# NitroSorg

## a research program dedicated to develop tools for improving grain quality and adapted to poultry feeding

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AVEC LA CONTRIBUTION FINANCIÈRE DU COMPTE D'AFFECTATION SPÉCIALE DÉVELOPPEMENT AGRICOLE ET RURAL

## Who ?

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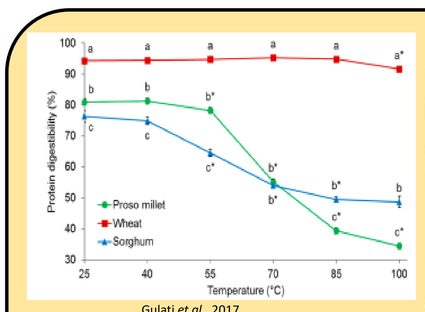
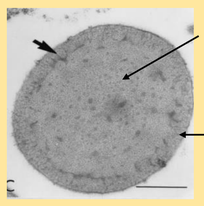
## Context and objectives



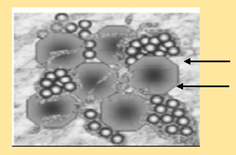
Gulati *et al.*, 2017

- Low digestibility of sorghum protein by gastro-intestinal enzymes, 25 % lower than others cereals (Gulati *et al*., 2017).
  Decreases with cooking
- Slowing down the adoption of sorghum for feed and food uses



**Protein bodies** (Duodu *et al.*, 2003)

- Low digestibility mainly linked to the Kafirin structure and properties (Kafirins represent 70 % of sorghum grain proteins).



Protein - Starch interaction
(De Mesa-Stonestreet et *al.*, 2010)

- other component/properties of the seed:
  -starch, tannins
  -endosperm texture

Phenotypic characterization of those traits using high throughput tools

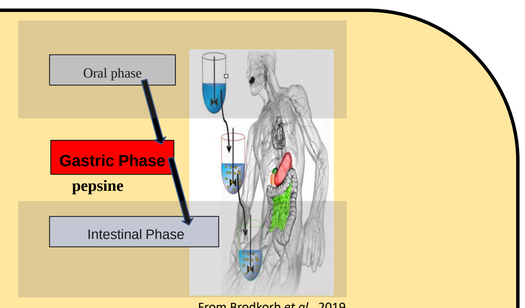
Development of breeding tools to optimize breeding efficiency

## Conduct of the project

**Screening of genotypes**
-EU commercial varieties
-Parental lines of the partner breeding programs
-Worldwide panel

**Genotyping**

**Collecting seeds**

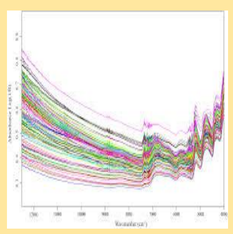


From Brodkorb *et al.*, 2019

-Low to middle throughput wet chemistry for protein, starch, tannins, protein digestibility (simple test with only one digestive enzyme) +texture

**Phenotypic characterization**
-NIRS (Near Infrared Spectrometry)

**Calibration**

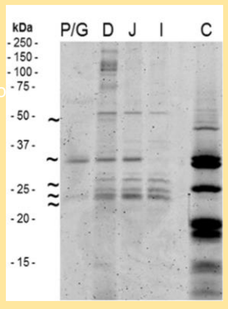


**Fine characterization of *in vivo* and *in vitro* digestibility**
-on a small panel of varieties
-5 varieties selected (high and low digestibility, one with tannins)
-compared to maize/wheat feeding as control

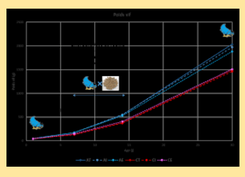
⇒Deciphering factors involved in protein digestibility

*In vivo* protein digestibility

6 groups of animals

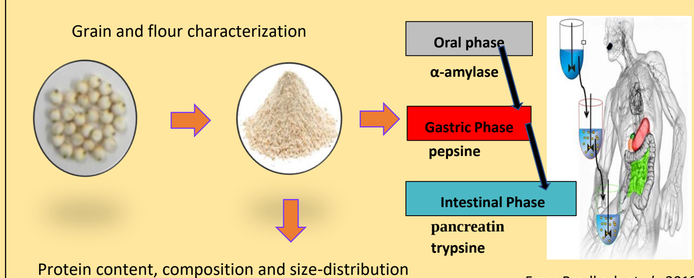


Analysis of protein digestion in the digestive tract by SDS-PAGE electrophoresis

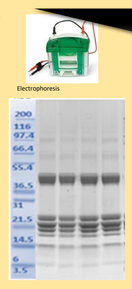

Rate of growth
Animal wellfare
Quality of of the meat

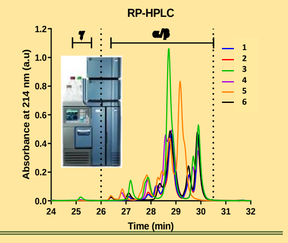
From Recoules *et al.*, 2017

*In vitro* protein digestibility



From Brodkorb *et al.*, 2019

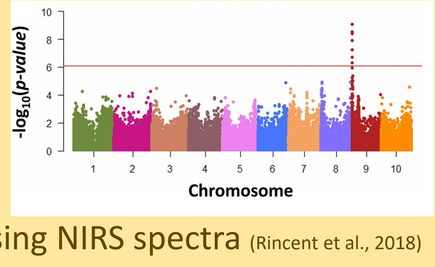




**UE PEAT**

**Breeding tools for grain quality traits**

-identification of genomic regions

Mono- and multi-traits analysis




-Genomic prediction calibration
-Phenomic selection calibration using NIRS spectra (Rincent et al., 2018)

⇒Optimize breeding efficiency

## References

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