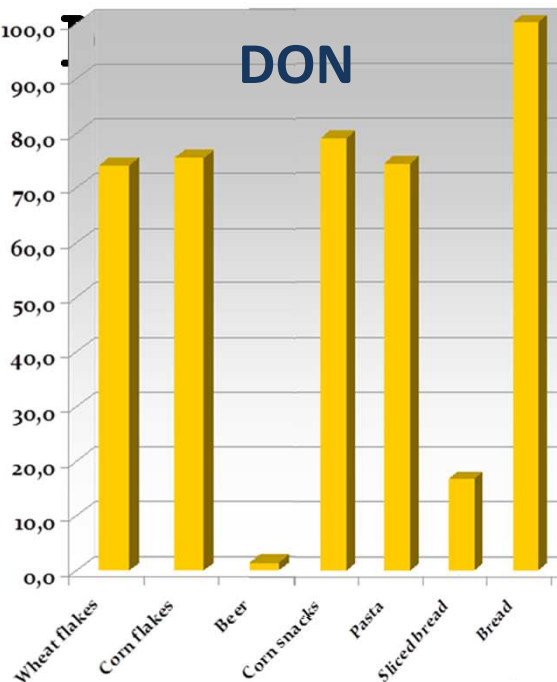


# Research on the metabolism and renal excretion of DON and DON-3-glucoside in humans.

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Marcel Mengelers and Sarah de Saeger.

- High presence of DON in food.



**Figure.** Percentage of DON in cereal products.

**References.** Cano-Sancho et al., 2011.

- DON-3-glucoside can have a large concentration in food.

**Table.** Obtained results for the ratio DON-3-glucoside/DON in raw cereals.

| References              | Ratio |
|-------------------------|-------|
| Berthiller et al., 2009 | 0.15  |
| Dall'Asta et al., 2013  | 0.28  |
| Rasmussen et al., 2013  | 0.22  |

**Table.** Obtained results for the ratio DON-3-glucoside/DON in breads.

| References             | Ratio |
|------------------------|-------|
| De Boevre et al., 2012 | 1     |
| De Boevre et al., 2012 | 0.84  |
| Vidal et al., 2016     | 0.75  |

# Introduction

## Objectives

## Methodology

## Results and discussion

## Conclusions

### - High presence of DON in urine.

-BIOMYC0-study (2012-2014, n=394):  
> 90 % DON + DON-glucuronides.  
(Heyndrickx et al., 2015)

-High levels of DON in urine, 56-69% children >>> TDI  
(DON TDI: 1 µg/kg bw/day)  
16-29% adults >>>

