Package ‘uneqmixr’

June 7, 2022

Type Package

Title Modelling the Quantity of Material Sampled in the Risk Assessment

Version 0.0.1

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URL https://github.com/Mayooran1987/uneqmixr

BugReports https://github.com/Mayooran1987/uneqmixr/issues

Description This package allows general practitioners to get probability estimations and graphical displays in the risk assessment. This study mainly focuses on the risk assessment when aggregating unequal incremental samples in the production process.

License GPL (>= 2)

Encoding UTF-8

LazyData true

Imports extraDistr, ggplot2, ggthemes, reshape2, stats

Suggests spelling,
testthat

RoxygenNote 7.2.0

Depends R (>= 4.0)

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Language en-US

R topics documented:

`scenario_1A_OC` *Construction of Operating Characteristic (OC) curve under lot with homogeneous contaminations.*

Description

`scenario_1A_OC` provides the Operating Characteristic (OC) curves under scenario 1 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_1A_OC(mulow, muhigh, sd, M, m1, n)
```

Arguments

`mulow`	the lower value of the mean concentration (μ) for use in the graphical display's x-axis.
`muhigh`	the upper value of the mean concentration (μ) for use in the graphical display's x-axis.
`sd`	standard deviation on the log10 scale (default value 0.8).
`M`	the quantity (weight) of the aggregate sample.
`m1`	the quantity (weight) of the based sample for the risk assessment (for this research, we used a quantity of sample which is to be the minimum quantity of selected incremental samples).
`n`	number of aggregate samples which are used for inspection.

Details

`scenario_1A_OC` provides the Operating Characteristic (OC) curves under scenario 1 of modelling the quantity of material sampled in the risk assessment study. Under this scenario (lot with homogeneous contaminations), we employed Poisson distribution to the model number of micro-organisms in the incremental samples. The purpose of this function used for compares different sets of sampling schemes when lot with heterogeneous and high-level contamination. Under this scenario expected cell count in each incremental sample can be written in terms of the based incremental sample's expected cell count (for this study, the based sample is a sample that is to be the minimum quantity). The probability of acceptance is plotted against mean log10 concentration and expected cell counts. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu + log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Operating Characteristic (OC) curves under lot with homogeneous contaminations.

See Also

scenario_1A_pd

Examples

```
mulow <- -6
muhigh <- 0
sd <- 0.8
M <- 60
m1 <- c(5,10,15)
n <- 10
scenario_1A_OC(mulow, muhigh, sd, M, m1, n)
```

`scenario_1A_pd` *Probability of detection estimation when lot with homogeneous contaminations.*

Description

`scenario_1A_pd` provides a probability of detection under scenario 1 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_1A_pd(lambda, M, m1)
```

Arguments

`lambda`	expected cell count in the based sample (for this research, we used a quantity of sample which is to be the minimum quantity of selected incremental samples).
`M`	the quantity (weight) of the aggregate sample.
`m1`	the quantity (weight) of the based sample for the risk assessment.

Details

`scenario_1A_pd` provides a probability of detection under scenario 1 of modelling the quantity of material sampled in the risk assessment study. Under this scenario (a lot with homogeneous contaminations), we employed Poisson distribution to the model number of micro-organisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu + log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Probability of detection under lot with homogeneous contaminations.

Examples

```
lambda <- 0.05
M <- 60
m1 <- 5
scenario_1A_pd(lambda, M, m1)
```

`scenario_1B_OC` *Construction of Operating Characteristic (OC) curve under lot with homogeneous contaminations based on simulations results.*

