

Package ‘qPCRtools’

August 15, 2022

Version 0.2.1

Title Tools for qPCR

Description RT-qPCR is a widely used method to detect the expression level of genes in biological research. A crucial step in processing qPCR data is to calculate the amplification efficiency of genes to determine which method should be used to calculate expression level of genes. This Package can do it easily. In addition to that, this package can calculate the expression level of genes based on three methods.

URL <https://github.com/lixiang117423/qPCRtools>

BugReports <https://github.com/lixiang117423/qPCRtools/issues>

License MIT + file LICENSE

Imports broom, data.table, dplyr, ggplot2, ggpmisc, ggthemes, kableExtra, magrittr, multcomp, readxl, reshape2, rstatix, sjmisc, stringr, tibble, tidyr, xlsx

RoxygenNote 7.2.1

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

Author Xiang LI [cre, aut]

Maintainer Xiang LI <lixiang117423@gmail.com>

R topics documented:

CalCurve	2
CalExp2ddCt	3
CalExpCurve	4
CalExpRqPCR	5
CalRTable	6
Index	7

CalCurve

*Standard Curve Calculation.***Description**

The function can calculate the standard curve. At the same time, it can get the amplification efficiency of primer(s). Based on the amplification efficiency, we can know which method can be used to calculate the expression level.

Arguments

`cq.table` The data frame of the position and Cq value.

`concen.table` The data frame of the position and concentration.

`highest.concen` The highest concentration for calculation.

`lowest.concen` The lowest concentration for calculation.

`dilution` Dilution factor of cDNA template. The default value is 4.

`by.mean` Calculation by mean Cq value or not. The default value is TRUE.

Value

A list.

Author(s)

Xiang LI [lixiang117423@gmail.com]

Examples

```
df.1.path <- system.file("examples", "calsc.cq.txt", package = "qPCRtools")
df.2.path <- system.file("examples", "calsc.info.txt", package = "qPCRtools")
df.1 <- data.table::fread(df.1.path)
df.2 <- data.table::fread(df.2.path)
CalCurve(
  cq.table = df.1,
  concen.table = df.2,
  lowest.concen = 4,
  highest.concen = 4096,
  dilu = 4,
  by = "mean"
) -> p

p[["table"]]
p[["figure"]]
```

CalExp2ddCt	<i>Calculate expression using standard curve.</i>
-------------	---

Description

Calculate expression using standard curve.

Arguments

cq.table	The data frame of the position and cq value.
design.table	The data frame of the position and corresponding information.
correction	Correct expression value by reference gene.
ref.gene	The name of reference gene.
ref.group	The name of reference group.
stat.method	Statistical method.
fig.type	Output image type, 'box' represents 'boxplot', 'bar' represents 'barplot'.
fig.ncol	Number of columes of figure.

Value

A list contain a table and a figure.

Author(s)

Xiang LI plixiang117423@gmail.com

Examples

```
df1.path = system.file("examples", "ddct.cq.txt", package = "qPCRtools")
df2.path = system.file("examples", "ddct.design.txt", package = "qPCRtools")

cq.table = data.table::fread(df1.path)
design.table = data.table::fread(df2.path)

CalExp2ddCt(cq.table,
            design.table,
            ref.gene = "OsUBQ",
            ref.group = "CK",
            stat.method = "t.test",
            fig.type = "box",
            fig.ncol = NULL) -> res

res[["table"]]
res[["figure"]]
```

CalExpCurve	<i>Calculate expression using standard curve.</i>
-------------	---

Description

Calculate expression using standard curve.

Arguments

cq.table	The data frame of the position and Cq value.
design.table	The data frame of the position and corresponding information.
correction	Correct expression value by reference gene.
ref.gene	The name of reference gene.
stat.method	Statistical method.
ref.group	The name of reference group.
fig.type	Output image type, 'box' represents 'boxplot', 'bar' represents 'barplot'.
fig.ncol	Number of columen of figure.

Value

A list contain a table and a figure.

Author(s)

Xiang LI jlixiang117423@gmail.comj

Examples

```
df1.path = system.file("examples", "cal.exp.curve.cq.txt", package = "qPCRtools")
df2.path = system.file("examples", "cal.expre.curve.sdc.txt", package = "qPCRtools")
df3.path = system.file("examples", "cal.exp.curve.design.txt", package = "qPCRtools")

cq.table = data.table::fread(df1.path)
curve.table = data.table::fread(df2.path)
design.table = data.table::fread(df3.path)

CalExpCurve(
  cq.table,
  curve.table,
  design.table,
  correction = TRUE,
  ref.gene = "OsUBQ",
  stat.method = "t.test",
  ref.group = "CK",
  fig.type = "box",
  fig.ncol = NULL) -> res

res[["table"]]
res[["figure"]]
```

CalExpRqPCR*Calculate expression using standard curve.*

Description

Calculate expression using standard curve.

Arguments

cq.table	The data frame of the position and cq value.
design.table	The data frame of the position and corresponding information.
correction	Correct expression value by reference gene.
ref.gene	The name of reference gene.
ref.group	The name of reference group.
stat.method	Statistical method.
fig.type	Output image type, 'box' represents 'boxplot', 'bar' represents 'barplot'.
fig.ncol	Number of columes of figure.

Value

A list contain a table and a figure.

Author(s)

Xiang LI jlixiang117423@gmail.comj

Examples

```
df1.path <- system.file("examples", "cal.expre.rqpcr.cq.txt", package = "qPCRtools")
df2.path <- system.file("examples", "cal.expre.rqpcr.design.txt", package = "qPCRtools")

cq.table <- data.table::fread(df1.path, header = TRUE)
design.table <- data.table::fread(df2.path, header = TRUE)

CalExpRqPCR(cq.table,
             design.table,
             ref.gene = NULL,
             ref.group = "CK",
             stat.method = "t.test",
             fig.type = "box",
             fig.ncol = NULL
             ) -> res

res[["table"]]
res[["figure"]]
```

CalRTable

Calculate RNA volume for reverse transcription.

Description

The first step of qPCR is usually the preparation of cDNA. We need to calculate the column of RNA for reverse transcription to cDNA. So, if we have the concentration of RNA, we can use the function ‘CalRTable’ to do that.

Arguments

<code>data</code>	A data.frame contained the sample names and the concentration value. The default unit of concentration is ng/uL.
<code>template</code>	A data.frame contained the information of reverse transcription. In this data.frame there must be a column called ‘all’.
<code>RNA.weight</code>	RNA weight required for reverse transcription. Default is 1 ug.

Value

A list contain a table and a figure.

Author(s)

Xiang LI plixiang117423@gmail.com;

Examples

```
df.1.path <- system.file("examples", "crtv.data.txt", package = "qPCRtools")
df.2.path <- system.file("examples", "crtv.template.txt", package = "qPCRtools")
df.1 <- data.table::fread(df.1.path)
df.2 <- data.table::fread(df.2.path)
result <- CalRTable(data = df.1, template = df.2, RNA.weight = 2)
head(result)
```

Index

CalCurve, [2](#)
CalExp2ddCt, [3](#)
CalExpCurve, [4](#)
CalExpRqPCR, [5](#)
CalRTable, [6](#)