TDI

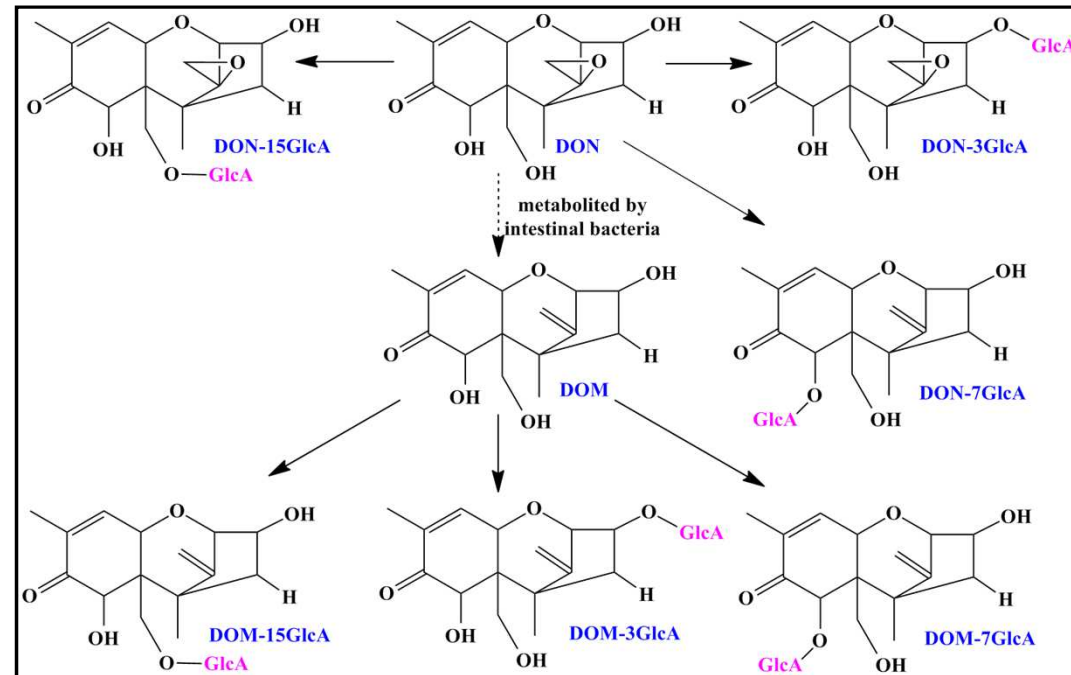


Figure. Some DON metabolites after DON intake.

### - Uncertainties:

1. Some DON biomarkers in urine can come from DON-3-glucoside ?

2. Morning urine or 24 h?

3. Excretion rate ? (72 % Turner et al., 2010; 68 % Warth et al., 2013)



- Unraveling the human metabolism of DON and DON-3-glucoside.
  - Excretion pattern of DON, DON-3-glucoside and metabolites + excretion-rates.
  - Standardized method to estimate DON-intake by means of biomarkers.

# • Intervention

**study.**

Restricted diet



Urine collection(24 h)

DON intake (1µg/ kg bw/day)

