Hypothetical examples of FSO-derived Microbiological Criteria

*Campylobacter* and *Salmonella* in raw poultry

Marcel Zwietering
Laboratory of Food Microbiology

Contents

ALOP/FSO/MC
Dose-response
MC for prevalence
preventing the extremes?
number of cases (ALOP)

\[ \# \text{ of cases} = P \cdot C \cdot M \cdot S \cdot r \]

- **P**: Prevalence
- **C**: not log \( C \)!
- **M**: mass per serving
- **S**: amount of servings/ year
- **r**: virulence, state

FSO based on \( P \) and \( C \)
also compliance?

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Dose response: *Salmonella*

Figure 3.19: Comparison of all dose-response models with reported outbreak data.
Dose response: *Salmonella*

Risk assessments of *Salmonella* in eggs and broiler chickens

![Dose response graph for *Salmonella*](image)

**Figure 3.21** Comparison of alternative dose-response models in the -1.0 to 1.0 mean log dose interval.

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Dose response *Campylobacter*

![Dose response graph for *Campylobacter*](image)

**FIGURE 5.1** Beta-Poisson dose-response relationship for the probability of infection for *C. jejuni* based on human feeding trial data and two strains (A3249 and 81-176) and (model parameters, $\alpha = 0.21$, $\beta = 59.95$)

- **LCL** - Lower confidence limit
- **UCL** - Upper confidence limit

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Dose response

Large uncertainty ("impossible" to gather real data)

Often relative risk can be estimated more accurately

$P$ from 10% to 5%: factor 2 reduction in illness
$C$ from 2 logs to 1 log: in certain cases 90% reduction of illness, sometimes less

From FSO to PO

P/C at slaughter

storage
transport
storage
preparation

survivor of (inadequate) cooking
recontamination (hands, tools, surfaces)
Difficult to relate FSO/PO (growth, cross contamination inactivation
default: Proportional effect of C and P
P from 10% to 5%
Relation number at retail and resulting illness

Rarely occurring high contaminated servings are driving the risk to a large extent.

Does the uncertainty effect the decision?
From PO to MC?

Objective that must (100%?) be reached
Standardised Method
Measurement inaccuracy
Sampling frequency: false positives/false negatives

- fresh product, only way to make “virtually” Salmonella- or Campylobacter-free is heating and irradiation
- decontamination might have relevant effect

Criteria: presence/absence in 25 g

1) Prevalence: today 10% objective 5%

P rejection for c=0,1,2 with 5 samples

0 0.02 0.04 0.06 0.08 0.1

0 0.1 0.2 0.3 0.4 0.5

real prevalence

0 1 2
What would be the result of c=0

C=0:
real P=0.05 OK: Preject=0.23 \( (1-0.95^5) \)
real P=0.10 not OK: Paccept= 0.59 \( (0.9^5) \)

test is not discriminative
even with 20 samples 12% of not detecting P=0.1!

Better to focus on record of safety?

Force by ratio Pdetection/costs

How are criteria related to interventions

Pdetection
fine:
- 100€
- rework batch 1.000€
- destroy batch 10.000€
- blame and shame 100.000€
- out of business 10.000.000€

It is not the sampling scheme as such that determines policy and intentions producers
Approach

1) Set level for P
2) If more known about effects P/C set combined level P/C

1) method to prove compliance
2) method to reject highly contaminated batches

1) For example record of safety P=0.05 (yearly basis)
2) Batch where >100 cfu/g is rejected

Conclusions

Difficult to structurally relate ALOP/FSO/MC for fresh products where the main route is by mishandling/recontamination

RA can give clues for relative effects of interventions

record of safety / batch sampling only to detect/reject extremes