Description

scenario_1B_OC provides the Operating Characteristic (OC) curves under scenario 2 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_1B_OC(mulow, muhigh, sd, m1, m2, n, n_sim)
```

Arguments

mulow	the lower value of the mean concentration (μ) for use in the graphical display's x-axis.
muhigh	the upper value of the mean concentration (μ) for use in the graphical display's x-axis.
sd	standard deviation on the log10 scale (default value 0.8).
m1	the vector of the first set of incremental samples (with equal/unequal weights).
m2	the vector of the second set of incremental samples (with equal/unequal weights).
n	number of aggregate samples which are used for inspection.
n_sim	number of simulations (large simulations provide more precious estimation).

Details

scenario_1B_OC provides the Operating Characteristic (OC) curves under scenario 2 of modelling the quantity of material sampled in the risk assessment study. The purpose of this function used for compares two different sets of sampling schemes when lot with homogeneous contaminations. Nevertheless, each sampling scheme's total quantity (weight of aggregate sample (say M)) must be equal. The probability of acceptance is plotted against mean log10 concentration and expected cell counts. We employed Poisson distribution to the model number of micro-organisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu + log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Operating Characteristic (OC) curves when lot with homogeneous contaminations.

See Also

scenario_1B_pd

Examples

```
mulow <- -6
muhigh <- 0
sd <- 0.8
m1 <- c(10,10,10,10,10,10)
m2 <- c(10,12,18,20)
n <- 10
n_sim <- 100000
scenario_1B_OC(mulow, muhigh, sd, m1, m2, n, n_sim)
```

`scenario_1B_pd` *Probability of detection estimation when lot with homogeneous contaminations based on simulations.*

Description

`scenario_1B_pd` provides a probability of detection under scenario 1 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_1B_pd(mu, sd, m, n_sim)
```

Arguments

`mu`	the the mean concentration (μ).
`sd`	standard deviation on the log10 scale (default value 0.8).
`m`	the vector of incremental samples (with equal/unequal weights).
`n_sim`	number of simulations (large simulations provide more precious estimation).

Details

`scenario_1B_pd` provides a probability of detection under scenario 1 of modelling the quantity of material sampled in the risk assessment study. Under this scenario (lot with homogeneous contaminations), we employed Poisson distribution to the model number of micro-organisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu+log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Probability of detection when lot with homogeneous contaminants by simulations results.

Examples

```
mu <- -3
sd <- 0.8
m <- c(5,10,15,5,10,10,5)
n_sim <- 100000
scenario_1B_pd(mu, sd, m, n_sim)
```

scenario_2_OC *Construction of Operating Characteristic (OC) curve under lot with heterogeneous and high-level contamination.*

Description

scenario_2_OC provides the Operating Characteristic (OC) curves under scenario 2 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_2_OC(mulow, muhigh, sd, m1, m2, n, n_sim)
```

Arguments

mulow	the lower value of the mean concentration (μ) for use in the graphical display's x-axis.
muhigh	the upper value of the mean concentration (μ) for use in the graphical display's x-axis.
sd	standard deviation on the log10 scale (default value 0.8).
m1	the vector of the first set of incremental samples (with equal/unequal weights).
m2	the vector of the second set of incremental samples (with equal/unequal weights).
n	number of aggregate samples which are used for inspection.
n_sim	number of simulations (large simulations provide more precious estimation).

Details

scenario_2_OC provides the Operating Characteristic (OC) curves under scenario 1 of modelling the quantity of material sampled in the risk assessment study. The purpose of this function used for compares two different sets of sampling schemes when lot with heterogeneous and high-level contamination. Nevertheless, each sampling scheme's total quantity (weight of aggregate sample (say M)) must be equal. The probability of acceptance is plotted against mean log10 concentration and expected cell counts. We employed Poisson lognormal distribution to the model number of micro-organisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu + log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Operating Characteristic (OC) curves when lot with heterogeneous and high-level contamination.

See Also

scenario_2_pd

Examples

```
mulow <- -10
muhigh <- 0
sd <- 0.8
m1 <- c(10,10,10,10,10,10)
m2 <- c(10,12,18,20)
n <- 10
n_sim <- 100000
scenario_2_OC(mulow, muhigh, sd, m1, m2, n, n_sim)
```

`scenario_2_pd` *Probability of detection estimation when lot with heterogeneous and high-level contamination.*

Description

scenario_2_pd provides a probability of detection under scenario 2 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_2_pd(mu, sd, m, n_sim)
```

Arguments

mu	the the mean concentration (μ).
sd	standard deviation on the log10 scale (default value 0.8).
m	the vector of incremental samples (with equal/unequal weights).
n_sim	number of simulations (large simulations provide more precious estimation).