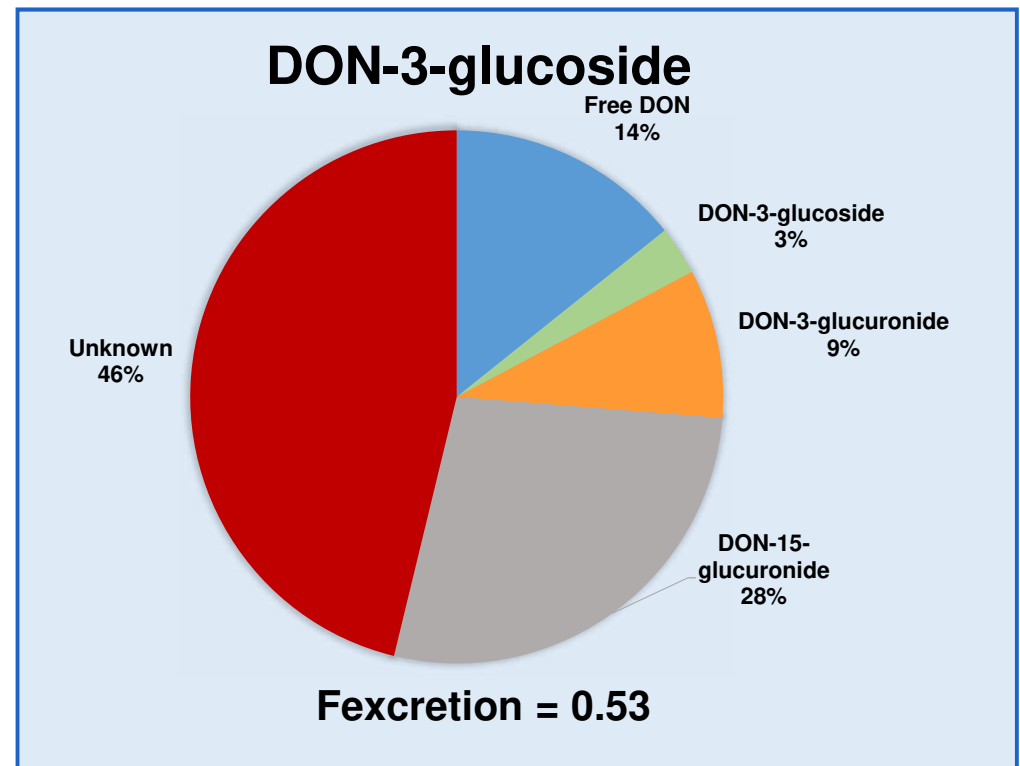
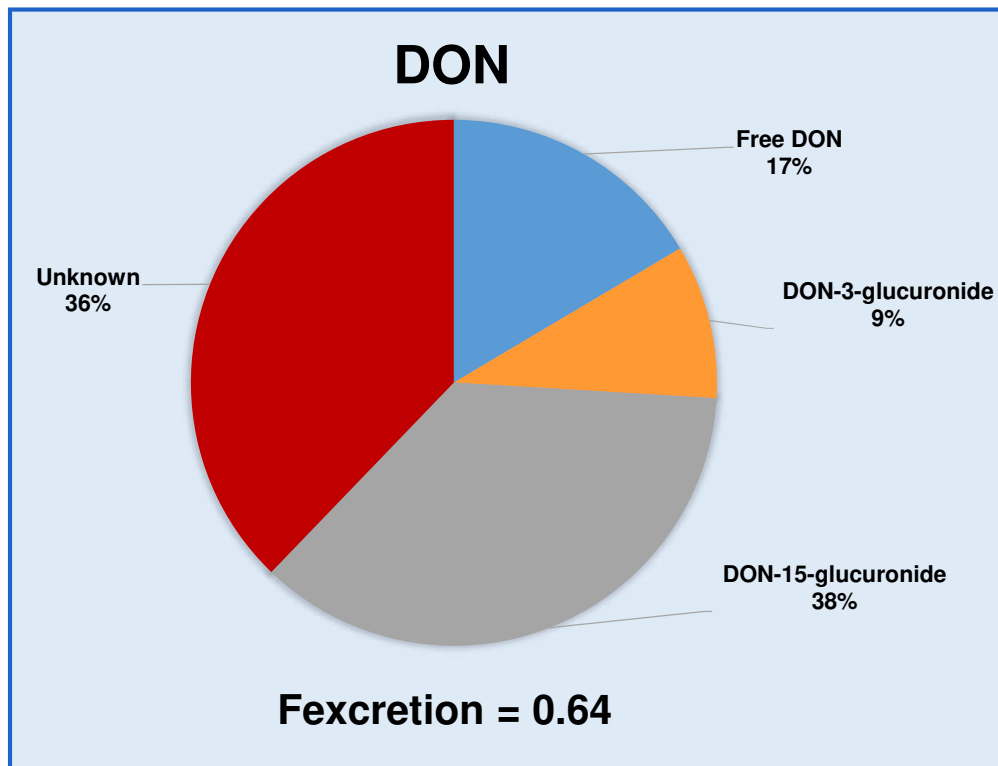
- Ethical Approval.
- Trial: 20 representative subjects (4 controls).
- 55 % women 45 % men.
- Average age = 32 years old.
- Questionnaire (Smoking, Coffee, BMI, ...).

• Analysis LC-

MS/MS •  
• QUECHERS method.

