Effect of pH and donor cow diet on ruminal linoleic acid delta12 and delta9 isomerisation

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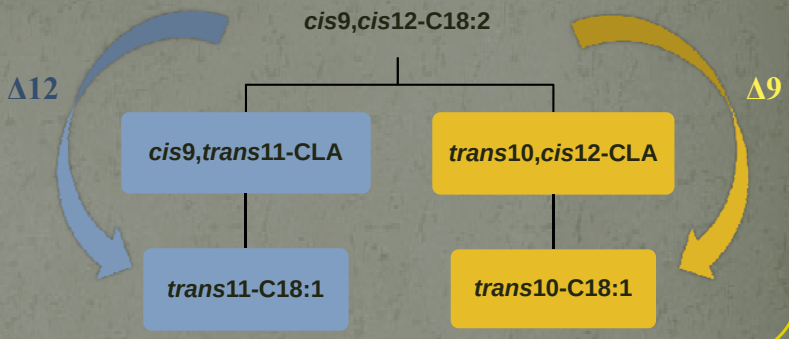
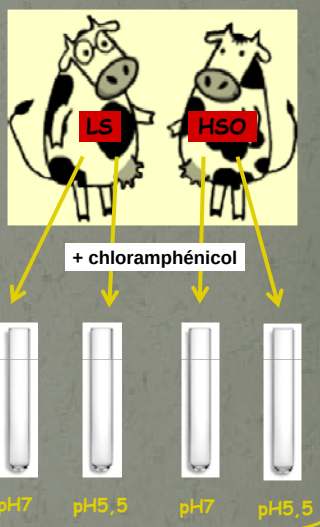
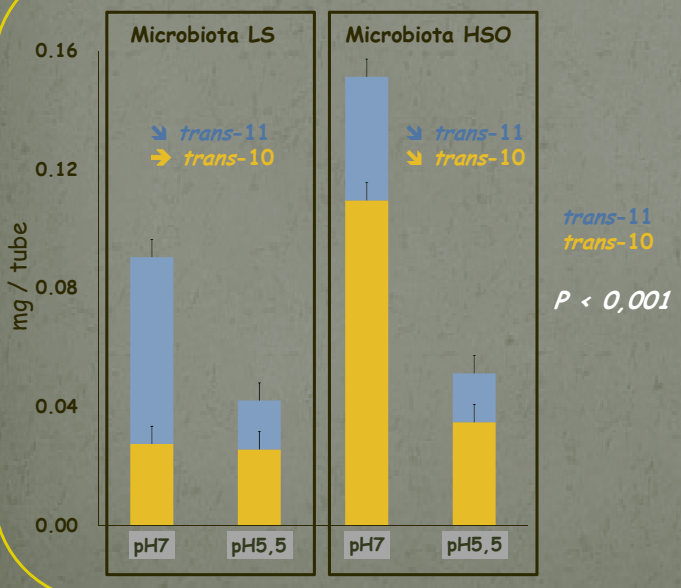
Due to the different effects of *trans* fatty acids on human health and cows' milk production, it is necessary to better understand the reactions of ruminal isomerisation of linoleic acid (cis9,cis12-C18:2), which lead to different isomers.



in vitro incubations

- We used 2 enzymatic solutions originating from rumen fluids collected from two cows:
  - one receiving a low-starch low-fat diet (**LS**, 22% starch, 3% fat, DM basis) inducing a high *trans*-11 isomers production.
  - and the other receiving a high-starch + sunflower oil (**HSO**) diet (33% starch, 7.3% fat, DM basis) inducing a high ruminal *trans*-10 isomers production.
- Before incubation, bacterial growth was inactivated in ruminal fluids with chloramphenicol, to avoid enzyme production during incubations .
- 1 ml of each enzymatic solution was incubated with 1 ml of a buffer solution (pH 5.5 or 7.0) in vials containing 0.5 mg of pure linoleic acid (Sigma®) for 1 hour in four replicates. Fatty acids of incubated vials were analysed by gas chromatography.





P < 0,001

With the microbiota LS, *trans*-11 isomers production was lower at pH 5.5 than at pH 7.0.

With the microbiota HSO, the low pH resulted in both a lower *trans*-11 and *trans*-10 isomers production at pH 5.5 than at pH 7.0.

➡ Low pH inhibts the two isomerisation pathways of linoleic acid.

The capacity of ruminal fluid to produce *trans*-10 isomers probably depends on the number of bacteria and not a higher activity of enzymes.