AAP & WAAP & Interbull Congress 2023

Session 64

Assessing the Quality of Insect-Derived Products: Methods and Findings from the FARMYNG Project

30th August 2023

This project has received funding from the Bio Based Industries Joint Undertaking (JU) under grant agreement No 837750. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio Based Industries Consortium.

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EUROFINS, A START-UP THAT BECAME A WORLD LEADER

Created in
1987
in Nantes (FR)

€6.7bn
revenues in 2022

61,000
employees

900
laboratories

in
61 countries
across
6 continents

Performing
over 450m
tests per year

With
200,000+
analytical methods

In-depth Industry expertise in technical & regulatory matters
Focus on the protection of our customers' products & valuable brands

Data correct as of March 2023

Horizon 2020 European Union Funding for Research & Innovation

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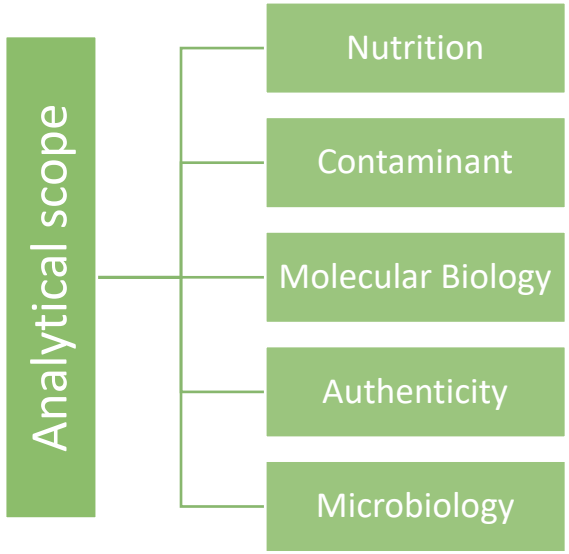
EUROFINS IN FEED AND PETFOOD TESTING

- 8 persons dedicated to serving Feed and Petfood industries in France : Analyzing samples and Consulting



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ROLE IN THE FARMYNG PROJECT

Eurofins: leader of the WP6 Quality, Safety, Purity assessment of insects based-products

Partners:

WP6 objectives: evaluate the quality of the products

- Nutritional composition
- Assessment of the presence of microbiological pathogens
- Quantification of potential chemical contaminants
- Check insect species authenticity

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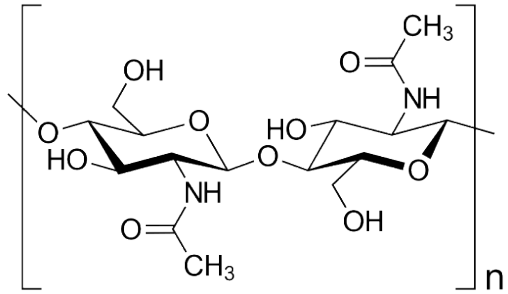
CHITIN CONTENT EVALUATION

Chitin: an insoluble fiber

- contained in the exoskeleton of the insects
- Leading to less digestibility of insect-based products.



Increasing demand for chitin quantification because chitin:

- Can contribute to overestimation of protein content
- Has the potential to act as an anti-nutritional factor

To date, no specific and targeted method for chitin quantification in insects

Comparisons between 3 different methods to determine the best one:

Method	Description	TAT	Applied by
Ynsect internal method	Reference method for accurate chitin determination	4-5 days	YNS
ADF-ADL	Viable alternative to acetyl group analysis for determination of chitin content	2-3 days	CRA-W + EAF
Crude fiber (cellulose)	Structure of cellulose is similar to that of chitin	1.5 days	CRA-W + EAF