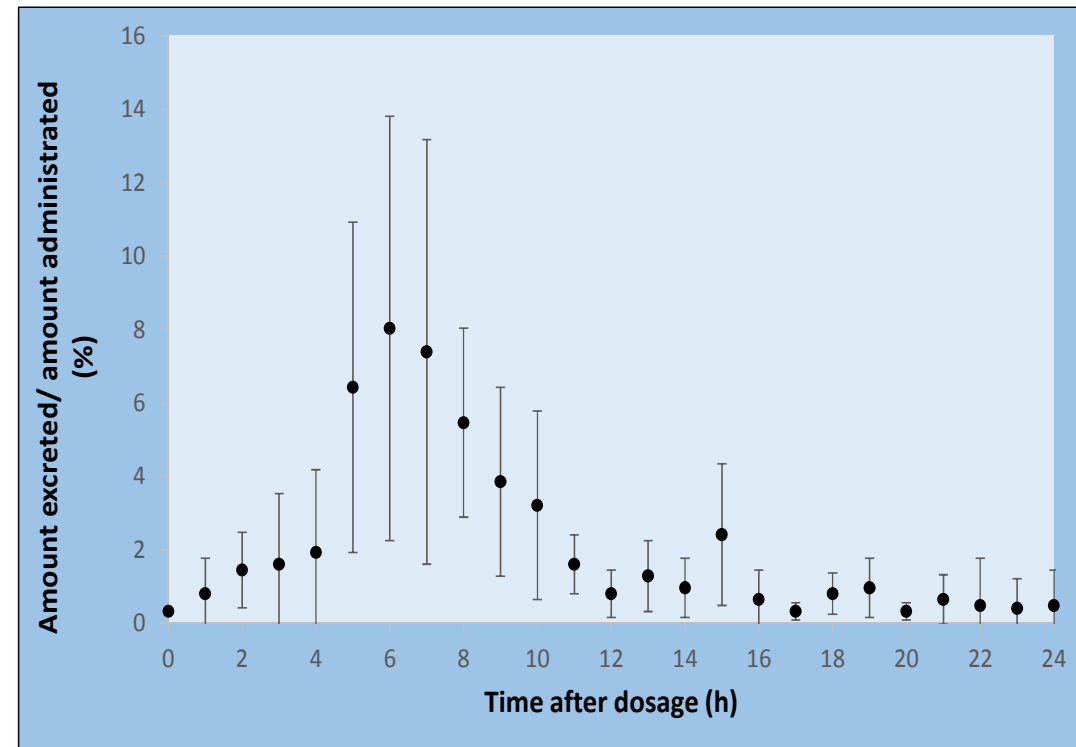
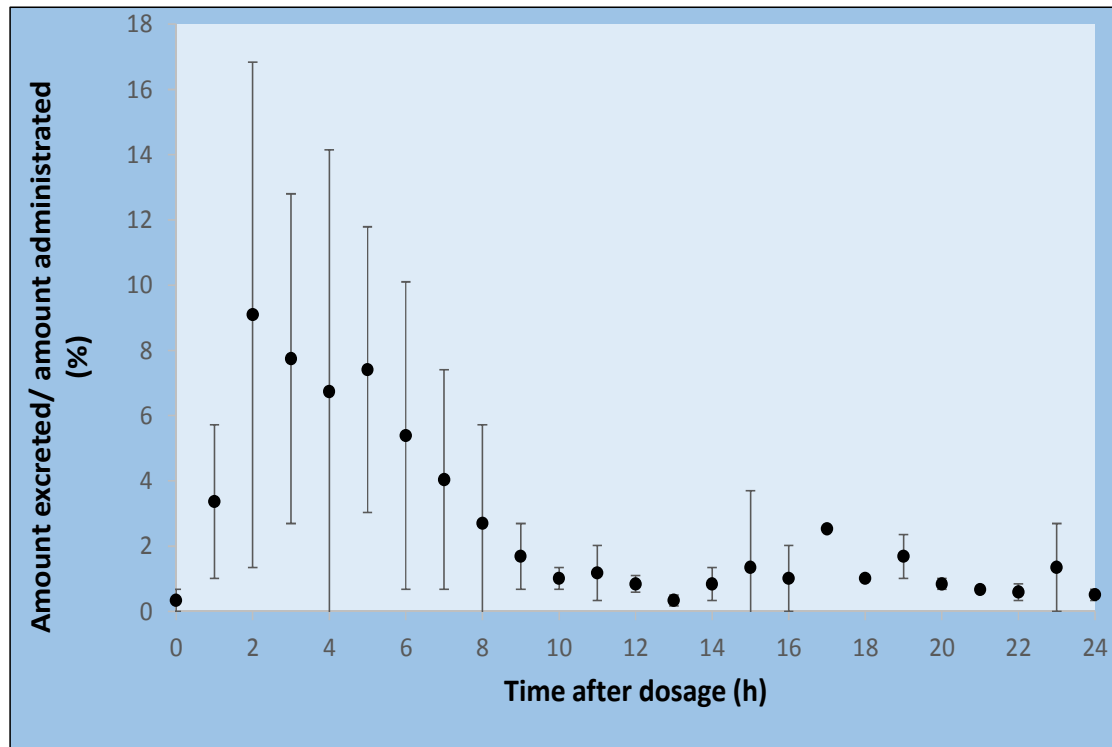
| Mycotoxin          | LOD<br>(µg/kg) | LOQ<br>(µg/kg) | Calibration<br>range<br>(µg/kg) | R<br>(mean) | Apparent<br>recovery (%) | SE  | RSD <sub>r</sub> | RSD <sub>R</sub> | U (%) |
|--------------------|----------------|----------------|---------------------------------|-------------|--------------------------|-----|------------------|------------------|-------|
| DON                | 0.2            | 0.4            | 0.5-100                         | 0.99        | 103.3                    | 7.6 | 5.5              | 6.6              | 14.8  |
| DON-3-glucoside    | 0.3            | 0.6            | 0.5-100                         | 0.99        | 97.8                     | 8.7 | 0.9              | 3.7              | 8.3   |
| DON-3-glucuronide  | 0.5            | 1.0            | 0.5-100                         | 0.99        | 111.3                    | 9.9 | 7.2              | 10.1             | 20.8  |
| DON-15-glucuronide | 0.4            | 0.9            | 0.5-100                         | 0.99        | 108.1                    | 9.9 | 7.2              | 10.1             | 20.7  |
| DOM-1              | 0.6            | 1.2            | 0.5-100                         | 0.99        | 101.3                    | 0.5 | 2.8              | 5.4              | 10.0  |
| 3-ADON/15-ADON     | 0.1            | 0.2            | 0.5-100                         | 0.99        | 105.1                    | 7.7 | 2.5              | 4.5              | 13.2  |