Details

scenario_2_pd provides a probability of detection under scenario 2 of modelling the quantity of material sampled in the risk assessment study. Under this scenario (a lot with heterogeneous, high-level contamination), we employed Poisson lognormal distribution to the model number of micro-organisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu+log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Probability of detection when lot with heterogeneous and high-level contamination.

Examples

```
mu <- -3
sd <- 0.8
m <- c(5,10,15,5,10,10,5)
n_sim <- 100000
scenario_2_pd(mu, sd, m, n_sim)
```

`scenario_3_OC` *Construction of Operating Characteristic (OC) curve under lot with heterogeneous and low-level contamination.*

Description

`scenario_3_OC` provides the Operating Characteristic (OC) curves under scenario 2 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_3_OC(mulow, muhigh, sd, m1, m2, K, n, n_sim)
```

Arguments

`mulow`	the lower value of the mean concentration (μ) for use in the graphical display's x-axis.
`muhigh`	the upper value of the mean concentration (μ) for use in the graphical display's x-axis.
`sd`	standard deviation on the log10 scale (default value 0.8).
`m1`	the vector of the first set of incremental samples (with equal/unequal weights).
`m2`	the vector of the second set of incremental samples (with equal/unequal weights).
`K`	shape parameter (default value 0.25).
`n`	number of aggregate samples which are used for inspection.
`n_sim`	number of simulations (large simulations provide more precious estimation).

Details

`scenario_3_OC` provides the Operating Characteristic (OC) curves under scenario 2 of modelling the quantity of material sampled in the risk assessment study. The purpose of this function used for compares two different sets of sampling schemes when lot with heterogeneous and low-level contamination. Nevertheless, each sampling scheme's total quantity (weight of aggregate sample (say M)) must be equal. We employed Poisson gamma distribution to the model number of microorganisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu + log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Operating Characteristic (OC) curves when lot with heterogeneous and low-level contamination.

See Also

scenario_3_pd

Examples

```
mulow <- -5
muhigh <- 2
sd <- 0.8
m1 <- c(10,10,10,10,10,10)
m2 <- c(10,12,18,20)
K <- 0.05
n <- 10
n_sim <- 100000
scenario_3_OC(mulow, muhigh, sd, m1, m2, K, n, n_sim)
```

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scenario_3_pd — *Probability of detection estimation when lot with heterogeneous and low-level contamination.*

Description

scenario_3_pd provides a probability of detection under scenario 2 of modelling the quantity of material sampled in the risk assessment study.

Usage

```
scenario_3_pd(mu, sd, m, K, n_sim)
```

Arguments

mu	the the mean concentration (μ).
sd	standard deviation on the log10 scale (default value 0.8).
m	the vector of incremental samples(with equal/unequal weights).
K	shape parameter (default value 0.25).
n_sim	number of simulations (large simulations provide more precious estimation).

Details

scenario_3_pd provides a probability of detection under scenario 2 of modelling the quantity of material sampled in the risk assessment study. Under this scenario (a lot with heterogeneous, low-level contamination), we employed Poisson gamma distribution to the model number of microorganisms in the incremental samples. Based on the food safety literature, the expected cell count is given by $\lambda = 10^{\mu + log(10)\sigma^2/2}$. (this section will be updated later on)

Value

Probability of detection when lot with heterogeneous and low-level contamination.

Examples

```
mu <- -3
sd <- 0.8
m <- c(5,10,15,5,10,10,5)
K <- 0.05
n_sim <- 100000
scenario_3_pd(mu, sd, m, K, n_sim)
```

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