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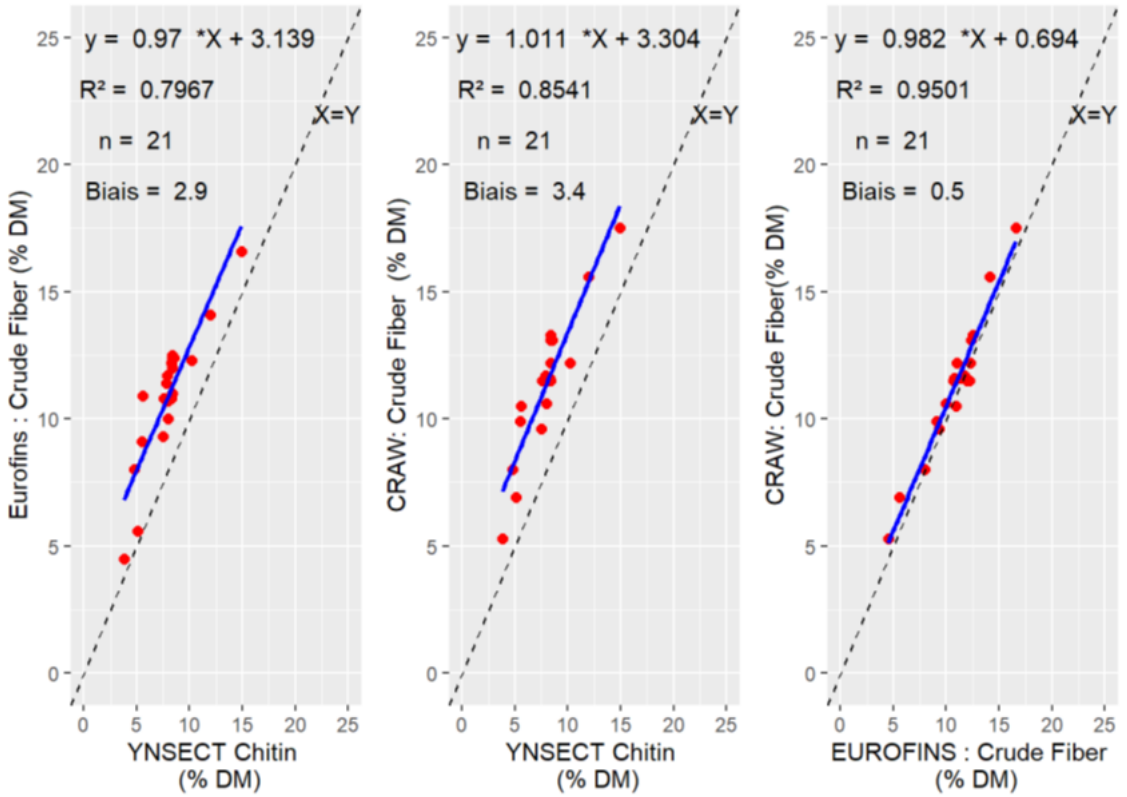
ADF-ADL OR CRUDE FIBER METHODS COULD BE USED FOR A RAPID ESTIMATION OF CHITIN CONTENT

- Good correlation between labs and methods: 0.79 < R2 < 0.95
- A bias is observed
- Both crude fiber / cellulose and ADF-ADL approaches can be used for rapid estimation of chitin content (quality control in industrial environment)
- Crude fiber / cellulose is the less time- and cost-consuming method
- Applicability to insect larvae and insect-based meal
- Method transferability demonstrated

Crude fiber



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POTENTIAL OF NIR SPECTROSCOPY TO PREDICT CHEMICAL COMPOSITION OF INSECT-BASED PRODUCTS