## Mycotoxins recovery after 24 hours of urine collection:

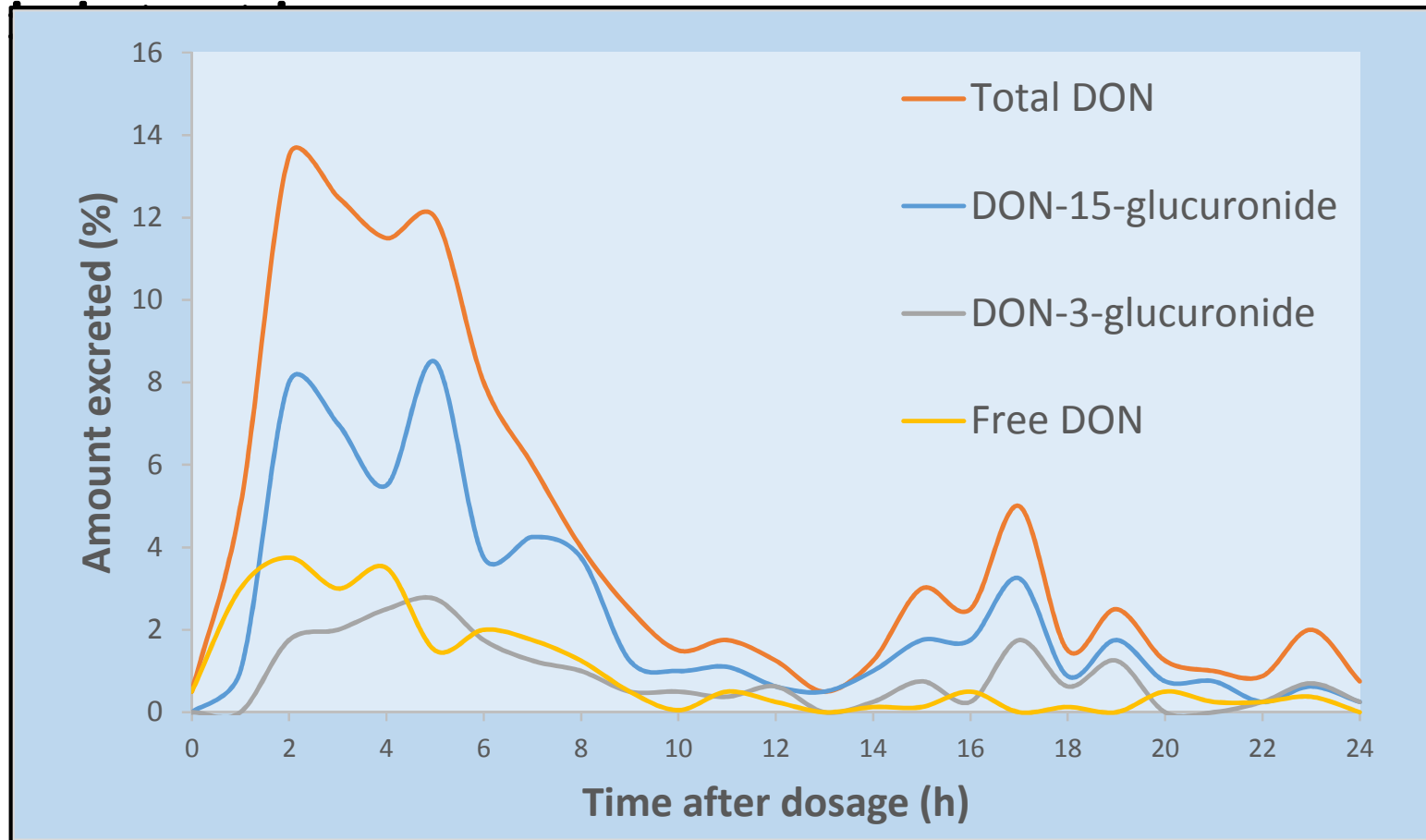




