



## Feeding Fats Safety



### FEEDING FATS SAFETY

#### One-Year Meeting

9-10 February 2006 - Barcelona

WP-1: Characterization and classification of feeding fats  
(preliminary results)

### Proposal for a classification system of fat feedstocks

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The classification of a fat substance to  
be used for feeding purposes means:

- ☞ *Identifying properly the material*
- ☞ *Knowledge of potential problems related to it*
- ☞ *Select the suitable analytical strategy*
- ☞ *Attribution of the correct commercial value*





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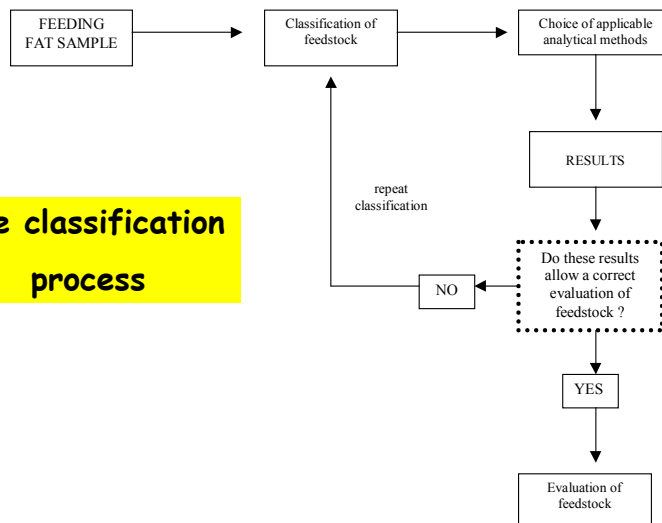
### *HISTORICAL EXAMPLES OF MISUNDERSTANDINGS*

- ✘ Processing calcium soaps as a solid fat
- ✘ Evaluating mono and diglycerides mixtures as common fats frying oils



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### The classification process





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### Background

- ✧ experiences using NIR
- ✧ literature papers (identification of vegetable oils, assessment of their purity)

### Choice

- ✧ FT-IR
- ✧ no algorithms, direct evaluation of absorption bands



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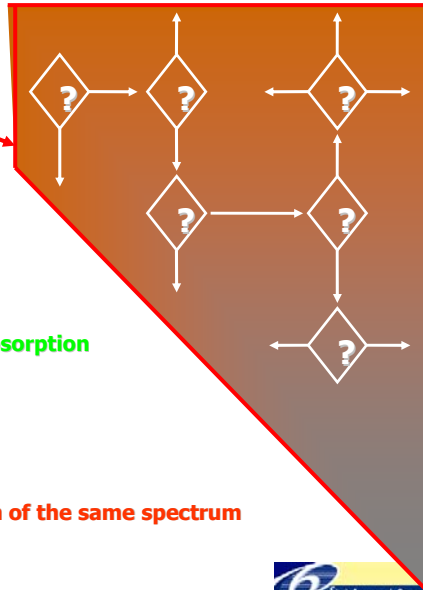
### ADVANTAGES

- simple technique and when used for the scope of this work, it does not require trained technicians;
- Only few minutes to record one spectrum and to read it;
- Easily available in several laboratories;
- No chemicals, non-destructive technique;
- Computed-aided identification is possible, numerous software applications available on the market;
- The FT-IR spectra can also be recorded using an optic fibre connected sensor, allowing the identification of material directly on the truck or in drums



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Principle of **DECISIONAL TREE**

