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# A METHODOLOGY FOR THE CHARACTERIZATION OF VOLATILE AND AROMATIC PROFILE OF DRY SOURDOUGH AND THEIR RELATED BREAD

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## Objectives

Apply different analytical and sensorial techniques in order to understand the volatiles composition and the consequences on the aromatic profile of dry-sourdough (DSD) and the corresponding dry-sourdough-bread (DSD-bread).

### Process of dry-sourdough and methods applied

Liquid sourdough



Drum drying

Dry Sourdough

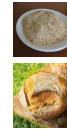


Bread-making process

DSD-Bread



Methods used :



- Volatiles compounds analysis : GC-MS/FID
- Volatiles odor analysis : GC-Olfactometry
- Sensorial characterization : Odor profile

## Materials and Methods

## Results and Discussion

### Volatile compounds analysis : Extraction by HS-SPME and analysis by GC-MS/FID

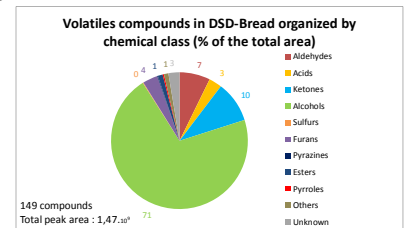
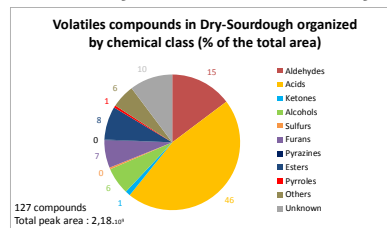
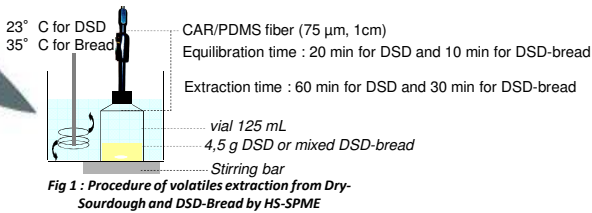
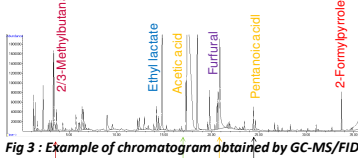


Fig 4 : Volatiles compounds repartition (in % of the total area) by chemical classes in DSD (left) and the corresponding DSD-bread (right)

There is high differences in DSD and DSD-bread volatiles chemical class repartition. The DSD-bread is characterized by a major part of **alcohols** issue of the yeast fermentation, and the DSD is characterized by a major part of **acids** which are evaporated during bakery. The DSD volatiles composition is more equilibrated for an higher total area but less compounds than the DSD-bread.



### Odorant compounds analysis : Analysis by GC-Olfactometry

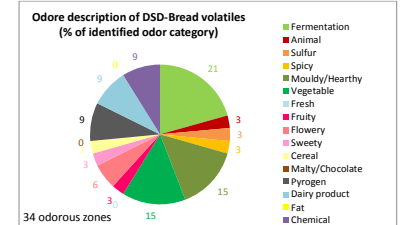
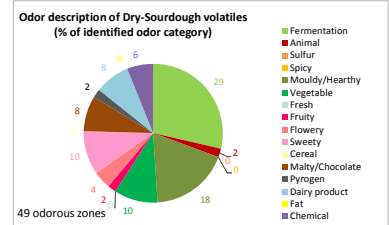
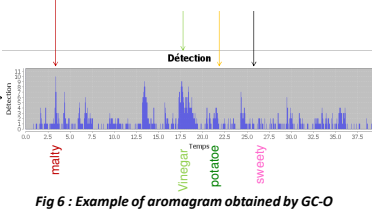


Fig 7 : Repartition of the volatiles odor by wheel-odor category (in % of the total odor) in DSD (left) and the corresponding DSD-bread (right)

The GC-O sessions highlight more odorous zone for DSD than DSD-Bread. There is some **similarity** between DSD and DSD-bread, as the score of "animal, mould/hearthly, flowery and fruity", but also some **differences** as the DSD seems to be more "fermentative", more "sweet" and more "malty" than the DSD-bread which presents a more **diversified profile**.

By comparison of the chromatogram with the aromagram, it's possible to associate an odor with a volatile compound :  
3-Methylbutanal → malty ; Hexanal → green ; Acetic acid → vinegari ; Furfural → Potate ; Pentanoic acid → sweety...

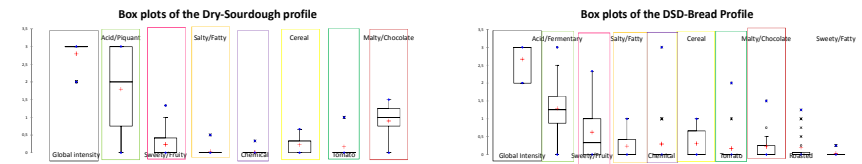
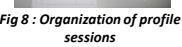
### Sensorial characterization by odor-profile

#### Panel formation

12 judges trained to the identification of odors and the use of 4 points intensity scale (0: none, 1: low, 2: medium, 3: strong).  
Analysis of DSD and the corresponding DSD-bread.  
For the study of DSD-bread odor, the crumb and the crust were separately evaluated.

#### Profile training and sessions

3 sessions of odor-description generation.  
5 training session for the DSD and the DSD-bread.  
3 profile sessions for DSD and DSD-bread.



The profile sessions point out that - as for the GC-O session - there is some **similarities** between DSD and DSD-bread crumb odors and some **differences**. Indeed they present the same global intensity, "sweet" and "salty/fat" score but the DSD odor is more "acidic/fermentative" and more "malty" than the DSD-bread odor which is more complex.

## Comparison analytical & sensorial results

Combine different type of analyses permit to obtain a stronger understanding of product aromatical characteristics.

Differences in volatiles composition imply sensorial differences. We can notice that the differences in the malty and fermentative odors mentioned in the profile are also found in the GC-O results. But the contrary is also true so there is **not a linear correlation** between the product odor profile and the volatiles odors. That could be explain by the interaction phenomenon between volatiles and by the matrix effect. This methodology combined analytical and sensorial results in order to understand the odor formation during the sourdough and bakery process.