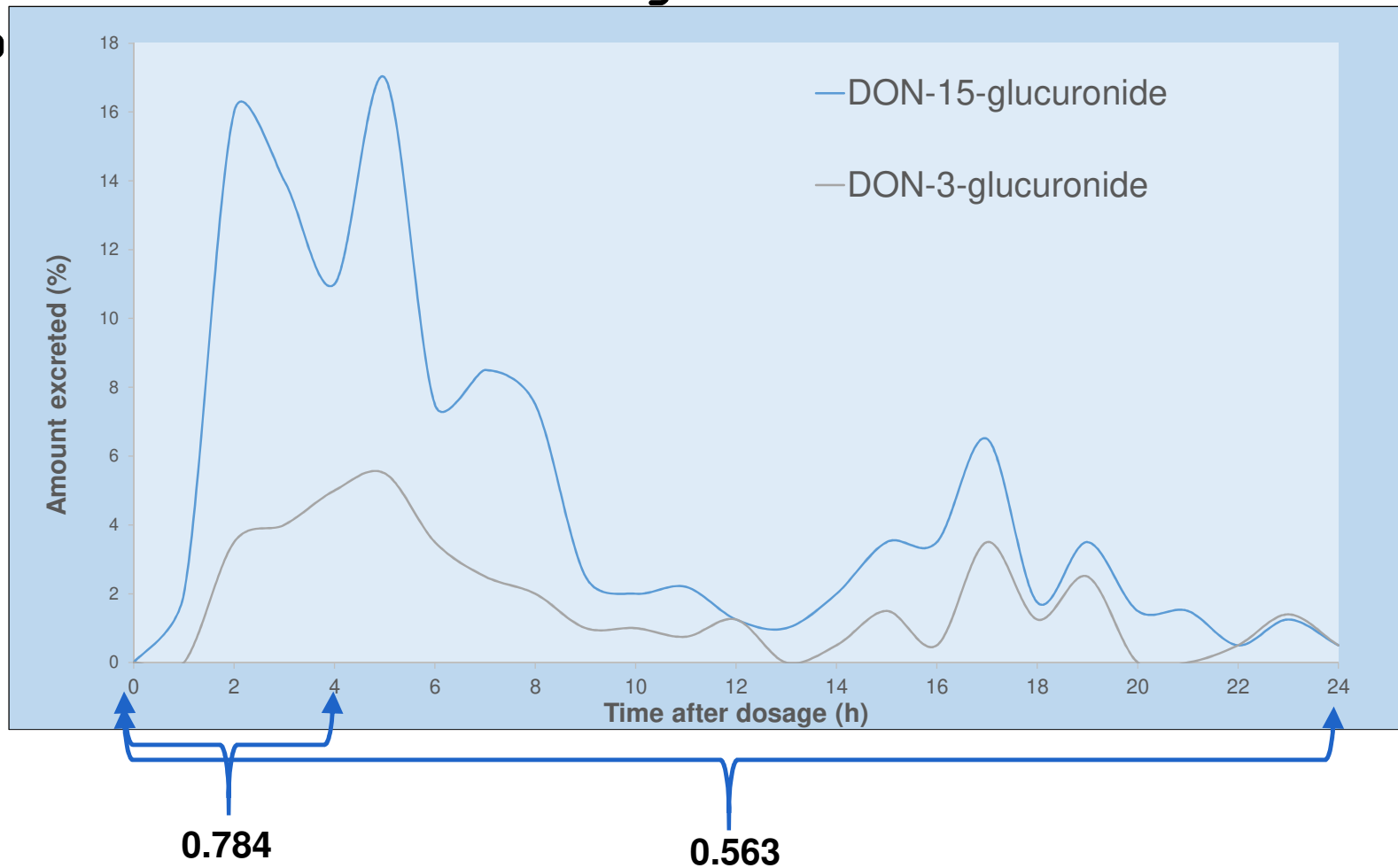
## Average percentage of total mycotoxin excreted in urine over time (h)