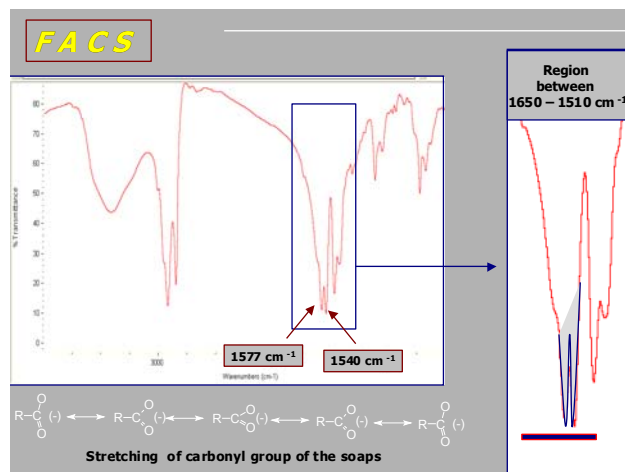


According to the different classes of compounds  
the ***classification criteria*** could be:

- ✓ The identification of a specific pattern of absorption (fingerprint)
- ✓ Presence/absence of specific band
- ✓ The ratio between two different absorption of the same spectrum

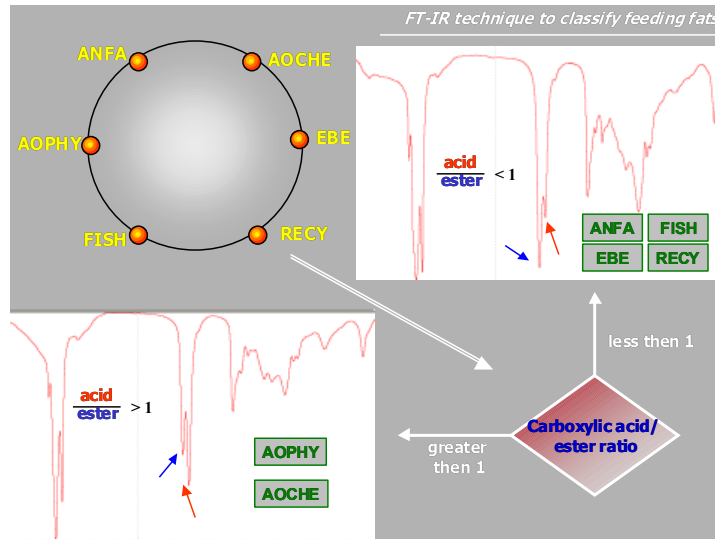


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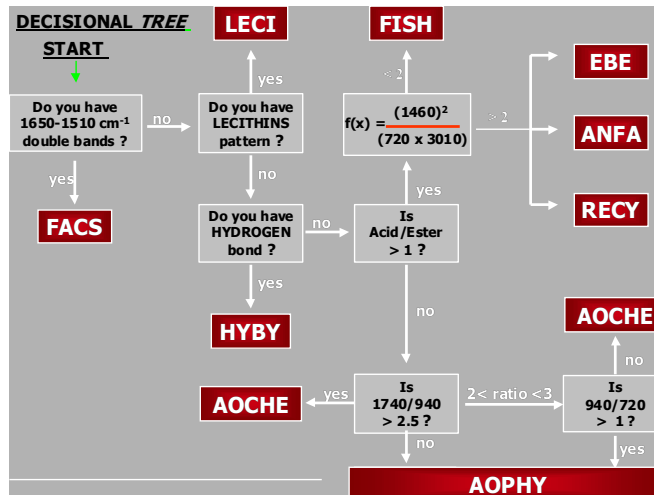
*Relationship between FT-IR absorption and functional groups*

Wavenumber	Functional group
720	Chain length (when length is > 4 carbon atoms)
940	-OH moiety of carboxylic acid
1460	Chain length (general)
1711	C=O moiety of carboxylic acid
1741	C=O moiety of esters
3011	Olefinic groups



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### THE DECISIONAL TREE



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### RESULTS

- ⇒ 118 Samples out of 124 fit with the proposed model
- ⇒ ANFA, EBE and REC samples cannot be discriminated using this model
- ⇒ Additional test for these three classes: polymer content



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*The related paper was  
submitted in August 2006 for  
publication on*

*European Journal of  
Lipid Science and  
Technology*