

Technical University of Denmark



## Do pesticides affect the intestinal bacterial community and does this have health implications?

Nielsen, Lene Nørby; Roager, Henrik Munch; Escola Casas, Monica; Frandsen, Henrik Lauritz; Bay Gosewinkel, Ulrich; Bester, Kai; Licht, Tine Rask; Bohse Hendriksen, Niels; Bahl, Martin Iain

*Publication date:*  
2017

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Nielsen, L. N., Roager, H. M., Escola Casas, M., Frandsen, H. L., Bay Gosewinkel, U., Bester, K., ... Bahl, M. I. (2017). Do pesticides affect the intestinal bacterial community and does this have health implications?. Abstract from Dansk Selskab for Toksikologi og Farmakologi Årsmøde, Sønderborg, Denmark.

**DTU Library**  
Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Annual Meeting, Sandbjerg Manor, Sønderborg

## 2-3. November 2017

### “Gut, Metabolism and Brain in Health and disease”

#### Abstract

##### **Title**

Do pesticides affect the intestinal bacterial community and does this have health implications?

##### **Author's (underline the presenting author)**

Lene Nørby Nielsen<sup>a</sup>, Henrik M. Roager<sup>a</sup>, Mònica Escolà Casas<sup>b</sup>, Henrik L. Frandsen<sup>a</sup>, Ulrich Gosewinkel<sup>b</sup>, Kai Bester<sup>b</sup>, Tine Rask Licht<sup>a</sup>, Niels Bohse Hendriksen<sup>b</sup> and Martin Iain Bahl<sup>a</sup>

##### **Institutions**

<sup>a</sup>National Food Institute, Technical University of Denmark

<sup>b</sup>Department of Environmental Science, Aarhus University

##### **Background**

The intestinal bacterial community is now recognized as an important factor for health and implicated in numerous states of disease including, but not limited to, inflammatory bowel diseases. Despite the fairly extensive regulatory demands for risk assessment of pesticides in relation to human exposure, there is currently very little knowledge related to potential effects on the gut microbiota. It has however recently been speculated that glyphosate based herbicides may affect the gut microbiota of humans and animal husbandry due to inhibition of the Shikimate pathway in bacteria causing loss of aromatic amino acid synthesis and growth inhibition, supported by *in vitro* studies. Here we present results from the first animal trial to address this question.

##### **Methods**

Sprague Dawley rats (n=20/group) were exposed to glyphosate at 5x and 50x the acceptable daily intake (ADI) for humans. 16S rRNA gene sequencing of the bacterial community and liquid chromatography mass spectrometry (LC-MS) based metabolic profiling of aromatic amino acids and their downstream metabolites was applied to intestinal samples obtained after two weeks of oral dosing.

##### **Results**

We found that glyphosate had very limited effects on bacterial community composition even at the highest exposure concentration. Also we find relatively high concentrations of aromatic amino acids in the intestine of the animals.

##### **Discussion and conclusion**

Our data show that glyphosate inhibits bacterial growth in minimal medium but this inhibitory effect is relieved in the presence of aromatic amino acids in the growth medium. Results from the animal trial suggest that sufficient levels of aromatic amino acids are present in the rat intestine to alleviate the need for bacterial synthesis and thus prevent an antimicrobial effect of glyphosate *in vivo*.

SEPTEMBER 11, 2017

MEMBERS OF THE BOARD

EVA C. BONEFELD-JØRGENSEN  
PRESIDENT

GUNNAR TOFT  
TREASURER,  
SECTION FOR TOXICOLOGY

AGNETE LARSEN  
SECRETARY,  
SECTION FOR PHARMACOLOGY

LISBETH E. KNUDSEN  
SECTION FOR TOXICOLOGY

ANDERS JENSEN  
SECTION FOR PHARMACOLOGY

HOME PAGE  
[WWW.DSFTM.DK](http://WWW.DSFTM.DK)

CONTACT  
[INFO@DSFTM.DK](mailto:INFO@DSFTM.DK)

TAX REG: 33976771