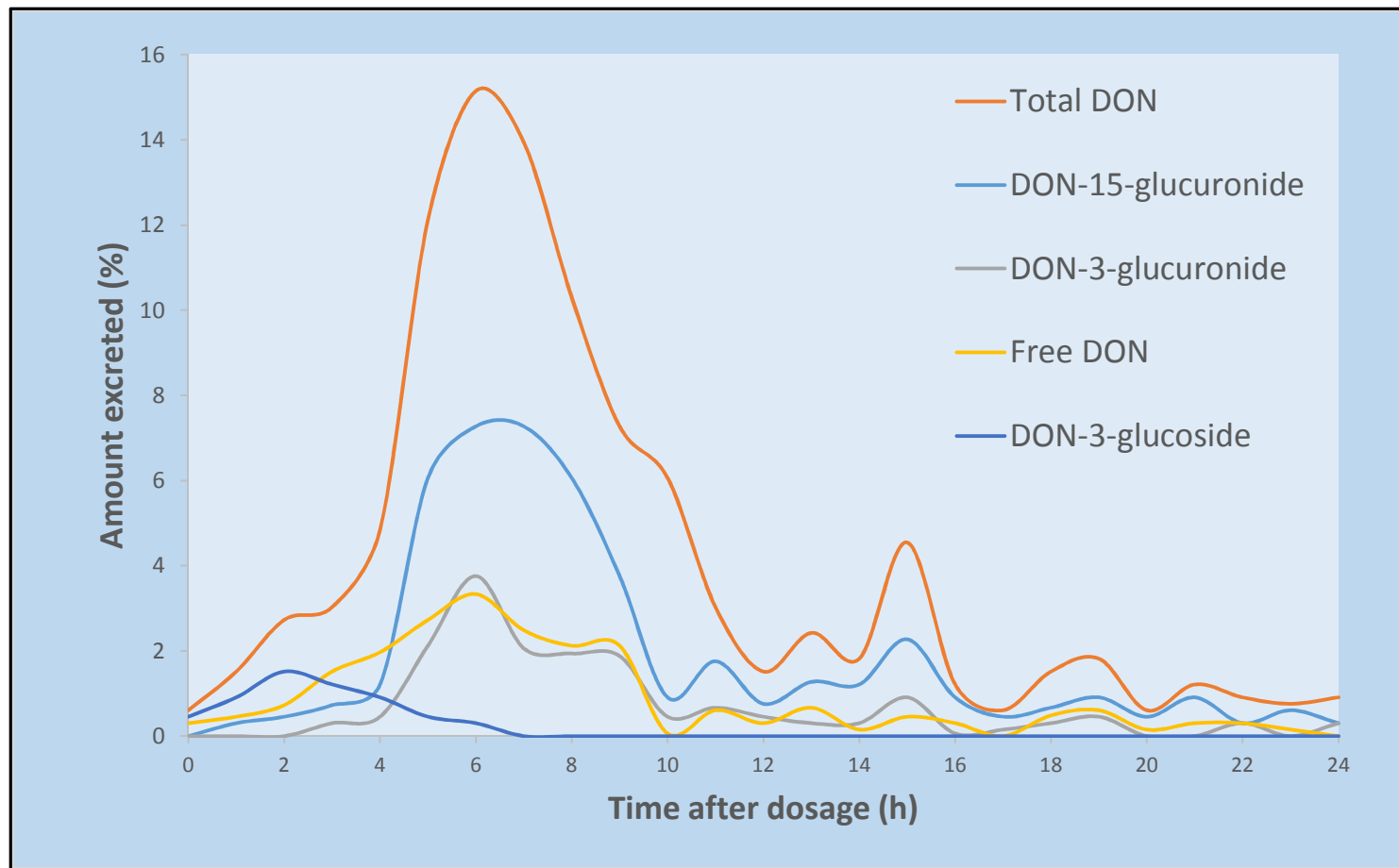
Excretion profile for average of total DON, DON-15-glucuronide, DON-3-glucuronide and free DON excreted after DON adm