Parameters : moisture, protein, fat, cellulose and chitin

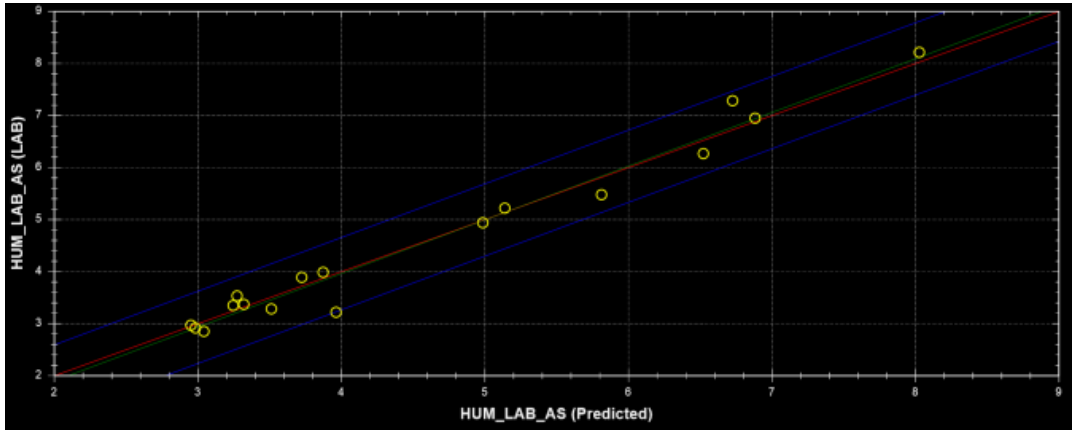
Two approaches:

- Specific: based on insect samples only. Better specificity, but smaller size and diversification
- Global: mix of insect samples and other feed samples. Larger size, but less specific

→ Good prediction performance, especially for fat and moisture.

→ Both approaches developed in this study performed similarly

→ Implementation of the approach in YnFarm to be evaluated



Correlation between the predicted and reference values for HUMIDITY - Specific Approach

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VERIFICATION OF MICROBIOLOGICAL METHODS ON THE MATRIX INSECT

5 methods necessary for YnFarm quality control are under verification

- Method performances verified on a specific unusual food matrix: insect-based product
- Verification is appropriate when no ring tests is available
- Including the new ISO/TS 15213-3 for *C. perfringens* detection

Type	Organism	Mode	Matrix	Method	Results
Bacteria	*Enterobacteriaceae*	Enumeration	Finished product	NF EN ISO 21528-2 at + 37°C	✓
Strains	*Salmonella ssp*	Detection	Finished product	NF EN ISO 6579-1	✓
Fungi	Yeasts and Moulds	Enumeration	Finished product	NF EN ISO 21527-2	✓
Strains	*C. perfringens*	Enumeration	Larvae	NF EN ISO 7937	
Strains	*C. perfringens*	Detection	Finished product	ISO/TS 15213-3	

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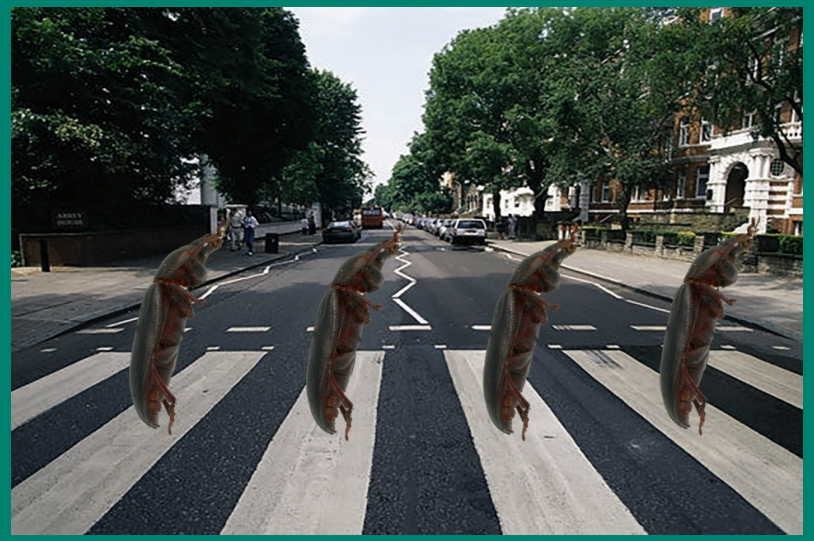
Thank you for your attention

Visit poster #42082 and discuss with our partners



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