                                                Möller et al. (2009)
                                                                                        Neerackal et al. (2015)
                                                                                                 Nyord et al. (2012)
                                                                                                         Pain et al. (1990)
                                                                                                                  Pedersen and Nyord (2023)
                                                                                                                          Pedersen et al. (2021)
                                                                                                                                                   Riva et al. (2016)
                                                                                                                                                            Rubæk et al. (1996)
                                                                                                                                                                    Sommer et al. (2006)
                                                                                                                                                                                     Wulf et al. (2002)
                                                                                            source
ggplot(dw, aes(pH.ref, pH.dig)) +
```





geom\_point()

## Warning: Removed 8 rows containing missing values (`geom\_point()`).



## Stats

Try robust regression.

```
m1 <- lm(pH.dig ~ pH.ref, data = dw)</pre>
summary(m1)
##
## lm(formula = pH.dig ~ pH.ref, data = dw)
##
## Residuals:
       Min
                 1Q
                     Median
                                   ЗQ
                                           Max
## -1.32032 -0.20600 0.07968 0.27968 0.81368
##
## Coefficients:
              Estimate Std. Error t value Pr(>|t|)
##
                5.5785
                        1.7525
                                    3.183 0.00338 **
## (Intercept)
## pH.ref
                0.3300
                           0.2335
                                    1.413 0.16792
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
## Residual standard error: 0.4664 on 30 degrees of freedom
     (8 observations deleted due to missingness)
## Multiple R-squared: 0.06241, Adjusted R-squared: 0.03115
## F-statistic: 1.997 on 1 and 30 DF, \, p-value: 0.1679
```

```
m2 <- MASS::rlm(pH.dig ~ pH.ref, data = dw)
summary(m2)
##
## Call: rlm(formula = pH.dig ~ pH.ref, data = dw)
## Residuals:
##
       Min
                  1Q
                      Median
                                    3Q
                                             Max
## -1.33376 -0.22712 0.05298 0.23206 0.77509
##
## Coefficients:
               Value Std. Error t value
##
## (Intercept) 4.6610 1.3478
                                 3.4583
                                 2.5380
## pH.ref
               0.4558 0.1796
##
## Residual standard error: 0.34 on 30 degrees of freedom
     (8 observations deleted due to missingness)
Digestate pH does seem correlated with raw pH but only with robust regression. Issue seems to decrease in
change in pH at higher raw pH.
t.test(dw$dpH)
##
##
   One Sample t-test
##
## data: dw$dpH
## t = 6.0685, df = 31, p-value = 1.01e-06
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
## 0.3688892 0.7423608
## sample estimates:
## mean of x
## 0.555625
Clearly pH does increase, according to a one-sample t-test.
But look at change in pH:
m3 <- lm(dpH ~ pH.ref, data = dw)
summary(m3)
##
## lm(formula = dpH ~ pH.ref, data = dw)
##
## Residuals:
##
       Min
                  1Q
                      Median
                                    3Q
                                             Max
## -1.32032 -0.20600 0.07968 0.27968 0.81368
##
## Coefficients:
               Estimate Std. Error t value Pr(>|t|)
## (Intercept) 5.5785
                          1.7525 3.183 0.00338 **
## pH.ref
                -0.6700
                            0.2335 -2.869 0.00747 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
## Residual standard error: 0.4664 on 30 degrees of freedom
```

```
(8 observations deleted due to missingness)
## Multiple R-squared: 0.2153, Adjusted R-squared: 0.1892
## F-statistic: 8.233 on 1 and 30 DF, p-value: 0.007466
m4 <- MASS::rlm(dpH ~ pH.ref, data = dw)
summary(m4)
##
## Call: rlm(formula = dpH ~ pH.ref, data = dw)
## Residuals:
       Min
                  1Q
                      Median
## -1.33376 -0.22712 0.05298 0.23206 0.77509
## Coefficients:
##
               Value Std. Error t value
                                   3.4583
## (Intercept) 4.6610 1.3478
## pH.ref
              -0.5442 0.1796
                                   -3.0304
## Residual standard error: 0.34 on 30 degrees of freedom
     (8 observations deleted due to missingness)
Interestingly, the change in pH is negatively correlated with initial pH.
Change DM change.
dw$dDM <- dw$DM.dig - dw$DM.ref</pre>
t.test(dw$dDM)
##
##
   One Sample t-test
##
## data: dw$dDM
## t = -6.4365, df = 37, p-value = 1.614e-07
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
## -2.778377 -1.447939
## sample estimates:
## mean of x
## -2.113158
And DM clearly decreases.
```