## Correlation between DON-15-glucuronide and DON-3-glucuro

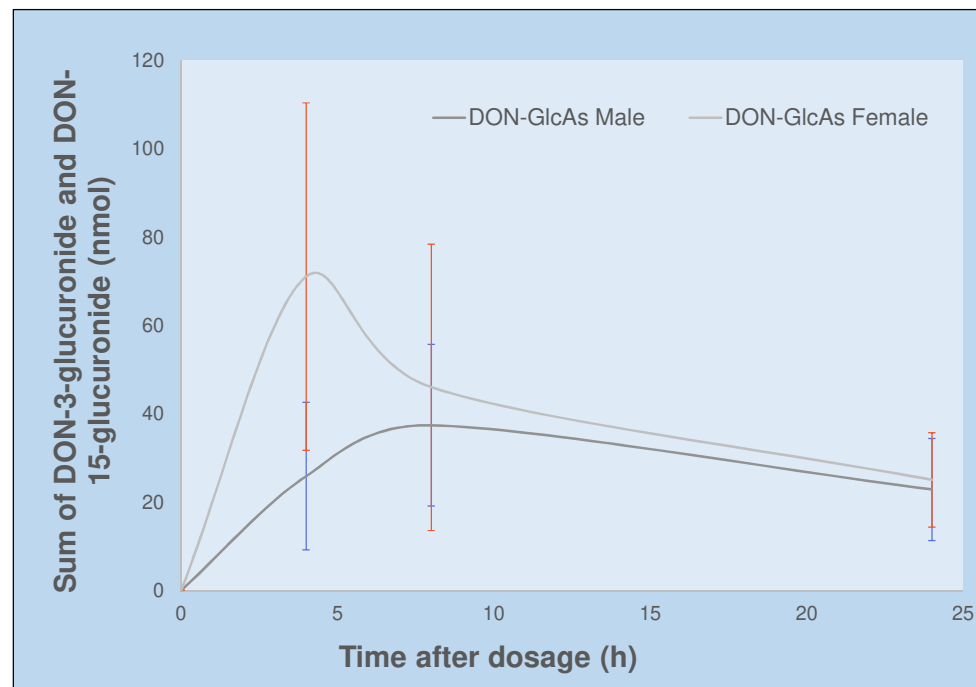


Average of total DON, DON-15-glucuronide, DON-3-glucuronide and free DON excreted after DON-3-glucoside administration.



Gender could affect the excretion of DON.

- Men excreted less total DON than women ( $p < 0.05$ ).
- Glucuronides were higher in women (UGT expression).



## Other factors did not cause variations:

- Age (children excreted more DON than adults?)
- BMI (hydrosoluble)
- Diet
- Coffee

# Conclusions:

- **0.64** for DON and **0.53** for DON-3-glucoside excretion rate.
- DON, **DON-15-glucuronide** and DON-3-glucuronide are main metabolites of DON.
- **Correlation** of DON-15-glucuronide and DON-3-glucuronide.
- DON represent a **fast excretion**, urine collection of 24 hours better than urine morning.

**Gender** affects the DON excretion.

Age, coffee, smoking or RMT did not show any affect to DON

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